



# **Canadian Perspectives on Initial Teacher Environmental Education Praxis**

**Douglas D. Karrow, Maurice DiGiuseppe, Paul Elliott,  
Yovita Gwekwerere, Hilary Inwood  
Editors**



*Canadian Perspectives on Initial  
Teacher Environmental Education  
Praxis*

*Edited by*

**Douglas D. Karrow, Maurice DiGiuseppe, Paul Elliott,  
Yovita Gwekwerere, and Hilary Inwood**

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The editors dedicate this book volume to faculty instructors, initial teachers, and their students who strive to connect with the natural world in a way that makes it better for us as human beings, non-human beings, and the Earth.

As David Orr, once said, “All Education is Environmental Education.” We hope this modest contribution to the Canadian Association for Teacher Education reaffirms this.



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## Acknowledgements

Two years ago, we embarked on a mission to profile Canadian faculties of education and the work they are doing in initial teacher Environmental Education. This volume features some of the exemplary work we have received and included in our book. We are inspired by the diversity and depth of experiences initial teacher educators across the country have discussed in their chapters. It is obvious that there is a strong, passionate, and determined group of initial teacher educators throughout Canada who are concerned about the status of the Earth and the important role the education of future teachers plays in advancing the goals of Environmental Education. A project such as this could not be completed without the assistance of many highly motivated and dedicated individuals and groups.

We would like to extend our gratitude to the Canadian Association for Teacher Education (CATE) for agreeing to publish our volume and to include it in their Polygraph Series, *Canadian Research in Teacher Education*. The editorial board consisted of five faculty members from a variety of faculties of education in southern Ontario. I would like to personally thank the members of the editorial board—Dr. Maurice DiGiuseppe, University of the Ontario Institute for Technology; Dr. Paul Elliott, Trent University; Dr. Hilary Inwood, Ontario Institute for Studies in Education of the University of Toronto; and Dr. Yovita Gwekwerere, Laurentian University—for their enduring and efficient commitment to the project from start to finish. In particular, my co-editor, Dr. Maurice DiGiuseppe, who provided invaluable conceptual input during initial discussions of the book volume, practical advice during its inception, and keen editorial feedback during various iterations of the review process. As well, we thank our contributing authors for their commitment to the project, ensuring the standards, conventions, and requirements of communicating their experiences with Environmental Education praxis were of the highest quality. More importantly, we appreciate the expertise, knowledge, wisdom, and experience they bring to the task of educating a future generation of teachers confronted with the great social and environmental challenges of our times. As David Orr once said, “All education is Environmental Education.” You convey this beautifully through your praxis.

In closing, we would also like to thank our translator, Ginette Bromhead, for the efficient and thorough translation of the chapter abstracts from English to French, and copy-editor, Kathryn Allen, for her superb and final editing of the volume. Of course, none of this would be possible without financial contributions from Brock University, Trent University, the Symon's Trust Fund for Canadian Studies, and TD Friends of the Environment.

Douglas D. Karrow

October 7, 2016

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## **Chapter 1**

### **Introduction to Canadian Perspectives on Initial Teacher Environmental Education Praxis**

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### Abstract

This first chapter of the volume is divided into six parts. *Part One: Impetus Behind the Volume* describes the events culminating in our decision to publish this book; restates the importance of initial teacher Environmental Education (IT-EE) as a response to the social, economic, and environmental challenges we face on global and local scales; and explains our use of the term Environmental Education (EE). *Part Two: Status of Canadian Initial Teacher Environmental Education* outlines why, and how, a pan-Canadian perspective on IT-EE informs our work and may help us achieve our goals. *Part Three: Enhancing the Conversation, Orienting Questions* briefly describes the volume's call for proposals and orienting questions. *Part Four: Overview of the Chapters* briefly discusses the term "praxis" in relation to the volume's chapters and provides a synopsis of each chapter. *Part Five: Approaches to Reading the Volume* suggests several ways to read the volume (e.g., sequentially or according to interest), and acknowledges present and absent voices. Finally, *Part Six: The Future of Canadian Initial Teacher Environmental Education*, identifies the diversity of IT-EE across provinces; discusses ongoing challenges and possible solutions; anticipates future work by posing additional questions; and identifies future research and program priorities.

*Keywords:* initial teacher, preservice teacher, environmental education, initial teacher environmental education, pan-Canadian.



### Abstrait

Ce premier chapitre du volume est divisé en 6 parties. Partie un: *Impetus behind the Volume* décrit les événements culminants dans notre prise de décision afin de publier ce livre; réaffirme l'importance de IT-EE en réaction des défis sociaux, économiques et écologiques sont à la fois mondiaux et locaux; et explique la façon dont on utilise ce terme qui va refléter l'éducation de l'environnement. (EE). Partie Deux : *Status of Canadian Initial Teacher Environmental Education* précise pourquoi, et comment, une perspective pan-canadienne sur le IT-EE motive notre travail et nous aide à réaliser nos objectifs. Partie trois: *Enhancing the Conversation: Orienting Questions* décrit brièvement les nouvelles propositions et orientent les questions. Partie quatre: *Overview of the Chapters*, examine brièvement le terme “praxis” en relation aux chapitres du volume et fournit un sommaire de chaque chapitre. Partie cinq: *Approaches to Reading the Volume* suggère plusieurs façons de lire le volume (e.g., en séquence ou en fonction des intérêts), et qui tient compte des voix présentes et absentes. Finalement, Partie six: *The Future of Canadian Initial Teacher Environmental Education*, certains points communs et ces différences entre provinces; examine les défis persistants et des solutions possibles tout en anticipant le travail de l'avenir en posant des questions additionnelles; et en définissant les priorités des recherches futures en matière du programme.

*Mots clés*: la formation initiale des enseignants, le personnel enseignant en formation, l'éducation de l'environnement, la formation initiale de l'éducation de l'environnement, l'aspect pan-canadien.

## Introduction to Canadian Perspectives on Initial Teacher Environmental Education Praxis

For those committed to the goal of enhancing initial teacher Environmental Education (IT-EE) in Canadian faculties of education, this volume is a milestone. Its express purpose is to raise the profile of IT-EE research in the Canadian context. This first chapter of the volume is divided into six parts. *Part One: Impetus Behind the Volume* describes the events culminating in our decision to publish this book, restates the importance of IT-EE as a response to the social, economic, and environmental challenges we face on global and local scales, and explains our use of the term Environmental Education (EE). *Part Two: Status of Canadian Initial Teacher Environmental Education* outlines why, and how, a pan-Canadian perspective on IT-EE informs our work and may help us achieve our goals. *Part Three: Enhancing the Conversation, Orienting Questions* briefly describes the volume's call for proposals and orienting questions. *Part Four: Overview of the Chapters* discusses the term “praxis” in relation to the volume's chapters and provides a synopsis of each chapter. *Part Five: Approaches to Reading the Volume* suggests several ways to read the volume (e.g., sequentially or according to interest) and acknowledges present and absent voices. Finally, *Part Six: The Future of Canadian Initial Teacher Environmental Education*, identifies some commonalities and differences across provinces, discusses ongoing challenges and possible solutions, anticipates future work by posing additional questions, and identifies future research and program priorities.

### Part One: Impetus Behind the Volume

The impetus for this volume is derived from two events. The first was a provincial roundtable hosted by Dr. Hilary Inwood of the Ontario Institute for Studies in Education of the University of Toronto (OISE/UT) in the spring of 2013. This event brought together IT educators from across the province of Ontario to examine and assess the current state of EE in Ontario's Faculties of Education. One of the outcomes of that roundtable was the publication of *DEEPER: Deepening Environmental Education in Pre-Service Education Resource* (Inwood & Jagger, 2014), a resource guide designed to support IT faculty members in their efforts to educate Ontario's future teachers *in, about, and for* EE (Ontario Ministry of Education [OME], 2009). The second event, which evolved from the roundtable, was a developing collaboration among four southern Ontario faculties of education and their respective EE scholars and leaders: Dr.

Douglas D. Karrow, Brock University; Dr. Maurice DiGiuseppe, The University of the Ontario Institute for Technology; Dr. Paul Elliott, Trent University; and Dr. Hilary Inwood, OISE/UT. Our informal consortium has built on the work begun at the provincial roundtable, which includes: the broad dissemination of the DEEPER Guide in Ontario and other Canadian provinces; conceptualizing IT-EE praxis; identifying, articulating, and advocating for IT-EE competencies; and championing the establishment of a national body of scholars who are committed to the task of raising the profile and status of IT-EE in Ontario, Canada, and throughout the rest of the world.

In June 2016, our group hosted the National Roundtable 2016: Enhancing Environmental and Sustainability Education in Canadian Faculties of Education, which was the first gathering of environmental educators from across Canada to centre exclusively on issues pertaining to IT-EE in the Canadian context. Research studies that focus on the creation of new interdisciplinary fields (Dinnerstein, O'Donnell, & MacCorquodale, 1981), including EE, consistently advocate for the establishment of a national community of scholars (i.e., a “working group”) unified in articulating a common identity, mission, and set of priority objectives. Our contribution to the CATE Polygraph Series through this volume, *Canadian Perspectives on Initial Teacher Environmental Education Praxis*, represents a significant step toward realizing this goal.

Given the most recent reports of the Worldwatch Institute's *Vital Signs, Global Trends that Shape our Future* (Worldwatch Institute, n.d.) and the *Yearbook of the United Nations* (United Nations, 2015), there is much that we, as environmental educators, should be concerned about. War, inequality, discrimination, human rights violations, infringements on Indigenous rights, resource depletion, climate change, biodiversity loss, habitat destruction, and environmental pollution pose profound challenges. Responding to the severity of these and other problems affecting people and the planet, the United Nations Educational, Scientific, and Cultural Organization (UNESCO), during its “Decade for Sustainable Education 2005-2014,” called for a reorientation of teacher education to address sustainability (McKeown & Hopkins, 2005). Our group's ongoing attempts to reach out to IT-EE educators across practices—their *praxis*—demonstrates our resolve in acknowledging the significance of these global challenges for the education system by enhancing EE in initial teacher education. In the words of Ed Groark, chair of the Worldwatch Institute, “Our population is growing and our lifestyles are expanding, but we've passed the point where business as usual will leave a world fit for our

grandchildren” (WorldWatch Institute, 2015, p. 5). As IT-EE educators and researchers, we are called to do all we can to ensure the health and well-being of Earth and its human and more-than-human inhabitants.

This volume squarely focuses on IT-EE in the Canadian context. In terms of nomenclature, we realized that the focus of the volume could be described using various terms and abbreviations, including Environmental Education (EE), Education for Sustainable Development (ESD), Environmental Sustainability Education (ESE), and Place-based Education (PBE). We have chosen to use EE because it is a general term that encompasses a broad range of environmental teaching, learning, and research.

## **Part Two: Status of Canadian Initial Teacher Environmental Education**

Since education is a provincial/territorial responsibility in Canada, a number of bodies in each jurisdiction share the administration of education, including faculties of education, ministries of education, ministries of colleges and universities, teachers’ federations, teaching regulatory bodies (e.g., college of teachers), and local school boards. As such, it is difficult to ascertain the current “status” of any aspect of education on a pan-Canadian basis. This includes Canadian IT-EE, though any discussion of IT-EE necessarily entails consideration of the Kindergarten-to-Grade 12 (K-12) education system. In each provincial/territorial jurisdiction, therefore, these various bodies work collectively to provide for the needs of that province’s/territory’s K-12 system. Though there are many similarities among these systems, there are also many significant differences, including variations in the provision of EE and IT-EE. This diversity of provision provides rich opportunities for inter-provincial/territorial exploration and learning.

Research on EE in Canadian faculties of education is “limited, but growing” (Inwood, & Jagger, 2014, p. 15). In this volume, we make a modest effort to bring together a representative sample of this research. Surveys at the national level by Rioux (1973), Towler (1981), and Lin (2002) provided baselines demonstrating that little had changed in Canadian preservice teacher education programs between the early 1970s and 1998. These surveys demonstrated that while EE has been widely acknowledged as being important, its presence in preservice teacher education programs has remained limited (Inwood & Jagger, 2014). In 2012, the Council of Ministers of Education, Canada (CMEC) completed a study exploring the inclusion of ESD in

preservice programs in Canada (CMEC, 2012). Despite its hopeful finding, that “modest but promising progress toward reorienting teacher education to address education for sustainable development” (CMEC, 2012, p. 3) was occurring in faculties of education, the Council provided support for the need for faculties and ministries of education to reflect on their relationship, and work together to strengthen ESD in preservice teacher education programs (Inwood & Jagger, 2014).

### **Part Three: Enhancing the Conversation, Orienting Questions**

Following our decision in the spring of 2014 to produce a book volume in CATE’s *Research in Canadian Teacher Education* series, we distributed the following “call” to faculties of education and academic associations across Canada:

Given the end of UNESCO’s *Decade of Education for Sustainable Development* declaration, it is an appropriate time to take stock of the research and practice of initial teacher environmental education. We are particularly interested in developing a pan-Canadian perspective (provinces and territories). We hope to represent the practices, views, and perspectives of all of Canada’s regions— Western, Northern, Central, and Eastern. In particular, we are interested in initial teacher environmental education praxis—how theory influences practice and practice influences theory. This theory-practice dialectic characterizes the scholarship of teaching (Bowyer, 1990) and is consistent with the theme of the Polygraph series.

In addition, we provided the following four “orienting questions” to help potential contributors think about and contextualize their prospective chapters:

1. What is the environmental education policy context within your provincial/territorial jurisdiction?
2. How has provincial/territorial environmental education policy been interpreted and implemented within initial teacher education?
3. What particular current(s) of environmental education (Sauvé, 2005) are emphasized within your program?
4. What challenges (if any) has your institution experienced in your jurisdiction regarding the implementation of your initial teacher environmental education

program, and how have these challenges been overcome through unique/creative curricular and/or pedagogical approaches?

As a result, we were pleased by the number and variety of proposals received. Following blind peer review, a total of seven chapters were accepted for inclusion in the volume (not including this chapter). Each of these chapters is summarized briefly in the next section.

## **Part Four: Overview of Chapters**

### **Pan-Canadian Perspective**

The seven topical chapters in this volume originate from provinces across Canada, including Nova Scotia (Cape Breton University), Ontario (University of the Ontario Institute of Technology, Nipissing University, Trent University, York University, Laurentian University), Manitoba (University of Winnipeg, Université de Saint-Boniface, Brandon University), and British Columbia (University of British Columbia). The approaches to IT-EE praxis represented in the volume are varied and eclectic—this breadth is not surprising given the manner in which EE has been taken up by provincial/territorial education authorities and the manner in which researchers and practitioners interpret the meaning of “praxis.”

### **Initial Teacher Environmental Education Praxis**

The word “praxis” derives from the ancient Greek word stem *prattein*, which means “to do or to act” (Oxford University, 1971, p. 2267). In our original call to authors, we defined praxis as “theory-informed practice; and practice-informed theory.” After reviewing our submissions, we were able to elaborate on the meaning of praxis as the actions and behaviours we engage in *as* humans, which are *directed* toward other humans and more-than-humans. This definition is not unlike Gadamer’s (1979) characterization of the continual interplay between thought and action involving interpretation, understanding, and application as one “unified process” (p. 275). Cases depicting this form and understanding of “praxis” are creatively presented throughout the various chapters of this volume.

### **Book Organization, Chapter Contributors, and Summaries**

The seven topical chapters in this volume are clustered according to originating province as follows: Chapter 2 (Nova Scotia); Chapters 3, 4, and 5 (Ontario); Chapters 6 and 7 (Manitoba); and Chapter 8 (British Columbia). The following section provides a synopsis of each chapter.



*Chapter 2: Revisioning Teacher Education for Sustainability in Atlantic Canada (Nova Scotia).* Dr. Patrick Howard of Cape Breton University (CBU), Nova Scotia (NS), provides a brief history of the province's initiatives to educate for sustainability. He then describes an innovative program in the Faculty of Education at CBU in which an initial teacher sustainability education program was founded on principles of the *relational*, drawing on Nell Noddings' work on "care," Max van Manen's interpretation of the "pedagogic relation," and Catherine O'Brien's concept of "sustainable happiness." Howard describes a faculty-wide praxis of "dialogue and reflection" as the first precondition for fostering skills, knowledge, attitudes, and beliefs in preservice teachers for teaching the values of sustainable development.

*Chapter 3: Worldviews and Preservice Teachers' Beliefs about Nature and Environmental Education: A Case for Socially and Culturally Critical Science Teacher Education (Ontario).* Author Darren Hoeg of the Ontario Institute for Studies in Education of the University of Toronto (OISE-UT) and Sarah Barrett of York University demonstrate how an empirical, mixed methods intervention, in which secondary school science students were given an opportunity to describe their environmental perceptions and beliefs, led to an increase in these students' pro-environmental perceptions with respect to environmental preservation. However, since EE was being learned in the context of school science, a number of commonly held Western assumptions (e.g., individualism, anthropocentrism, and consumerism) were found to complicate such interventionist strategies. These authors' critical praxis revealed that until these assumptions are identified in advance, school science will remain a site of cultural reproduction instead of acting as a site of critical environmental reflection, resistance, and advancement.

*Chapter 4: Evaluating the Effectiveness of an Innovative Environmental Education Course for Concurrent Education Majors and Non-Education Majors (Ontario).* Yovita Gwekwerere of Laurentian University shares with us a self-study focused on an undergraduate EE course that was designed to meet the needs of ITE majors and non-education majors in her faculty. Employing a survey research design and a praxis involving self-examination and reflection, Dr. Gwekwerere assessed the course's effectiveness, identified areas for improvement, and concluded that such a course has the power to positively change and enhance students' environmental behaviours and sustainable life choices.

*Chapter 5: Rising to the Challenge: Strategies and Tensions in Addressing Environmental Education in Three Ontario Faculties of Education (Ontario).* Maurice

DiGiuseppe and Sheila Rhodes of the University of Ontario Institute for Technology (UOIT), Paul Elliot and Sheliza Ibrahim Khan of Trent University (TU), and Astrid Steele and Jeff Scott of Nipissing University (NU) describe efforts made and tensions felt as their faculties of education address IT-EE. Recognizing the critical role faculties of education play in the preparation of initial teachers and in their graduates' eventual contributions to the EE of children in K-12 schools, the authors pose the question: "How can a faculty of education effectively prepare teachers to embed studies *in, about, and for* the environment in their teaching practice?" They answer this question through three narratives, discussing and analyzing the similarities and differences in each respective praxis.

*Chapter 6: Contextualizing Education for Sustainability and Teacher Education in Manitoba Faculties of Education (Manitoba).* Lee Anne Block of the University of Winnipeg, Laura Sims of l'Université de Saint-Boniface, and Chris Beeman of Brandon University recognize that unique values and practices are essential for initial teachers to sustainably educate their K-12 students. Through narratives of teaching, the authors describe distinct pedagogies that recognize diversity of IT perspectives while being oriented toward inquiry, problem-solving, and systems thinking. Their praxis of collaboration reveals the importance of context (place) in pedagogy and allows for an examination of the strains between intention and action.

*Chapter 7: Developing Competencies for Education for Sustainable Development: A Case Study of Canadian Faculties of Education (Manitoba).* Laura Sims of l'Université de Saint-Boniface and Thomas Falkenberg of the University of Manitoba summarize the results of a research project that surveyed competencies for education about sustainable development at four Canadian faculties of education. Using a qualitative case study research design and a praxis of empiricism to guide their work, they identified promising initiatives in IT-EE as well as the challenges and enablers of reorienting teacher education toward sustainability in each institute.

*Chapter 8: Learning to Teach Environmental Education: Exploring the Landscape of the Academy (British Columbia).* In this last chapter, Julia Ostertag, Susan Gerofsky, and Sandra Scott of the University of British Columbia (UBC) describe ways in which EE continues to remain on the margins of a university's self-proclaiming goals of sustainability. Using the metaphor of "gardening at the margins," these authors explore—through research findings and autobiographical narratives—those pedagogical places and practices essential to IT-EE. These authors' collective praxis of "gardening at the margins" highlights the joys and ongoing

challenges of IT-EE in the UBC context.

## **Part Five: Approaches to Reading the Volume**

### **Reading Order**

Given that this CATE volume includes works from across Canada, readers may choose to read the chapters sequentially (provincially), according to topics of interest, or in no particular order. Given our premise of drawing attention to IT-EE across Canada—from programming and research standpoints—we encourage a sequential reading. In addition to the topic of IT-EE, readers may be also interested in how praxis has been conceptualized, interpreted, and applied by the various contributing authors. As well, readers may be more interested in one methodological approach over another as the contributing authors demonstrate a variety of methodologies and research designs: qualitative (e.g., conceptual, interview, narrative, autobiographical narrative, self-study, and case study), quantitative (e.g., survey), and mixed methods (e.g., interviews and surveys).

### **Present/Absent Voices**

While our objective was to garner submissions from across Canada, we were only partly successful. We include perspectives from British Columbia, Manitoba, Ontario, and Nova Scotia, but we are missing geographical voices from Alberta, Saskatchewan, Quebec, New Brunswick, Prince Edward Island, Newfoundland, Yukon, Nunavut, and Northwest Territories. Despite our efforts, we were unable to obtain submissions from these provinces and territories. We can only speculate as to why these absences exist. It is possible that the use of the term “environmental education” may have alienated some potential authors, that there is lack of EE research in various jurisdictions, or that there are time and motivation barriers in writing and publishing in this field. Regardless of these absent voices, we believe that the volume adequately represents IT-EE praxis in Canada at this time.<sup>1</sup> The contributors to this book are diverse in academic background: professors, associate professors, assistant professors, itinerant instructors/lecturers, recent doctoral graduates, and doctoral candidates. Educators teaching and conducting research in large urban centres and in smaller, more rural settings are represented, as well as those practitioners who play a role in curriculum and policy development.

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<sup>1</sup> The aim of the volume was to seek geographical representation of Canada. The editors recognize there may be other minority voices that are also under-represented.

### **Part Six: The Future of Canadian Initial Teacher Environmental Education**

Canadian IT-EE has come a long way since Rioux (1973), Towler (1981), and Lin (2002) conducted Canada-wide surveys assessing the status of IT-EE in Canadian colleges and faculties of education. In his report, Rioux (1973) indicated that only six of the 41 colleges and faculties of education in Canada at the time offered any form of EE for its preservice teachers. Almost a decade later, reporting on the results of his nation-wide survey, Towler (1981) noted that so few Canadian faculties of education provided EE programming that a “neutral if not a negative attitude towards the subject and its importance” (p. 15) was likely at play. When Lin (2002) conducted a similar Canada-wide survey in 1996, they concluded:

Environmental education in Canada has not progressed greatly in the last two decades. . . . Over 65% of teacher training institutions surveyed do not offer either environmental education courses and/or specialization programs for environmental education. . . . Environmental education continues to be a low priority in K-12 schools and teacher preparation programs. (p. 211-212)

Now, two decades after Lin’s 1996 survey, what can be said about the state of IT-EE today? With the exception of a large-scale study conducted by CMEC (2012), a comprehensive survey similar to those of Rioux (1973), Towler (1981), and Lin (2002) has not been conducted recently. In this volume, we have included a series of chapters conveying an interesting and diverse assortment of EE frameworks, courses, programs, approaches, and activities currently offered at faculties of education across Canada with the aim to address this gap. Through these chapters, the reader will be introduced to personalities who are currently active in passionately promoting and enhancing IT-EE praxis and research within their own institutions and beyond.

#### **The Diversity of IT-EE**

Given the diversity of the field, there are notable similarities and differences in the authors’ IT-EE views, experiences, approaches, and methodologies. Faculties of education set in rural locations, for instance, may have easy access to lush natural areas for study and research, while faculties in larger urban centres may lack such natural resources and be more amenable to studying the effects of the built environment on environmental health and sustainability. Also, faculties in certain provinces or regions may have greater/better access to socio-cultural resources, including noted environmentalists, environmental protection organizations, and First Nations, Métis, and Inuit scholars and elders. In terms of EE-IT programming, some faculties are

located in universities that have already made solid commitments to environmental sustainability and effective IT-EE programming, while others may still be sidelining EE and IT-EE by only giving lip service to plans for enhancement and improvement. It is in these latter faculties where some of the true “champions” of the IT-EE enhancement movement are at work, striving to lead the way to more effective IT-EE in the future. Despite policy frameworks that tend to marginalize the provision of IT-EE, there continues to be an amazing variety of hopeful IT-EE praxis in faculties of education across Canada.

### **Challenges and Solutions**

It is important to note that researchers and educators face a variety of challenges in their efforts to enhance IT-EE programming in their jurisdictions. In some cases, these may involve inadequate funding for IT-EE research and/or courseware. In other cases, IT-EE educators/researchers may find it difficult to convince their peers and administrators of the value and essential nature of IT-EE and of the need for EE to become an essential—even compulsory—component of all preservice programs in Canada. There also remains the significant challenge of convincing relevant government representatives that K-12 and IT curriculum and program policies fall short and urgently require overhaul to include meaningful IT-EE.

There is, of course, no simple panacea for the problems associated with IT-EE programming in Canada’s faculties of education, especially given the provincial-territorial jurisdictional divide. Provinces and territories will have to chart their own course while ensuring that they are collaborating, communicating, and learning from each other. This volume is a first step in this direction, providing chapters that discuss IT-EE praxis across Canada and that address its unique challenges and possible solutions.

### **Future Work: Outstanding Questions, Research Priorities, Policy Priorities**

The chapters in this volume raise a number of critical questions regarding the future development of IT-EE in Canada: What is the current status of IT-EE in Canada? Should EE be compulsory for all preservice teachers? What is the best way to provide IT-EE in preservice programs? Should there be dedicated EE courses in all preservice and K-12 programs in Canada, and should these courses be compulsory or elective? What are some current IT-EE research priorities? These (and others still to be asked) questions suggest for us a variety of possible research and policy directions. For example, it seems reasonable that a survey-based study

similar to those of Rioux (1973), Towler (1981), and Lin (2002) should be conducted in the near future to assess the current status of IT-EE in Canada. Furthermore, research into the effectiveness of the EE infusion model currently in use in some of Canada's K-12 jurisdictions (e.g., Ontario) should be conducted to determine whether this approach should be continued or replaced with a more effective alternative. Also, studies focused on the benefits and challenges inherent in compulsory IT-EE courses would help determine the extent to which compulsory IT-EE may or may not be of benefit as IT-EE development occurs.

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## **Chapter 2**

### **Re-visioning Teacher Education for Sustainability in Atlantic Canada (Nova Scotia)**

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### Abstract

This chapter will provide a brief historical overview of initiatives to educate for sustainability in the province of Nova Scotia. The central premise of this chapter is that teaching for the values of sustainability cannot simply be teaching “about” sustainability; it must be about teaching and learning that is, at its heart, *relational*. The institutions responsible for teacher education are central to any effort to educate for a sustainable future. This chapter describes the efforts and challenges resulting from one Nova Scotia teacher education institution’s commitment to reorient teacher education for sustainability. Reorienting a teacher education program requires time for faculty and staff to explore and theorize relationships and issues among social, economic, and environmental dimensions of sustainable development. Through dialogue and reflection, it was determined that efforts to foster the requisite skills, knowledge, attitudes, and beliefs in preservice teachers to teach for the values of sustainable development must be firmly grounded in the relational. Nell Noddings’ care theory, Max van Manen’s interpretation of the pedagogic relation, and Catherine O’Brien’s concept of sustainable happiness offer teacher educators and teacher education institutions a deeper understanding of how to structure learning opportunities and reorient curricula to foster the values of sustainability in preservice teacher education.

*Keywords:* preservice teacher education, sustainability education, care theory, pedagogic relationality, sustainable happiness

### Abstrait

Ce chapitre servira à démontrer un aperçu de l'historique des initiatives qui vise à l'enseignement de la viabilité dans la province de la Nouvelle Écosse. Cependant, le point essentiel de ce chapitre est que l'enseignement pour les valeurs de la viabilité ne puissent pas être tout simplement "au sujet" de la viabilité. On devrait se concentrer sur l'apprentissage et l'enseignement au coeur de ce qui est relié. Les institutions responsables pour la formation des enseignants est essentielle visant à l'effort d'éduquer pour un avenir viable. Ce chapitre décrit les résultats des efforts et des défis face à l'engagement de la réorientation à la viabilité d'une institution en Nouvelle Écosse. Afin d'orienter le programme de formation d'éducation, nul doute que celle-ci requiert du temps pour le corps professoral et le personnel enseignant qui peut explorer et mettre en relation les dimensions sociales, économiques et environnementales pour un développement durable. C'est avec l'aide du dialogue et de la réflexion qu'on a déterminé les efforts qui facilitent les compétences requises, les connaissances, les attitudes et les croyances des étudiants à la faculté pour les valeurs du développement viable. Celle-ci doit reposer fortement sur des critères relationnelles. La théorie des soins de Nell Noddings, l'interprétation pédagogiques de relation de Max van Manen et le concept de bonheur durable de Catherine O'Brien offrent une meilleure connaissance. Cette compréhension approfondie nous aide à structurer une formation et réorienter le curriculum afin de favoriser les valeurs durables aux enseignants aux étudiants des institutions d'éducation.

*Mots clés:* les étudiants à la faculté d'éducation, la viabilité d'éducation, la théorie du souci, la relationalité, la pédagogie relative, le bonheur durable

## Re-visioning Teacher Education for Sustainability in Atlantic Canada

Atlantic Canada has been shaped by a tenuous relationship with the living landscape. From the destruction of the largest living biomass on the planet—the northern cod off Newfoundland and Labrador—to the social upheaval resulting from generations of unsustainable, exploitative, extractive industrial practices in Nova Scotia and New Brunswick, the region struggles to find a sustainable way forward in the 21st century. This chapter will provide a brief historical overview of initiatives to educate for sustainability in the province of Nova Scotia. The central premise of this chapter, however, is that teaching for the values of sustainability cannot simply be teaching “about” sustainability; it must be about teaching and learning that is, at its heart, *relational*. Teacher education, specifically, institutions responsible for teacher education, is central to any effort to educate for a sustainable future. While there have been efforts to reorient teacher education for the values of sustainability (Hopkins & McKeown, 2005), such efforts will only be successful if there is a clear understanding of how people best learn such values. The chapter will describe the efforts and challenges resulting from one Nova Scotia teacher education institution’s commitment to reorient teacher education for sustainability. It explores the ways in which Noddings’ care theory (Noddings, 1984, 2002), van Manen’s interpretation of the pedagogic relation (van Manen, 1991, 2002), and O’Brien’s concept of sustainable happiness (O’Brien, 2012, 2013) offer teacher educators a deeper understanding of how to structure learning opportunities to foster the values of sustainability in preservice teacher education.

Canada has played a significant role in education for sustainable development since international efforts were launched after the publication Gro Harlem Brundtland’s watershed report in 1987. Canada was present in the planning meetings that would lead to the Earth Summit in 1992 and, a few months after the Rio Summit, Canada then hosted the first international Education for Sustainable Development (ESD) conference in the world (Hopkins, 2013a). In the early 1990s, as governments were becoming involved in sustainable development, NGOs were also organizing. In Canada, the group Learning for a Sustainable Future (LSF) was launched nationally. LSF was designed as a joint initiative to bring together the private sector and federal and provincial governments with supporters of ESD.

In 2004, the UN declared 2005-2014 the UN Decade of Education for Sustainable Development (DESD). In 2005, at a meeting of high-ranking education and environment ministers, held in Vilnius, Lithuania, Canada gave its support for the DESD. The goal of the Vilnius meeting was to set out strategies that included objectives to: (a) equip educators with the competencies to include ESD in their teaching; (b) ensure that adequate tools and resources for ESD are accessible; and (c) strengthen cooperation on ESD at all levels. In 2009, the Council of Canadian Ministers of Education, Canada attended the UNESCO World Conference on ESD and signed the resulting Bonn Declaration. The Bonn Declaration specifically focused on teacher education by committing to:

Reorient curriculum and teacher education programmes to integrate ESD into both pre-service and in-service programmes. Support teacher education institutions, teachers and professors to network, develop, and research sound pedagogical practice. Specifically support teachers to develop ESD strategies that can work with large class sizes, and to evaluate ESD learning processes. (UNESCO, 2009, p. 4)

Post-DESD planning is underway to coincide with the expiration of the Millennium Development Goals in 2015 and to ensure ESD commitments continue.

### **Education for Sustainable Development in Nova Scotia**

Hopkins (2013a) outlines the particular challenges specific to the Canadian context in adhering to and implementing international ESD commitments. In the early 1990s, federal leadership for ESD was given to Environment Canada, which, according to Hopkins, “unfortunately perpetrated the notion of ESD as the same as EE” (2013, p. 28). The second major challenge for a national ESD strategy is the structure of the education system in Canada, which lacks a national ministry of education. The exclusive responsibility for matters pertaining to education rests with the 13 provincial and territorial governments. Implementing ESD policy and strategy across a huge country with disparate provincial ministries has severely curtailed meaningful, widespread ESD adoption across Canada (Hopkins, 2013a, p. 24).

Nova Scotia has been involved in sustainability education initiatives since the early 1990s. In 1991, the presidents of 33 universities from ten countries on five continents met in Halifax to examine the role of universities regarding the environment and development. They were joined by a number of senior representatives from business, the banking community,

governments, and non-governmental organizations. The Halifax Declaration (1991) was released at the conclusion of this conference. It stated among other things that,

The voice of the university be clear and uncompromising in its ongoing commitment to the principle and practice of sustainable development within the university, and at the local, national and global levels. (p. 1)

However, the response to adopting ESD as a core element of the public school system reflects the challenges described by Hopkins, in that Nova Scotia's Ministry of Education made early and modest steps to integrate ESD into the provincial curriculum. In progress reports and responses to UNESCO questionnaires (CMEC, 2006, 2007), many provinces, including Nova Scotia, reported activities that are described by Hopkins (2013b) as being in the beginning stages of an ESD adoption trajectory.

Nova Scotia government internal strategic planning documents lay out commitments characteristic of early adopters at the beginning of a trajectory leading to full implementation. The Nova Scotia Department of Education Annual Accountability Report 2009-2010 states:

The department has evaluated and listed a number of ESD tools and resources in the Authorized Learning Resources list. ESD outcomes are addressed in various curricula at all grade levels. Plans for a Nova Scotia ESD website are in development. The department provided *Green Technology for Exploring Technology 10* summer institute in 2009. The department has planned summer institutes and other workshops to be provided in 2010-11. (Nova Scotia Department of Education, 2009, p. 17)

These initiatives are in line with a teaching “about” sustainability approach, which is also characteristic of early adopters. In 2016, while the plan for the development of an ESD website has not been realized, according to the Department of Education, ESD “permeates several subject areas. Science, Social Studies, English Language Arts, Health Education, and Technology Education tend to have more outcomes related to ESD. Other subjects have ESD embedded in their outcomes” (S. Taylor-Foley, personal communication, July 6, 2015). The Government of Nova Scotia is committed to LEED (Leadership in Energy and Environmental Design) gold certification in the building of new schools. Altogether, the province has not moved beyond modest steps to integrate ESD learning outcomes and has not pursued systemic, province-wide ESD adoption such as that pursued by Manitoba (Buckler & MacDiarmid, 2013).

ESD in the Nova Scotia public school system depends, as it does in many other jurisdictions, on the commitment and passion of teachers, parents, and communities dedicated to education for sustainability. Some rural schools are becoming community centres, supporting the viability of small towns; school gardens and entrepreneurial ventures are appearing and producing local, healthy food as the result of authentic, project-based learning. Despite these developments, the systemic support that comes with province-wide policy is not yet in place. The lack of a provincial vision for ESD means, for example, that schools are unable to get the fresh food they grow to the cafeteria because of restrictive contracts signed by corporations managing food services.

Nova Scotia is undertaking an extensive review of its public education system. New Essential Graduation Competencies provide a future vision for K-12 education in the province. The competencies include: Creativity and Innovation, Citizenship, Personal and Career Development, Critical Thinking, Communication, Technological Fluency. The language of the six competencies in many ways reflects the principles of ESD. For example, for the competency of Citizenship:

Learners are expected to contribute to the quality and sustainability of their environment, communities, and society. They analyze cultural, economic, environmental, and social issues, make decisions, make judgments, solve problems, and act as stewards in a local, national, and global context. (Nova Scotia Department of Education and Early Childhood Development, 2015).

While the language is hopeful, recent decisions by the Department of Education in reforming the Kindergarten to Grade 3 curriculum do not seem to bode well for real commitment to ESD in the province. Addressing the concern for raising test scores and increasing accountability, the Minister of Education is committed to “fundamental changes to improve and *modernize* [emphasis added] the education system for the first time in a generation” (Nova Scotia Department of Education and Early Childhood Development, 2015). The modernization referred to by the Minister means that the K-3 curriculum will focus on Math and Literacy, which are deemed to be core subjects. One may argue this approach constricts the breadth of the curriculum and reflects typical neoliberal education approaches primarily concerned with accountability, standardization, and achievement scores (van Heertum & Torres, 2011). While the plan to integrate the teaching of other subjects into Math and Literacy aligns with integrative,

interdisciplinary approaches of ESD, without an accompanying vision and a theoretical framework to support professional development designed to effectively prepare teachers to implement integrative, project based learning in the classroom, the K-3 curriculum will be severely constricted in the coming years.

In Nova Scotia, the promotion and implementation of ESD has primarily been taken up by an organization called Sustainability Education in Nova Scotia for Everyone (SENSE). This group represents a network of governmental, non-governmental, community, and industry groups. SENSE's current status and level of activity is difficult to ascertain as it currently does not have a web presence and its contact information is difficult to find. Efficiency Nova Scotia, an independent non-profit organization funded by the province's electrical utility, provides financial support for Green Schools Nova Scotia:

Efficiency Nova Scotia, Green Schools teaches students about energy efficiency and helps schools reduce their environmental footprint. We work with the whole school—students, staff, parents, and community members—to strengthen positive efforts already underway and help establish new leadership in schools that are ready to go green. (Green Schools Nova Scotia, 2013)

The focus of Green Schools Nova Scotia is on environmental issues and energy conservation, and, significantly, it does not explicitly reference ESD. Environmental education that makes direct links to the health, well-being, and economic prosperity of communities in Nova Scotia instead has fallen to longstanding donor-funded NGOs, such as the Ecology Action Centre based in Halifax and the Atlantic Coastal Action Program (ACAP) in Cape Breton.

### **Teacher Education and ESD**

In 1998, realizing that teachers were crucial to the success of any effort to use education to promote sustainability, efforts were initiated by UNESCO to reorient teacher education. A UNESCO Chair on Reorienting Teacher Education to Address Sustainability was established at York University in Toronto, and an international network of 30 teacher education institutions in 28 countries began planning to move the initiative forward. It is not surprising that faculties of education and teacher educators are identified as “key change agents in reorienting education to address sustainability” (Hopkins & McKeown, 2005, p. 12). Teachers, and the education and



preparation teachers receive, are critical to any effort to use education, specifically schooling, to foster more sustainable societies.

The unique challenges faced by Atlantic Canada regarding teacher education and ESD are related to shifting demographics and a reliance on strained non-renewables (including mining, fishing, and oil and gas). For decades there have been calls for bold, creative responses to these challenges. The most recent call came in the aptly named report, *Now or Never: An Urgent Call to Action for Nova Scotians* (Ivany, d'Entremount, Christmas, Fuller, & Bragg, 2014). The report unabashedly insists that “there is a crisis, and it does threaten the basic economic and demographic viability of our province, most dramatically our rural regions” (Ivany et al., 2014, p. vii). The report calls on Nova Scotians to have the “courage,” “imagination,” and “determination” needed to reshape the province’s future. While it is an economic document that recommends solutions largely driven by business and investment, the report does recognize a role for education, primarily entrepreneurial education. Although the *Now or Never* report does not reference ESD, its authors speak directly to the need for an educated citizenry able to meet the existing challenges. The values, skills, knowledge, and beliefs required to transform the province means that people need to be fully invested in the places they live—they need to understand their rich history and culture, as well as respect and use with restraint the living ecosystems on which everything else depends. While the *Now or Never* report is one start of the conversation, the province needs to take further steps. Sustainability will require people who can problem solve, are creative and innovative, and who are community-minded and motivated through direct inquiry-based learning that is authentic, meaningful, and has a benefit for the community. Nova Scotia needs learning that values participatory, collaborative approaches that break down the barriers that block interdisciplinary connections and that encourages systems-thinking and local solutions to local problems. In other words, the principles of education for sustainability must be fully integrated at all levels of the public education system.

In Nova Scotia, top-down, policy-supported leadership on ESD is largely absent. NGOs wax and wane on the availability of funding. Industry-funded initiatives, such as Green Schools Nova Scotia, are primarily environmental programs aimed at energy conservation and they lack the full vision and mandate required to reshape education. Despite this, there are local, school-based, teacher and community-led initiatives that reflect the principles of ESD. They are flexible, creative, and foster a sense of personal responsibility for place and planet. There are projects all

over the province that encourage respecting and preserving our histories, valuing culture and community, caring for others and the environment, and taking real action for viable, sustainable communities in which people can live well. Teacher education institutions have an important role in supporting this work by reorienting teacher education for the values of sustainability.

### **Reorienting Initial Teacher Education: Cape Breton University**

In 2012, the Council of Ministers of Education, Canada, in partnership with the International Institute for Sustainable Development (IISD), and Learning for a Sustainable Future (LSF), surveyed Canadian teacher education institutions (TEIs) to “gain a better understanding of how they are incorporating ESD into their pre-service programs, research, and other activities” (CMEC, 2012, p. 1). Of the five TEIs in Nova Scotia, four were invited to respond to the survey. Of the four invited, two responded. While a full discussion of the research is beyond the scope of this chapter, it was reported that across Canada, “There is modest but promising progress toward reorienting teacher education to address education for sustainable development” (CMEC, 2012, p. 2). At the time of the CMEC survey in 2012, Cape Breton University (CBU) was preparing to make education for sustainability a core focus in its preservice teacher education program. The CBU reorientation was based largely on theoretical and conceptual frameworks related to the values-driven and normative undertaking that is ESD. In other words, faculty and staff were engaged in the necessary hard work of “decid[ing] which themes to emphasize within their curricula, programs, practices, and policies to ensure that teacher-education programs fit the environmental, social, and economic conditions and goals of their communities, regions, and nations” (Hopkins and McKeown, 2005, p. 15).

In the early phase of the reorientation to ESD, faculty and staff engaged in discussions that questioned how teacher education might be reoriented for the values of sustainability. It was believed such a reorientation could only be undertaken with a clear understanding of what constitutes these values and how people best “learn” these values. In outlining the specific values of sustainable development, the ESD Toolkit (McKeown, 2002) refers to the Earth Charter as a reference point, recognizing that values taught in school need to reflect:

The larger values of the society that surrounds the school . . . a full range of values influenced by local traditions, aboriginal groups, ethnic populations, immigrants,

religions, media and pop culture will be revealed, inventoried and considered for relation to and inclusion in ESD. (p. 23)

Being located in Unama'ki, the ancestral homeland of the Mi'kmaq people, aboriginal values, teachings, and education should be central to the reorientation process in Nova Scotia. Additionally, the Earth Charter sets out four basic values, or commitments, and 16 key principles that flow out of the basic values. The four broad commitments are: (a) respect and care for the community of life; (b) ecological integrity; (c) social and economic justice; and (d) democracy, nonviolence, and peace (Earth Charter, 2001, p. 2).

The document *Guidelines and Recommendations for Reorienting Teacher Education to Address Sustainability* (Hopkins & McKeown, 2005) provided further guidance for the CBU reorientation. The document offers recommendations on change within institutions of higher education and within faculties of education, including recommendations on funding, research, partnerships, and communication. These are worthwhile suggestions, but when designing transformational teaching practices to influence *values*, the “recommendations on change related to engaging pre-service and in-service teachers” (Hopkins and McKeown, 2005, p. 43) were especially significant. It is recommended that teacher educators request preservice teachers to:

Analyze the mandated curriculum they will be teaching to identify themes related to sustainability and provide student teachers with opportunities to explore their own values and attitudes towards local sustainability problems while encouraging critical thinking and decision making that influence personal lifestyle and economic choices. (p. 44)

If student teachers are to—in turn—teach for the values of sustainability, they must be encouraged to question whether education, in its current form, may be an obstacle to realizing sustainable communities. These communities can only be fostered within an educational framework that is “visionary and transformative and must clearly go beyond the conventional educational outlooks we have cultivated over the past several centuries” (O’Sullivan, 1999, p. 4). For example, instead of simply analyzing the mandated curriculum for themes that support the values of sustainability, student teachers must also be encouraged to inquire into how curriculum guides, textbooks, classroom practices, and teacher beliefs, as the main conveyors of curriculum in the classroom, may become tools in the perpetuation of values in conflict with values of sustainability. Textbooks (including novels), current classroom practices, and teacher beliefs in

public schools and in TEIs, require critical reflection to determine embedded cultural assumptions that may or may not support educating for the values of sustainability.

While these key recommendations allow teacher educators and initial teachers the opportunity to be critical as they access the personal and the experiential, they do not go far enough. The attainment of the values of sustainability is not commensurate with the knowledge we possess. Critical pedagogy (Kahn, 2010) addresses the underlying structures responsible for the current crises, which students should be engaged in deconstructing and unpacking. Education in sociopolitical analysis is clearly important, yet the ability to critique must also include, not only building a knowledge base around these issues, but a deeper sensibility for the losses we have experienced from being separated from each other and from nature because of cultural ideologies predicated on competition, individualism, aggression, and consumerism. (Howard, 2011, 2012). Although this critique is necessary, we must, as Doerr (2004) argues, be moved from “I know to I care” (pp. 30, 31).

### **Care, Pedagogy, and Sustainable Happiness**

Reorienting a teacher education program requires time for faculty and staff to explore and theorize the relationships and issues among social, economic, and environmental dimensions of sustainable development. These processes of inquiry and critical dialogue are crucial. Imposing the concept of sustainable development on others contravenes the basic ESD tenet of collaborative knowledge building and supportive ways to identify and build on shared values. For such a critical discourse to take place, it was important to make sustainable development an open question for examination in the socio-political and socio-ecological contexts within which we work. Through dialogue and reflection, it was determined that efforts to foster in initial teachers the requisite skills, knowledge, attitudes, and beliefs to teach for the values of sustainable development must be firmly grounded in the relational. The work of Noddings (1984, 2002) in care theory helped us to better understand how the values of sustainability may best be attained by initial teachers and to identify the types of learning tasks best suited to accomplishing this goal. We drew on van Manen’s (1991, 2002) phenomenological interpretation of pedagogy as it offered a deeper sense of how to structure learning opportunities in faculties of education. As well, O’Brien’s (2012; 2013) concept of sustainable happiness provided a framework by which the faculty and staff could challenge long-held and often unexamined assumptions and

behaviours. We could then use this awareness to lead initial teachers in understanding the interrelatedness of the environment, society, and economy, and have this interrelatedness be evident in their teaching and their lives as community members. An appreciation of how interrelatedness plays out on the campus and in daily life is a first step.

Noddings' (2002) work on care theory posits that values cannot be taught directly but are “defined situationally and relationally” (p. 2). Central to Noddings' work are her components of values education: modeling, dialogue, practice, and confirmation (p. 15-20). Noddings believes that, as carers, we attend because we want to, that “we love the ones who address us or have sufficient positive regard for them or the request is so consonant with ordinary life that no inner conflict occurs” (p. 13). In describing this encounter as one of “natural caring,” the *I must* is an expression of desire, not a recognition of duty. Noddings' first component, *modeling* the values of sustainability as a way of being in the world, allows teacher educators and institutions to communicate the values, as they are *lived*, in the classroom. Teacher educators who are committed to interdisciplinary course work, who support participatory learning, who seek ways to incorporate shared decision making, and who provide opportunities for initial teachers to reflect on their own values and explore issues around local sustainability, create powerful opportunities to foster the values of sustainability. Van Manen (1991) calls this the living out of a relational commitment to students and “the possibility of a new pedagogy” (p. 3). This new pedagogy requires us to “stand in a relationship of thoughtfulness and openness to young people rather than being governed by traditional beliefs, discarded values, old rules and fixed impositions” (p. 3).

Noddings' (2002) second component of care theory is *dialogue*, which is described as open ended, involving careful listening and attending, and as “the most fundamental component of the care model” (p. 16). Dialogue is also at the heart of van Manen's interpretation of the “pedagogical relation” (1991, p. 83). Attending to the other—to thoughts, feelings, memories, and experiences as they come out of conversation or out of response to reading and viewing—may serve as a space to deepen student teachers' understandings of their place in the world. Dialogue will inevitably involve questions that require knowledge, reasoning, and even debate. It is important, however, that we not close off further questioning with “answers.” The efforts to reorient education for the values of sustainability will require *unlearning* and *relearning*. It calls

for developing awareness that how we relate to the world is socially constructed and that education is a major purveyor of hegemonic practices and beliefs.

### **Concluding Thoughts**

In many ways, CBU is just beginning to reorient initial teacher education and it has taken important first steps. All initial teachers at CBU must take a course in Sustainability Education, EDUC 4114: Teaching and Learning for A Sustainable Future. This course is designed to allow students to acquire knowledge of theory related to Education for Sustainability (EfS) and to consider the complexities of its pedagogical implementation. The terms Education for Sustainability (EfS) and Education for Sustainable Development (ESD) are used interchangeably in Canada (McKeown & Nolet, 2013). The term preferred by CBU faculty and staff was EfS, as it avoids the contention sometimes associated with the word “development.” In the core course, EDUC 4114, students are introduced to societal perspectives related to systems thinking, globalization, and how historical events have influenced the development of the scholarship and practice of EfS. The course focuses on the competencies for educators in EfS and provides initial teachers with opportunities to build practical strategies to implement a holistic approach to learning. Students learn from the experiences of teachers, schools, students, and community organizations that have implemented EfS to organize the learning environment. In addition to theory and the scholarship of sustainability, students are engaged in experiential learning activities ranging from creating art in the natural environment to participating in urban neighbourhood adventures designed to introduce strategies for place based learning (Root, 2014).

Initial teachers also have the opportunity to take a popular elective course, EDUC 4104 Sustainable Happiness. Through lectures, group work, readings, and assignments, students investigate the applications of positive psychology in their lives, in society, and in the environment. Through the practice of “happiness skills” to increase happiness literacy, students examine the social messages related to happiness and well-being that influence values, beliefs, behaviour, and life choices (O’Brien, 2010). In addition to these courses, ESD principles and practices are integrated throughout each course in the B.Ed. program. As well, students can complete an Aboriginal Education Option that focuses on language preservation and Mi’kmaq education models, teachings, and cultural practices. Work continues on professional development for sessional instructors and on the creation of a graduate program in Sustainability,

Creativity, and Innovation. Faculty research agendas are growing to include questions related to sustainability education. As sustainability is an evolving process, so too is the journey to reorient a teacher education program.

The future prosperity and well-being of Atlantic Canadian communities requires a critical consciousness of our challenges. It also calls for the creativity and investment of those who are committed to living here and living well. A different definition of wealth and prosperity is needed. Halting the mass exodus of young people out of rural communities requires a progressive definition of community. In many ways, it means revitalizing values that have fallen by the wayside in the rush to modernity—values that have allowed people to survive and thrive here for hundreds of years. Communities are dynamic, and they create a context for interdependence. They teach the skills of leadership and the power of local action. Communities are about knowing a place and about seeing the connections and networks that exist between the local and the global. Schools are central to the community ecosystem. ESD allows us to think about how our schools enable or inhibit the natural development of community.

Teachers are community leaders, and understanding how to reshape our communities and live well in our places is essentially an educational challenge. However, for the foreseeable future in this region, reshaping our communities for different values will remain largely a grassroots endeavor. We are in need of teachers who believe that a revised form of education can play a transformational role in cultivating a cultural shift towards a more sustainable way of living, thereby providing us with a clearer sense of a way forward. As the eco-theologian Thomas Berry put it, we are in need of a new story—a story that places education at the heart, where the focus is on the practicalities of community renewal and regeneration, and on the creation of start-ups to meet real needs. Teachers with the right preparation can be at the centre of this shift and see it as a time of creative innovation and opportunity.

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## **Chapter 3**

### **Worldviews and Preservice Teachers' Beliefs about Nature and Environmental Education: A Case for Socially and Culturally Critical Science Teacher Education (Ontario)**

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### Abstract

Science knowledge and perspectives are an essential component of environmental education, making the preparation of science teachers an important consideration to the integration of environmental education in schools. This chapter examines the tensions that often exist between science, school science, and environmental education, which can create oppositional relationships between science and environmental education, and suggests how we might address these antagonisms. We investigated the influences of an environmental education intervention on the environmental orientations and pedagogical beliefs of six preservice science teachers in the initial teacher education program at a university in Ontario, Canada. We were particularly interested in how dominant cultural assumptions connected to Western and Western science worldviews might influence their beliefs. Our study used a mixed methods research design, consisting of a quantitative questionnaire and qualitative, semi-structured interviews to collect data on environmental perceptions and beliefs. Our analysis suggests that the participants generally had pro-environmental perceptions with respect to environmental preservation, and their awareness increased after the environmental education intervention. Also present, however, were complex cultural assumptions apparently in conflict with their pro-environmental perceptions, such as anthropocentrism, individualism, consumerism, and an exclusive value placed on scientific knowledge. We argue that these tensions must be identified and addressed if school science is to become a site of resistance, than reproduction, of environmentally detrimental dispositions in students.

*Keywords:* worldviews; school Science; preservice teachers; anthropocentrism; nature of science (NOS)

### Abstrait

La connaissance et les perspectives en science sont des composantes essentielles de l'apprentissage de l'environnement. C'est une considération importante en ce qui a trait à la préparation des enseignants pour l'intégration de l'apprentissage de l'environnement dans nos écoles. Ce chapitre examine les tensions qui existent entre l'école, l'école des sciences, l'apprentissage de l'environnement et comment adresser celles-ci. Nous avons mené une enquête au sujet des influences d'une approche par intervention de l'apprentissage de l'environnement sur les orientations de l'environnement et les croyances pédagogiques de six enseignants à une faculté d'éducation en Ontario, Canada. Nous nous sommes particulièrement intéressés de la façon dont les hypothèses culturelles dominantes étaient liées aux visions du monde occidentales et comment celles-ci pourraient influencer leurs croyances. L'élaboration de ce projet de recherche était constitué d'un questionnaire quantitatif et qualitatif, des entrevues semi-structurées ont été utilisés afin de recueillir des données en ce qui a trait aux perceptions et aux croyances de l'environnement. Notre analyse suggère que, généralement, les participants avaient des perceptions positives envers la conservation de l'environnement. Ces résultats ont augmenté après avoir reçu une intervention éducative. Cependant, il y avait des suppositions culturelles complexes avec les perceptions telles que l'anthropocentrisme, l'indivulisme et le consumérisme. Aussi, une valeur exclusive était présente, notamment sur les connaissances scientifiques. Nous remarquons que les tensions devaient être identifiées et abordées si l'école des sciences devenait un emplacement de résistance, plutôt que reproduire un effet nocif de provisions environnementales pour les élèves.

*Mots clés:* la vision du monde, les étudiants à la faculté d'éducation, l'anthropocentrisme, l'essence de la science (NOS)

## **Worldviews and Preservice Teachers' Beliefs about Nature and Environmental Education: A Case for Socially and Culturally Critical Science Teacher Education**

Environmental Education (EE) begins with teacher education (Bowers, 1997) because it is teachers who eventually facilitate EE in schools. As teacher educators, however, we recognize that teacher candidates (TCs) spend 16 or more years in the education system and only a short time within a preservice program. They arrive with beliefs that influence their understanding of all pedagogical approaches (Barrett & Nieswandt, 2010), including EE. This chapter examines a small group of TCs in terms of ways in which their worldviews influenced their understandings of EE.

School educators often view science and EE to be complimentary because nature is of primary interest in the two disciplines (Harding, 1991; Orr, 2004). For example, school science curriculum frequently contains the disciplines of Ecology and Environmental Science, making it appear to be the appropriate location for EE (Steele, 2011). In Ontario's public schools, the subject of science is infused with expectations that require teachers to educate all students about "the scientific and human dimensions of environmental issues" (Ontario Ministry of Education, 2008, p. 38). The curriculum also features Science, Technology, Society and the Environment (STSE) and Nature of Science (NOS) goals and content, providing opportunities for teachers to include socio-cultural aspects of science that are related to environmental problems (Hodson, 2009). In light of modern environmental issues, such as global warming and declining biodiversity due to habitat loss, this science curriculum is potentially well suited to address EE goals. Nevertheless, some scholars suggest that human-centered orientations common in Western<sup>1</sup> schools, including school science, result in educational programs that are constrained by environmentally detrimental<sup>2</sup> assumptions (Bowers, 1997; Stevenson, 2007). These scholars

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<sup>1</sup> "Western" is used throughout this chapter to describe those societies, cultures, and ways of living that have a European, particularly Western-European, origin.

<sup>2</sup> Here we mean doing further damage to natural ecosystems. "Environmentally detrimental" could also describe changes to existing activities that are harmful to natural ecosystems.

are concerned that schools may be reinforcing, rather than offsetting, environmentally detrimental assumptions reflecting a human-centred world perspective.

Socio-cultural assumptions that consider humans as being separate from, and dominant over, nature, along with individualism and materialistic orientations, are anthropocentric elements of Western systems of thought (Boddice, 2011; Nimmo, 2011). Explicit and implicit assumptions are constituted through language, which conveys what is “real” and defines the relationships between humans and “objects” (including relationships between humans and nature) (Cobern, 1991). Anthropocentrism can be thought of as a normative assumption that embodies or expresses—implicitly or explicitly—beliefs or orientations that consider some aspects of human experience, perspective, or valuation as being of greater value or importance than nature (DeLapp, 2011). Anthropocentric assumptions have been connected to environmentally detrimental behaviours (Benzce & Carter, 2011; Dryzek, 2005; Orr, 2004), and citizen’s worldviews (Cobern, 1991; Ignatow, 2006).

In this context, *worldviews* may be regarded as “culturally organised macro-thoughts; those dynamically inter-related basic assumptions of a people that determine much of their behaviour and decision making” (Kearny, 1984, p.1). Worldviews are multi-dimensional and are influenced by many factors, including environmental considerations (Cobern, 1991; Liu & Lederman, 2007). Worldviews have been shown to influence teachers’ beliefs and orientations, and, therefore, they also affect the educational experiences they provide for students (Hodson, 1998; Liu & Lederman, 2007). Teachers may not be aware of the environmental assumptions embedded in their worldviews or how these affect their beliefs about education and the experiences they provide for students. As a result, worldviews may inadvertently instil environmentally detrimental orientations in their students (Bowers, 2003; Kasser, 2011). To address this, teachers may need to be aware of their assumptions and beliefs (Hart, 2003; Sauvé, 2005). The study discussed in this chapter examines connections between the worldviews of science teacher candidates and their beliefs and orientations to the environment and EE. We also address how worldviews may be altered through preparation to teach EE.

### **Western and Scientific Worldviews**

Sociologists claim that the *Dominant Social Paradigm* (DSP) (see Appendix A), as coined by Catton and Dunlap (1980), has been prevalent in Western culture for several centuries (Cobern, 2000) and which appears to contain a strong anthropocentric tradition. Characteristic of

the DSP is a view of the world as a source of limitless opportunity for human progress. This view has developed through a seemingly never-ending process of searching for solutions to the problems and puzzles nature presents to us (Catton & Dunlap, 1980; Pirages, 1978). The DSP worldview appears to have spread to most modern nations and cultures through integration in the global economy (Benzce & Carter, 2011). The spread of such a Western worldview globally means it likely contains a multiplicity of assumptions and beliefs that results in multi-dimensional worldviews, which makes a singular characterisation problematic.

Western scientific worldviews (see Appendix A) appear to have coevolved with other Western worldviews from Greco-Judean culture and European enlightenment ideals (Tobin & Roth, 2007). Although the existence of a scientific worldview—let alone its characteristics—remains contested (Matthews, 2009), there is enough agreement on a “scientific perspective” that the development of a scientific worldview has become a goal of important science reforms, such as the American Association for the Advancement of Science’s (AAAS) Project 2061 (AAAS, 1990) (Appendix A), and it is reflected in influential modern science education policy, such as the Next Generation Science Standards (NGSS) in the United States (Achieve, 2013). While the Ontario science curriculum does not specifically identify worldview as an outcome of the science program, it does specify the importance of science literacy.

Science literacy can be defined broadly and in depth, but, for the purposes of our discussion, we are interested in the science worldview components evident in the following explanation: “Scientific literacy can be defined as possession of the scientific knowledge, skills, and habits of mind required to thrive in the science-based world of the twenty-first century” (Ontario Ministry of Education, 2008, p. 3). The language in this statement implicitly suggests that students should be able to think scientifically in order to function in society. Scientific worldviews can be generally characterised by an analytical, epistemological orientation that focuses on perceived objects and their particular attributes (Nisbett, 2003). While some scholars advocate for consideration of scientific worldviews in solutions to environmental problems (e.g., Gauch, 2009; Matthews, 2009), others make connections between these worldviews and positivistic approaches used in traditional school science (e.g., Aikenhead & Ogawa, 2007; Harding, 1991; Hodson, 1998; Longino, 1990). These positivistic approaches are potentially antithetical to environmentally beneficial learning because they inculcate a sense of mastery, dominance, and control over nature, than the interdependent relationship that may be needed to



foster care about nature (Aikenhead & Ogawa, 2007; Hoeg, 2015). Care may, in turn, be necessary to change environmentally detrimental behaviours (Orr, 2004).

Challenges to worldviews have occurred as humans reconsider the use and re-use of resources once considered limitless, making the beliefs of the DSP unjustifiable from an environmental point-of-view (Catton & Dunlap, 1980). Alternative worldviews that consider the interdependence of humans and the environment, the changing natural environment, growing awareness of ecological problems, and the capacity limits of the environment, have become apparent in modern societies (Catton & Dunlap, 1980; Crompton & Kasser, 2009). The *New Ecological Paradigm* (NEP) (Catton & Dunlap, 1980) (see Appendix B), for example, reflects this social change as it characterizes humans as one among many species that are interdependently involved in a global ecosystem. Studies in environmental ethics have identified a variety of worldviews that share many components with the DSP and NEP (DesJardins, 2012). As anthropocentrism appears to be foundational to both Western worldviews and Western scientific worldviews (Capra, 1991; Marten, 2001), we have therefore termed these *anthropocentric worldviews*. Worldviews that demonstrate human interconnectedness with nature have been termed *biocentric* (Hodson, 2009) or *nature-centric* (Liu & Lederman, 2007). We will refer to this second group of worldviews as *bio/nature-centric* for the remainder of this chapter.

Research evaluating science teachers' worldviews along an anthropocentric- bio/nature-centric spectrum has concluded that many science teachers have multi-dimensional worldviews, and they often bring alternative worldviews into science classes (Cobern, 2000). Liu and Lederman (2007) found that science teachers who recognized the limitations of scientific knowledge, and accepted the idea that science involves subjective and cultural components, were more likely to espouse a bio/nature-centric worldview. In contrast, teachers who described science as "close to technology and as of materialistic benefit" (Liu and Lederman, 2007, p. 1281) tended to have an anthropocentric worldview regarding human relationships with nature. School-based education may provide fundamental experiences involved in the development of worldviews (Cobern, 1991; Crompton & Kasser, 2009). Although Bowers (1997, 2003) describes how the environmentally detrimental beliefs of the DSP are foundational to Western models of education, and therefore are reproduced in students, other research (e. g., Kennelly,

Talyor, & Maxwell, 2008; Moseley & Utley, 2008; Thoe, 2007) describes the potential of education to invoke and foster more bio/nature-centric orientations in students.

### Context and Methods

This paper investigates the influence of worldviews on orientations and beliefs related to the environment and EE of preservice teachers in a university in Ontario, Canada. Twenty-two teacher candidates enrolled in a single high school biology class experienced a 2-day (6-hour) EE intervention taught by the first author. Educational interventions are often short-term experiences intended to address specific educational needs (Gall, Gall, & Borg, 2007). EE interventions have been used in preservice teacher education programs with positive effects; for example, Kennelly, Taylor, and Maxwell (2008) found preservice teachers had improved pedagogical knowledge and understanding of how to integrate EE after a two-class intervention. The purposes of the EE intervention used in this study were to:

1. Provide participants with knowledge of environmental issues relevant to Ontario.
2. Identify the goals and objectives of EE as outlined by UNESCO,<sup>3</sup> scholarship in EE, and the Ontario Ministry of Education.
3. Provide teachers with knowledge about EE pedagogy and practice.
4. Explore EE implementation challenges and successes.
5. Engage participants in practical activities that model good teaching practice in EE.
6. Act as the experimental basis for possible changes in participants' *orientations* to the environment.

The 22 students in this course also completed an Environmental Questionnaire (ENQ) (Johnson & Manoli, 2008) to evaluate preservice teachers' environmental orientations. The ENQ is a 24-item, Likert-based questionnaire: 14 questions are designed to assess environmental *preservation* and 10 statements are designed to assess environmental *utilization* (Table 1).

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<sup>3</sup> In this chapter, we use Environmental Education (EE) and Education for Sustainable Development (ESD)(UNESCO, 2011) as synonyms.

Table 1

*Environmental Perception Components as Measured by the ENQ*

Component	Factor	Sample item
<b>Preservation</b>	Intent of support	If I ever have extra money, I will give some to help protect nature
	Care with resources	I always turn off the light when I do not need it any more
	Enjoyment of nature	I would like to sit by a pond and watch dragonflies
<b>Utilization</b>	Altering nature	Weeds should be killed because they take up space from plants we need
	Human dominance	People are supposed to rule over the rest of nature

Preservation is a pro-environmental orientation that suggests the maintenance of a relationship and balance with nature; utilization, on the other hand, is environmentally detrimental and suggests nature is a resource that we can use and control (Johnson & Manoli, 2008). These two characteristics are not linear or equivalent, and a person may demonstrate a perspective that is favourable to environmental preservation while also utilizing the environment at the same time.

The ENQ is a type of *attitude scale*. Although there is no one conceptualization of attitude, it can refer to various orientations, such as perception, perspective, or other similar phenomenon (Schuman & Presser, 1996). These orientations are considered to have three components: (a) an affective component, which consists of the individual's feelings about the disposition object; (b) a cognitive component, which is the individual's beliefs or knowledge about the object; and (c) a behavioural component, which is the individual's predisposition to act toward the object in a particular way (Gall et al., 2007). The affective/cognitive component measured by the ENQ is termed *perception* by its creators (Johnson & Manoli, 2008), and the disposition object is the environment. Perception is a more complex phenomenon than attitude in that it can occur in two dimensions; while an individual has either a positive or negative attitude about the object in question (Gall et al., 2007), the same person may have a perception that is positive and negative at the same time (Johnson & Manoli, 2008). The ENQ was administered

twice, once prior to the EE intervention, and again one week after the intervention. Results of the ENQ provided quantitative information that became the basis for further analysis of participants' environmental orientations. For the sake of simplification and consistency with interview data, we will use the general term "orientations" to describe participants' dispositions toward the environment obtained from the ENQ, and "beliefs" to describe participants' dispositions toward the environment and EE obtained from interviews.

Six participants who fell within the median scores of the ENQ were interviewed to evaluate their beliefs about nature and EE. Beliefs are cognitive components of orientations toward objects, through which one views the object and makes decisions about it (Kane, Sandretto, & Heath, 2002). Although beliefs cannot be truly observed, espoused beliefs are communicated when a person is asked to describe their beliefs (Barrett & Nieswandt, 2010; Kane et al., 2002). In this study we examined espoused beliefs since our purpose was to report on the beliefs of preservice teachers who are not yet in a position to demonstrate behavioural components of environmental orientations (teaching). However, preservice teachers' beliefs are a concern because they inform teaching behaviour (Marbach-Ad & McGinness, 2008).

Interview questions were designed to gather participants' beliefs about their relationship with nature and teaching EE. Examples of questions included: How would you describe your relationship to nature? How would you describe some environmental issues that are important to you? What are the responsibilities of a teacher in EE? What should schools be doing in EE? Interviews were recorded and fully transcribed. We used a general inductive analysis (Thomas, 2006) to develop categories and themes that originated with the participants. A general inductive approach to data analysis allowed us to focus on the lived experiences of the participants as they expressed them (as opposed to interpretation through an existing conceptual framework, such as the DSP or NEP). The analysis involved a repetitive and circular coding procedure—deriving, defining, and modifying coding categories while reading, rereading, and assigning responses to the categories. Although we found themes that were consistent with many beliefs and assumptions associated with anthropocentric and bio/nature-centric worldviews, due to their heterogeneity, these frameworks were used for discussion purposes only and not as a definitive assessment of participants' worldviews.

### Findings

Results from the ENQ indicated participants generally had contradictory environmental orientations along its two dimensions. An average score of 2.5 or higher for Preservation components suggests increasing orientation to preserve the environment. Average scores of 2.5 or higher for Utilization components suggest increasing orientation to utilize the environment. Average scores below 2.5 suggest decreasing orientation to preserve or utilize the environment. As can be seen in Table 2, before the EE intervention (pre-test), the participants' average score (3.32) suggests that they were orientated toward preserving the environment (pro-environmental disposition). The average overall score for utilization (2.55), however, suggests that participants were also oriented toward utilizing the environment (environmentally detrimental disposition). After participating in the EE intervention (post-test), their scores for each Preservation component indicate increased orientation toward environmental preservation. Average post-test scores for the components of utilization remained relatively unchanged, suggesting that the EE intervention had little influence on participants' orientations toward utilizing the environment.

Table 2

*Pre- and Post-intervention Mean Scores and Effect Size*

		Mean scores				
	<i>n</i>	Pre-test	SD	Post-test	<i>SD</i>	<i>Effect size</i>
<i>Preservation total</i>	22	3.32	.596	3.65	.682	.25
Intent of support	22	3.35	.747	3.74	.748	.25
Care with resources	22	3.05	.886	3.28	.903	.13
Enjoyment of nature	22	3.44	.876	3.89	.739	.27
<i>Utilization total</i>	22	2.55	.499	2.6	.683	.04
Altering	22	2.80	.498	2.75	.532	.05

nature						
Human dominance	22	2.35	.723	2.41	.873	.04

Six participants who fell within post-test median scores on the ENQ (4 for Preservation; 3 for Utilization) were interviewed once, within two weeks of the EE intervention. Demographics of the participants can be found in Table 3.

Table 3

*Interview Participant Characteristics*

<b>Name</b> (pseudonyms)	<b>Gender</b>	<b>Age</b>	<b>Ethnic background</b>	<b>Major</b>	<b>Highest degree</b>
Barbara	Female	23	European	Biology	BSc.
Christine	Female	26	South East Asian	Chemistry	BSc.
Paula	Female	34	Asian	Chemistry	Masters
Michael	Male	24	European	Physics	BSc.
Rick	Male	25	European	Biology	BSc.
Ron	Male	30	South Asian	Biology	Masters

Each participant had a degree in a discipline of science and intended to be a high school science teacher. These participants had complex, multidimensional views about nature that appeared to correspond with many characteristics of both anthropocentric (particularly scientific) and bio/nature-centric worldviews. To be true to their experiences, we quote them liberally.

### **Bio/nature-centric Beliefs about Nature**

Several participants described emotional experiences they had in or with nature. For example, Barbara described her experiences caring for ducks that lived on her high school campus: “When I saw these helpless ducks, I cried, and couldn’t get the images of those starving ducks out of my head. Eventually, I asked my teacher if I could look after the ducks.”

Barbara’s emotional reaction is clear from her description of *crying* and from not being able get images of the ducks “out of her head.” Barbara referred to the ducks several times in her interviews, and she demonstrated environmentally beneficial orientations towards nature and beliefs about EE with greater frequency and enthusiasm than other participants. This, perhaps, supports the notion that meaningful experiences *in* nature can cause affective responses that initiate pro-environmental orientations (Ignatow, 2006).

Christine also described a yearning for closer relationships with nature:

I think that I am seeking honest and true relationships (with nature), and so I would want something real, not something that is manufactured by someone else. I think that there are a wide variety of issues with manufactured nature, such as biodiversity issues.

Christine’s criticism of human-made, or manufactured, nature demonstrates her belief that nature has value as it is. Valuing and appreciating undisturbed nature is characteristic of bio/nature-centric orientations as opposed to anthropocentric ones that are more likely to value nature according to how it can serve as a resource for human progress and aesthetics (Catton & Dunlap, 1980).

Participants also spoke of a close and protective relationship they have had with nature. For example, Rick stated this feeling when asked about his relationship to nature:

“I live in it. I like to think I have a good relationship, I actually live north of the city, I have a one-acre property, with a pond, and I have my fish in the pond.” Rick’s response that he lives *in* nature, suggests that he considers himself a part of nature, not separate or disconnected from it. The fact that he has property with natural features suggests he has an appreciation of nature.

### **Anthropocentric Beliefs about Nature**

Anthropocentric beliefs about relationships with nature were also observed among the participants. The primary anthropocentric beliefs (which correspond to a category in the ENQ) were characteristic of utilitarian orientations toward nature—that nature’s primary purpose is to serve human needs. For example, utilitarian beliefs are clear in a statement, made by Michael: “I

know that I treat the environment like it is something to be manipulated. Humans manipulating the environment is A-OK with me.” Michael’s frank admission that human manipulation of the environment is “A-OK” is a clear example of the normalisation of anthropocentric assumptions characteristic of Western worldviews.

The language of anthropocentrism is even more dramatic in Ron’s statement:

Like I said, it is there for my use, and, if all of humanity deems, we don’t want forests anymore, and would rather produce our oxygen in another way, then, so be it. I do believe in human[ity] over nature. There is no arguing that humans can master nature, at least a portion of it, and there is no reason not to in my mind.

Taken at face value, much of Ron’s statement could be said to describe the essence of anthropocentrism. Ron’s use of the phrase “master nature” suggests he feels that many aspects of nature continue to be unknown by humans, but that these will eventually be understood, as if nature is a puzzle that can be solved or completed by humans. This is one of the central tenets of scientific worldviews (Cobern, 1991). It should be noted that Michael and Ron demonstrated the most anthropocentric beliefs about nature during questioning. As well, their beliefs about what EE might look like were also the most conservative, often depicting positivistic school science approaches.

### **Bio/nature-centric Beliefs about EE**

Participants in this study demonstrated a commitment to, and enthusiasm for, EE in school, and they were excited about engaging students in environmental learning. Their enthusiasm was evident in their responses to the question: Should EE be a goal of school? In response, Ron remarked, “Yes, for sure! It’s a duty, it’s everyone’s duty to know about it, and be aware of it and do something about it,” and Christine said:

Absolutely! Because when we look at the grand scheme of humanity, we have set a cut-off date, unfortunately, and we need to stop that, and the best way to do that is through the next generation, the kids, because they will grow up in a different world than we did, and hopefully it will be a better one.

In addition to their enthusiasm, participants also described how they would like to provide outdoor learning experiences that helped students become aware of the ways in which they are interconnected with nature. For example, Rick stated: “I think students should be doing activities outside, and I think that part is missing.” Barbara also noted the importance of outdoor



education, claiming: “Students need to get outside, and see and be a part of nature.” Taking students outdoors and exposing them to nature was a common theme.

Participants also believed that students need to be made aware of their own environmentally detrimental beliefs and assumptions. For example, Rick stated:

Well, I suppose one way is just to make students aware of their own consumption. But as far as breaking their consumption behaviours . . . I’m not sure. It seems so embedded in the way we think. . . . I’m not sure how a teacher would go about doing that.

The need to address consumption was a common belief among the participants, although, as Rick pointed out, learning experiences aimed at reducing consumption are difficult to envision. His claim that consumption is “embedded in the way we think” indicates an awareness of deep cultural assumptions linked to consumption and a degree of critical reflection that is foundational to environmentally beneficial worldviews and, we suggest, to EE (Bonnett, 2007; Ignatow, 2006).

### **Anthropocentric Beliefs about EE**

In this study, the influence of anthropocentrism was also apparent in participants’ beliefs about EE. Common themes included: advocating for independent learning (seeing the individual as the primary social unit); describing activities that reinforce consumerism (seeing nature as a resource); and, describing activities that portray nature in mechanistic terms, such as a machine or puzzle that humans have the means and obligation to solve (privileging traditional scientific worldviews and methods).

**Seeing the individual as the primary social unit.** A belief that EE should be based on the individual, as opposed the group or community, was apparent among the participants. An example of this can be seen in Christine’s description of her science teacher responsibilities:

As a science teacher, what I want to do is give each of them their objectives, give them their apparatus that they need, and allow each of them to plan out how to meet those objectives with what they are given.

In this statement, Christine uses language that is typical of individualism (Bowers, 2003), such as the expression “each of them” to indicate the beliefs that learning should take place on an individual basis and that every student has his/her own developmental needs to be met by the teacher. Rick used similar language in his response to a question asking how students should learn in science: “The method of having students learn independently and arrive at their own

answers, rather than a step-by-step procedure to arrive at predetermined knowledge, is something that I believe in.”

The use of independent learning experiences are typical Western school approaches (Bowers, 1997; Matthews, 2009), so it is no surprise that some participants espoused these beliefs. While independent learning may be important for developing individual skills necessary for success in school (and society), many EE scholars (and scholars in other disciplines) advocate for collaborative learning that is more in keeping with what may be realistically required in addressing environmental issues (Rickinson, 2001; Yoon, 2005). For example, Dryzek (2005) has pointed out that the widespread aggregation of individual-level preferences, attitudes, and sensibilities inculcated in school (and society) constrain community-level engagement in environmental problem solving.

**Seeing nature as a resource.** Participants frequently described nature as something humans can, and should, use for their own development and consumption, or as a resource. For example, Paula stated:

In my practicum, there is an environmental club, and my practicum teacher is leading the club, and they are doing a lot of initiatives, for example, they are buying Dollarama baskets for each teacher, and these are for recycling paper, so, things like that for example. Paula seems to be unaware that buying baskets at a discount store (Dollarama) sends a competing message promoting consumption. As a result, questions such as: “Why do baskets need to be purchased in the first place?” “Why are baskets made and sold so cheaply?” “Who made the baskets, and what type of employment conditions exists for these workers?” and, “What could be used in place of the baskets?” are never asked.

A similar view was expressed by Rick:

Another good example, they are having a draw, like bringing in black inkjet cartridges, and anything they can bring in that is recyclable, the students get a token, and with that they are entered into a draw where the prize is a free iPod or something.

Rick’s use of a prize to motivate students to participate in recycling potentially reinforces a variety of ways of thinking that are environmentally unsustainable, such as needing to acquire new consumer goods, using consumer goods as a reward, and that we should aspire to be consumers. Considering our consumer-based economy and the abundant socio-cultural assumptions that exist to support consumer-based culture (Bencze & Carter, 2011), such

orientations connected to consumerism might be expected. However, this result is somewhat surprising, given that these participants also expressed concern about consumption during the interview and appeared to be critically aware of personal and sociocultural orientations based on consumerism. These competing and conflicting beliefs support a notion of resiliency among dominant Western worldviews, but it also highlights the multiple dimensions that constitute worldviews in general.

**Privileging scientific worldviews and methods.** In general, the participants in this study placed a high value on the use of science and scientific approaches in EE. For example, when asked how he would teach about the environment, Ron stated:

One thing I would like to do definitely is bring in articles, from *Popular Science*, *Scientific American*, *Discovery Magazine*, etcetera. Students need to do labs demonstrating environmental concepts, not just dissecting, and chemical reactions and stuff. Students need real scientific understanding about environmental issues.

While we agree with Ron that students may need scientific understanding about environmental issues, students' environmental orientations may also benefit from practical, cultural, indigenous, and progressive-scientific ways of understanding and experiencing nature in EE (Aikenhead & Ogawa, 2007; Hodson, 2009).

Like Ron, each participant, when providing details about an environmental learning activity or experience, described what could be considered typical or traditional science education experiences. For example, when asked how he would teach about the environment, Michael answered:

Well, there is a grade 10 science project that is always being done: you get a big glass jar and try to keep an ecosystem alive in it, and I think that is a fantastic way to do it. Now, we should maybe include a candle to represent industry, and take regular samples, like, what are the oxygen levels, what are the CO<sub>2</sub> levels? Add two candles, and say, hey look, the industrial age just happened, and modelling it like that.

The grade 10 science project described by Michael, while appearing to be an engaging learning experience, exemplifies a traditional type of science activity based on anthropocentric perspectives—in this case, viewing nature as an object that can be controlled, modelled, and understood through laboratory science (Keane, 2008; Nisbett, 2003). The ecosystem in a jar activity potentially communicates the message that nature is small, under our control,

understandable, and at our disposal to do with as we please. Furthermore, the endorsement of a reductive and objective beliefs of learning about nature was implied by Christine, who stated: “Students need to understand how the various parts of nature work.” In fact, no participant seemed to be aware of anthropocentric orientations in science education that might contribute to environmentally detrimental beliefs and behaviours among students. Additionally, no one described alternative science learning experiences that might develop more holistic orientations toward nature in students.

### **Discussion and Conclusion**

Evidence from the ENQ and interviews in this research illustrates the complexity of participants’ worldviews, and shows how orientations toward the environment might be changed through EE. It also suggests, however, that there are deep socio-cultural assumptions that shape participants’ beliefs about nature and EE, and that these assumptions may be difficult to change.

The results of this study cannot be understood, we suggest, without considering school science as its context. Although many educators may see science as the most appropriate location for EE because of certain corresponding knowledge domains (Ecology, Ecological knowledge), EE may have greater epistemological conflicts with science than with other school subjects (Hodson, 2009; Steele, 2011). The separation of humans and nature, foundational to anthropocentric orientations, validates traditional scientific approaches that consider nature as an object that can be studied through positivistic means (Cobern, 1991, 2000). Through the quantification and categorization of nature, Western science claims to construct knowledge about nature that is considered to be valid and true; yet questions about what knowledge of nature that is not constructed through Western, positivist approaches, are infrequently asked in school science (Hoeg, 2015; Hodson, 2009). Instead, traditional science methods that objectify nature so that it may be studied quantitatively, for example, are anthropocentric and dominate the practice of much contemporary science education (Hoeg, 2015; Hodson, 2009).

The privileging of anthropocentric school science practices was among the most influential of participants’ beliefs. Since Western and scientific worldviews are frequently described as anthropocentric and dominant, these findings are not necessarily unexpected. What is concerning, however, is how resilient participants’ anthropocentric orientations appeared to be. For example, while critical of consumerism and consumerist practices, several participants still

advocated EE approaches that simultaneously promoted consumerism and, therefore, may potentially produce this orientation in students. Describing EE as an enterprise utilizing relatively traditional scientific learning experiences, such as laboratory work, is another example of how an educational activity may promulgate implicit assumptions characteristic of anthropocentric worldviews. Although the participants' support of typical science approaches might be expected (since they were training to be science teachers), each participant was unaware of the potential anthropocentrism implicit in traditional laboratory and classroom science (Hodson, 2009).

It is interesting to note that the most overt anthropocentric beliefs in this study were conveyed by the male participants, while the female participants, in general, expressed more bio/nature-centric beliefs. Though the sample size is very small and results not generalizable, the results may reflect a gendered influence on human relationships with nature— anthropocentric, reductive views of nature associated with Western and scientific worldviews are commonly viewed as being masculine (Harding, 1991; Hodson, 2009), while more holistic, biocentric views are often considered feminine in nature (Longino, 1990).

### **Implications: Socially and Culturally Critical EE for Teacher Candidates**

In suggesting how teachers might be educated to teach EE in light of Western and scientific worldviews, we draw attention to the UNESCO-UNEP (1990) suggestions for teacher preparation in EE, which includes the following themes:

1. Environmental issues: Teacher education needs to include engagement with pertinent environmental issues.
2. Role of the teacher: Teachers need to be educated to be agents of change.
3. Integration of EE: Teachers of all subjects need to be trained in EE.
4. Whole school approach: EE needs to be embedded in school culture.
5. Local and global: Include environmental issues of both local and global importance.
6. Values education: EE needs to include the social and cultural issues that contribute to environmental problems.
7. Interdependence: The importance of the relationship between humans and the natural environment needs to be reinforced

Themes 6 and 7 appear to be most pertinent in an examination of the social and cultural orientations that may contribute to the environmental issues increasingly common in society and present in worldviews (Bonnett, 2007; Ignatow, 2006). Socio-culturally critical perspectives appear to be necessary in EE for preservice teachers so that they may understand and counter the underlying effects of worldviews on their practice (Van Petegem, Blicek, & Van Ongevalle, 2005). Far from being a novel approach, socio-cultural criticism is a recognized and suggested component of EE (Hart, 2003; Hart, Jickling, & Kool, 1999; Sauvé, 2005). Socio-cultural criticism involves understanding how socially constructed worldviews and dominant human beliefs and behaviours constitute morals and ethics pertaining to nature and the environment, including the influence of culture, politics, and economics (Bowers, 2003; Laessoe, 2010; Orr, 2004). It demands reflection on, and reorientation to, pedagogical approaches, with greater attention paid to Eurocentric biases and approaches that are transformative (Robertson & Krugly-Smolka, 1997).

Sauvé (2005) suggests pedagogy that can lead to socio-cultural criticism. A “value-centered” theme she identifies aims to “adopt eco-civic behaviours” and to “develop a system of ethics” which may be achieved through “analysis of values; clarification of Values; and criticism of social values” (p. 33). Indeed, it appears necessary that initial teacher preparation include experiences for teacher candidates to analyze and evaluate their own values and worldviews, and to assess and adapt common EE pedagogical practices relative to the social and cultural values they may possess. For instance, the preparation of preservice teachers for EE might include:

- Completion and reflection on a survey that evaluates social and cultural values relative to the environment, such as the Environmental Questionnaire (Johnson & Manoli, 2008).
- Discussion and reflection on readings pertaining to social and cultural influences on human relationships with nature/environmental ethics (e.g., Sauvé, 2005).
- Exposure to, and development of, EE activities and lessons that challenge anthropocentric dispositions and foster bio/ nature-centric dispositions (Jickling, 2004).
- Continuing and ongoing attention to, and reflection on, how social and cultural beliefs infuse school, subjects, teacher subjectivity, and pedagogy (e.g., through journal responses, class discussions, and components of lesson/unit plans)

As Crompton and Kasser (2009) have pointed out, even individuals with dominant anthropocentric orientations still contain environmentally beneficial identity components that are

less influential, and that these might be activated through education that causes individuals to see value in these components. Yet, if teachers lack knowledge or awareness of the socio-cultural influences related to environmental problems, they may inadvertently and unknowingly plan educational experiences that reproduce environmentally detrimental orientations, such as anthropocentrism (Plevyak, Bendixen-Noe, Henderson, Roth, & Wilke, 2001; North American Association for Environmental Education, 2000). Developing and advancing socio-cultural criticism among preservice teachers would therefore seem to be a potentially effective approach for programs preparing all teachers for EE.

### **Socially and Culturally Critical EE in Science Teacher Preparation**

A homogenous and exclusive school science perspective potentially creates a singular, oppressive way of perceiving nature and doing science (Harding, 1991). Nature of Science (NOS) education, which is a goal in the Ontario science curriculum, can potentially provide space to include diverse perspectives and more inclusive views of nature in school science. NOS appears to be well suited for such approaches because it is interested in understanding the socio-cultural values, beliefs, and assumptions of science. NOS education, however, too often results in simply teaching “the” scientific method and inculcating traditional anthropocentric beliefs and assumptions of science (Hoeg, 2015; Hodson, 2009). Even when traditional orientations of science (such as the notion that science is objective) are challenged, seldom does NOS include explicit learning about how science may be anthropocentric (Aikenhead & Ogawa, 2007; Hoeg, 2015; Hodson, 2009).

Although, in many respects, the preservice teachers in this study were eager to teach EE and had many ideas about how this might be achieved, it was clear they were unaware of the anthropocentrism that ran through many of the activities they described. This suggests that initial science teacher education should engage teacher candidates in NOS activities that interrogate socio-cultural assumptions related to nature, such as anthropocentrism. NOS education for science teacher candidates could include, for example, evaluation of how science and science lessons may be anthropocentric, and how to develop science and environmental experiences for students that are more biocentric. Discussions about how the Ecosystem in a Jar activity described by Michael, for example, may reproduce anthropocentric orientations in students, and how such an activity may be changed (or discarded) to address this issue, are discussions that, we suggest, should occur in science teacher preparation.

As we know that teacher candidates arrive with entrenched beliefs and worldviews, teacher educators can never be sure that teacher candidates will take what they learn in the program and apply it when they have their own classrooms. Having some insight into the nature of their beliefs and worldviews as they enter the program, however, allows us to take them to account through approaches such as those described in this chapter. Further research on this subject should include more investigations into the connections between worldviews and teacher candidates' beliefs and the ways in which those beliefs translate into classroom practice.



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## Appendix A: Anthropocentric Worldviews

Worldview	Tenets
Dominant Social Paradigm (DSP) (Catton & Dunlap, 1980)	(1) People are fundamentally different from all other creatures on Earth, over which they have dominion. (2) People are masters of their destiny; they can choose their goals and learn to do whatever is necessary to achieve them. (3) The world is vast, and thus provides unlimited opportunities for humans. (4) The history of humanity is one of progress; for every problem there is a solution, and thus progress never needs to cease.
Scientific Worldview (Cobern, 1991)	(1) The modern scientific worldview is a uniquely Western phenomenon born out of the intellectual tumult of the 16th to 18th centuries in Europe. (2) Scientists (humans) are seen as dominant over nature. (3) It is a reductionistic view that sees the explanation of the whole in the parts. (4) Machine-type analogies are considered appropriate for explaining natural phenomena. (6) It remains a thoroughly empirical view that stresses the importance of testable hypotheses concerning natural causes.

<p>The scientific worldview (adapted from AAAS, 1990)</p>	<p>(1) The things and events in the universe occur in consistent patterns that are comprehensible through careful, systematic study. Scientists believe that through the use of the intellect, and with the aid of instruments that extend the senses, people can discover patterns in all of nature.</p> <p>(2) The universe is, as its name implies, a vast single system in which the basic rules are everywhere the same. Knowledge gained from studying one part of the universe is applicable to other parts.</p> <p>(3) Science is a process for producing knowledge. The process depends both on making careful observations of phenomena and on inventing theories for making sense out of those observations. Change in knowledge is inevitable because new observations may challenge prevailing theories.</p> <p>(4) Although scientists reject the notion of attaining absolute truth and accept some uncertainty as part of nature, most scientific knowledge is durable. The modification of ideas, rather than their outright rejection, is the norm in science, as powerful constructs tend to survive and grow more precise and to become widely accepted.</p> <p>(5) There are many matters that cannot usefully be examined in a scientific way. There are, for instance, beliefs that—by their very nature—cannot be proved or disproved (such as the existence of supernatural powers and beings, or the true purposes of life).</p>
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Worldview components present in Western forms of schooling (Bowers, 1997)	<ol style="list-style-type: none"><li>(1) A view of the individual as the basic social unit.</li><li>(2) An anthropocentric view of the world that leads to organizing knowledge and constituting values from a human perspective and need.</li><li>(3) Change is viewed as inherently progressive in nature.</li><li>(4) Traditions, except for family holidays, patterns, and events, are seen as inhibiting progress.</li><li>(5) The world is understood as secular in nature, with spirituality either being limited to the experience of the individual or explained in functional terms.</li><li>(6) Social development is understood in economic and technological terms.</li><li>(7) Machines continue to serve as the analog for understanding life processes.</li><li>(8) Technologies are created using designs that can be replicated anywhere in the world to maximize profits and ensure central control over the technology.</li><li>(9) There is an increasing reliance on science as the most powerful and legitimate source of knowledge.</li></ol>
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## Appendix B: Bio/nature-centric Worldviews

Worldview	Tenets
<p>New Ecological Paradigm (NEP) (Catton &amp; Dunlap, 1980, p. 34)</p>	<p>(1) While humans have exceptional characteristics (culture, technology, etc.), they remain one among many species that are interdependently involved in the global ecosystem.</p> <p>(2) Human affairs are not only influenced by social and cultural factors, but also by intricate linkages of cause, effect, and feedback in the web of nature; thus, purposive human actions have many unintended consequences.</p> <p>(3) Humans live in and are dependent on a finite biophysical environment which imposes potent physical and biological restraints on human affairs.</p> <p>(4) Although the inventiveness of humans and the powers there from derived may seem for a while to extend carrying capacity limits, ecological laws cannot be repealed.</p>

<p>Ecological Worldview (Marten, 2001)</p>	<ul style="list-style-type: none"> <li>(1) Nature is an interrelated system.</li> <li>(2) Nature has a limited capacity.</li> <li>(3) Nature has value of and for itself.</li> <li>(4) Humankind is an integral part of nature.</li> <li>(5) Human destruction of nature is exceeding natural limits.</li> <li>(6) Humankind is responsible for nature. <ul style="list-style-type: none"> <li>(i) Based on human health and development (shallow ecology).</li> <li>(ii) For the reason that all species have an intrinsic right to live (deep ecology).</li> </ul> </li> </ul>
<p>Spiritual Model of Environmental Concern (Ignatow, 2006)</p>	<ul style="list-style-type: none"> <li>(1) Nature is highly valued and recognized as something that needs protection.</li> <li>(2) Nature and humans should be kept apart.</li> <li>(3) The natural world is threatened by modern society.</li> <li>(4) Science and technology allow for the increased utilization of nature and, therefore, need to be avoided or used with extreme caution.</li> </ul>

## **Chapter 4**

### **Environmental Literacy for All: Innovating Environmental Education for Teacher Education Majors and Non-Education Majors (Ontario)**

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### Abstract

A major goal of Environmental Education (EE) is to ensure that all citizens become environmentally literate. Institutions of higher learning, therefore, can play a significant role in developing EE programs that are suitable for training environmental educators both for formal and non-formal education settings. This chapter examines the nature of an undergraduate EE course that was designed to meet the needs of Initial Teacher Education (ITE) majors and non-education majors at Laurentian University in Sudbury, Ontario. A survey was designed for the purposes of evaluating effectiveness of the course and for improvement purposes. Twenty-eight undergraduate students who were enrolled in the course completed the anonymous, post-course survey. The survey results indicated that students found the course to be well balanced in terms of lectures, hands-on/action-oriented activities, invited guests, as well as opportunities to voice their opinions. The students also reported that their environmental behaviours were enhanced or changed in a positive way as a result of taking this course, and they felt empowered to teach others how to live more sustainably. Drawing from the findings, I argue that, alongside the preparation of environmentally literate teachers, we should also think about preparing environmental educators for “the masses.” The conclusion provides some insights into how this course can be utilized to ensure that all concurrent education majors are well prepared to effectively integrate EE across the school curriculum.

*Keywords:* initial teacher education, environmental education, environmental literacy, education majors, non-education majors.

### Abstrait

L'objectif primordial de l'apprentissage écologique c'est d'assurer que tous les citoyens aient des connaissances sur l'environnement. C'est la raison pour laquelle les institutions des études supérieures peuvent jouer un rôle significatif dans le développement des programmes EE qui sont appropriés pour la formation des enseignants écologiques dans un milieu formel ou non-formel. Ce chapitre examine la nature d'un programme de baccalauréat EE qui a été créé afin de répondre aux besoins de la faculté d'éducation initiale (ITE) majeure et non-majeure à l'Université Laurentienne de Sudbury, Ontario. Un sondage a été conçu afin d'évaluer les objectifs efficaces du cours et l'amélioration de ce dernier. Vingt-huit étudiants, inscrits au programme de baccalauréat, ont complété un sondage réalisé après le cours de façon anonyme. Les résultats du sondage suggèrent plusieurs aspects. Les étudiants ont trouvé que le contenu du cours avait un bon équilibre entre l'approche actionnelle, l'apprentissage pratique et les personnes invitées. Aussi, les étudiants ont noté qu'ils avaient le droit d'exprimer leurs opinions. Nul doute que les étudiants ont signalé qu'il y a eut une sensibilisation environnementale qui a été renforcée d'une manière positive. C'est évident qu'ils ont ressenti un sentiment de puissance qui visera à enseigner aux autres comment vivre d'une manière viable. En tirant des conclusions, j'exige que les étudiants soient prêts en tant qu'enseignants de littératie visant à une culture scientifique et écologique pour "une masse" de gens. Cette conclusion fournit quelques aperçus de comment ceux-ci peuvent servir afin d'assurer que les étudiants à la faculté qui suivent le programme de concurrent majeur soient bien préparés d'intégrer EE d'une façon pluridisciplinaire.

*Mots clés:* la formation initiale des enseignants, l'éducation de l'environnement, la littératie du milieu et de l'environnement, les étudiants à la faculté qui suivent le programme concurrent majeur, les majeurs non-educationnels.

## **Environmental Literacy for All: Innovating Environmental Education for Teacher Education Majors and Non-Education Majors**

In order to combat the environmental crisis confronting our world today there is need to ensure that all citizens are environmentally literate and that younger generations, in particular, receive an education that supports a more sustainable future. Schools play a critical role in this regard, and Initial Teacher Education (ITE) programs can play an even greater role by preparing teachers who are environmentally literate and who can successfully implement sound Environmental Education (EE) programs in schools. The North American Association for Environmental Education (NAAEE) defines an environmentally literate person as “someone who, both individually and together with others, makes informed decisions concerning the environment; is willing to act on these decisions to improve the well-being of other individuals, societies, and the global environment; and participates in civic life” (Hollweg et al., 2011, pp. 2-3). The ultimate goal of educating others about the environment is to bring about an awareness of how important it is to live in harmony with nature and to change the unsustainable ways that have led to the current environmental crisis. When we think about change, we normally target education because that is the easiest way to impact future generations. The current environmental crisis cannot just wait for future generations to solve the mistakes made by the generations before them. It is also critical that current generations get educated about the environmental crisis in order to bring about the needed changes, such as climate change mitigation and adaptation. Alongside the preparation of environmentally literate teachers, we should also think about ways to prepare environmental educators for non-formal education settings, what I would call “environmental educators for the masses.”

How can teacher educators play the dual role of preparing environmentally literate teachers and being environmental educators for the masses? This chapter provides an answer to this question by discussing an undergraduate EE course that was designed to meet the needs of undergraduate concurrent education majors and non-education majors at Laurentian University in Sudbury, Ontario. It reports on a post-course survey that was conducted for the purposes of evaluating the effectiveness of the course and for course improvement. The chapter begins with an introduction that discusses the need for environmental literacy among preservice teachers and how the neoliberal climate of our time has imposed challenges on implementing EE both in the

formal education system and in the non-formal sector. This is followed by a description of the EE course for concurrent education majors and non-education majors. Finally, I discuss the report findings within the context of the course content, and provide suggestions for course improvement to better meet the needs of a diverse student audience. The conclusion offers some insights into how the ITE program at Laurentian University can utilize this course to ensure that all concurrent education students are well prepared to effectively integrate EE across the school curriculum.

As a science educator with a background in biology, I have always had a passion for teaching about the environment. I have emphasized the integration of the environment into my Science and Technology courses for Primary-Junior and Junior-Intermediate teacher candidates in order to address the Ontario Ministry of Education policy on EE (Ontario Ministry of Education, 2009). This policy document highlights goals, strategies, and actions for teaching and learning, student engagement and community connections, as well as environmental leadership. The policy framework advocates for integration of EE across the curriculum; however, it does not give a universal model for implementation, mainly due to the eclectic and complex nature of EE. With such broad and non-specific goals and no specific direction in which EE should be addressed, teachers need to be knowledgeable about what constitutes EE and how it can best be integrated within different subjects.

The Ontario Ministry of Education has made progress in outlining specific expectations describing what students need to know and be able to do in the area of EE within the different subjects, but no specific directions or financial aid have been provided to support teacher preparation in this area. The contradictions between the policy mandate and implementation of EE in ITE have made it difficult for faculty who have been advocating for the inclusion of EE courses in their programs. However, some progress has been made and a number of ITE programs in Ontario are offering EE courses. Inwood and Jagger (2014) highlight examples of the ITE programs in Ontario that offer EE courses either as elective or required courses.

The ITE program at Laurentian University is one of the programs that did not offer an EE course for students in the Concurrent Education program until 2014 when I was given the opportunity to develop an EE course for the Environmental Studies program in the university's new *School of the Environment*. The idea was to develop an undergraduate elective EE course that would not only meet the needs of Environmental Studies and Environmental Science majors,

but that would be suitable for Concurrent Education majors as well as other students across campus who would be interested in learning how to teach others about the environment. Some of these students could eventually pursue careers in non-formal educational settings such as conservation areas, parks, science centers, and museums. Some may question why we should care about developing environmental literacy among preservice teachers. The following section provides a review of literature that shows the relationship between environmental literacy and preservice teacher effectiveness in developing environmentally literate students.

### **Environmental Literacy among Preservice Teachers**

The need to prepare teachers who are environmentally literate, who can impart environmental knowledge, and who can influence students' values, beliefs, and behaviours, is more critical now than ever before. The goal of EE in school is to shape young people's perceptions and values about human impacts on the environment, and to ensure the development of a sustainable future. Teachers play a significant role in the development of environmental literacy among students (McKeown & Hopkins, 2002; World Commission on Environmental Development, 1987). In addition, teachers are influential in environmental leadership development among children and teenagers (Esa, 2010). Teachers, therefore, are more likely to produce students who are more environmentally literate if they are more knowledgeable, have positive attitudes, and show concern for the environment (Tuncer et al., 2009). Teachers who lack proficiency in environmental knowledge, skills, and commitment are less likely to effectively lead environmental change in schools (National Environmental Education Advocacy Council, 2005; Yavetz, Goldman, & Pe'er, 2014). Inadequate incorporation of EE within ITE programs is one of the obstacles to successful implementation of EE in schools (Cutter & Smith, 2001; McKeown & Hopkins, 2002; UNESCO, 1997; Yavetz et al., 2014).

A lack of the desired environmental knowledge and understanding among preservice teachers has been well documented, including misconceptions regarding issues such as the greenhouse effect, ozone layer depletion, and acid rain (Boyes, Chambers, & Stanisstreet, 1995; Dove, 1996; Groves & Pugh, 1999; Khalid, 2003). Spiropoulou, Antonakai, Kontaxakaki, and Bouras (2007) reported on how limited knowledge about the environment among Greek primary preservice teachers resulted in low rates of implementation of environmental programs in



schools. Similarly, Esa (2010) reported that the lack of environmental knowledge among students and teachers contributed to a lack of pro-environmental behaviours.

Yet other studies have revealed positive environmental attitudes, limited environmental knowledge, and low levels of environmental behavior among preservice teachers (Boubonari, Markos, & Krevrekidis, 2013; Michail, Stamou, & Stamou, 2007; Pe'er, Goldman, & Yavetz, 2007; Stir, 2006; Tuncer et al., 2009). Preservice teachers in Australia and Turkey reported that they were very concerned about environmental issues and scored high on attitudinal factors. Although they possessed minimal knowledge regarding environmental issues, they expressed a lack of confidence in making wise decisions and in taking appropriate action (Boubonari et al., 2013; Stir, 2006). Similarly, preservice teachers in Turkey showed a high degree of concern about environmental problems, and expressed positive attitudes towards the environment despite their low levels of knowledge on current environmental issues (Tuncer et al., 2009). A study of Israeli preservice teachers revealed their positive attitudes towards the environment despite limited knowledge (Pe'er et al., 2007). This can be viewed as a reflection of the preservice teachers' awareness and desire to identify with what they intuitively accept as correct values regardless of their limited knowledge. Chapman and Sharma (2002) attributed the lack of environmental awareness among student teachers to the theoretical way in which EE is taught.

The literature above implies that teachers are more likely to produce students who are more environmentally literate if the teachers are more knowledgeable, have positive attitudes towards the environment, and show concern for environmental problems. If teachers lack proficiency in environmental knowledge, skills, and commitment, it is unlikely they will be able to effectively lead environmental change in schools. Inadequate incorporation of EE within ITE programs has been identified as one of the obstacles to successful implementation of EE in schools. Given the contradictions that exist between the EE policy mandate and the lack of support for implementation of EE, ITE programs need to find creative ways to ensure that teacher candidates are provided with the necessary knowledge and skills required to effectively lead EE programs in schools.

### **Environmental Education and its Challenges in a Neoliberal Climate**

A look at the history and development of EE shows that it is not a new concept. Internationally, it is claimed that the term "environmental education" was first used in Paris in

1948 at the International Union for the Conservation of Nature and Natural Resources meeting; in Britain, the first recorded use of the term can be traced to a conference held in 1965 at Keele University, Staffordshire (Palmer, 1998). The roots of studies of nature and what was commonly known as “nature study” in schools can be traced further back to the ideas of progressive educators of the 18th and 19th centuries (Hammerman, Hammerman, & Hammerman, 2001; Woodhouse & Knapp, 2000). Dewey (1939), for example, advocated an experiential approach to student learning in the local environment, and Jean-Jacques Rousseau (1712-1788) advocated for using the child’s natural interests and curiosities to the fullest, maintaining that education should include a focus on the environment (Hammerman et al., 2001). This was followed by nature study movements of the early 1900s, which paved the way to conservation education programs of the 1930s (Inwood & Jagger, 2014). The current EE movement was fueled by the public awakening to chemical pollution and general environmental awareness prompted by such publications as Rachel Carson’s (1962) book, *Silent Spring*. This was followed by international EE forums, meetings, and pronouncements, including the 1972 Stockholm Declaration, 1975 Belgrade Charter, 1977 Tbilisi Intergovernmental Conference on Environmental Education, and the 1992 Rio Summit (Palmer, 1998). These events brought together government officials from different nations and the support of key international institutions to raise the profile of EE during the 1970s, leading to a great deal of common understanding of the aims, objectives, and approaches to the subject (Palmer, 1998). The reports and declarations from these meetings provided guidelines for EE and Education for Sustainable Development (ESD). Article 6 of the United Nations Framework Convention on Climate Change (UNFCCC, 1992), for example, stipulates the promotion of education, training, and public awareness on climate change.

The latest global attempt to promote the inclusion of ESD in the education system was the United Nations declaration of 2005-2014 as the UN Decade on Education for Sustainable Development (UNESCO, 2002). The goal in this case was to ensure the development of education that would allow every human being to acquire the knowledge, skills, and values necessary to shape a sustainable future. Such education would include key sustainable development issues such as climate change, disaster risk education, biodiversity, poverty reduction, and sustainable consumption. It is education that would require teaching and learning methods to motivate and empower learners in changing their behaviours and taking action for sustainable development. Ten years later, the education system worldwide still struggles to

integrate environmental and sustainability education into curricula at all levels. Such challenges may be due to what Huckle and Wals (2015) identify as failure by the UN to acknowledge or challenge neoliberalism as a hegemonic force blocking transitions towards genuine sustainability.

Neoliberalism in this discussion refers to a modern politico-economic theory favouring free trade, privatization, minimal government intervention in business, and reduced public expenditure on social services. Neoliberals expect governments to replace a social democratic notion of public good with a version in which competitive markets provide for the public good (Judt, 2010). Hursh, Henderson, and Greenwood (2015) view neoliberal ideals that promote economic growth and use of markets to solve environmental and economic problems as constraints on how we conceptualize and implement EE. They go on to show how our lifestyles have become a part of these neoliberal ideals to the point that we cannot think of how else our societies could function. According to Hursh et al. (2015):

Neoliberal ways of thinking about and acting in the world have become so prevalent, naturalized, and internalized that we are often unaware of how neoliberalism constrains our thinking and practice, such that it is difficult in both thought and deed to imagine a society proceeding on different principles. (p. 300)

In Canada, for example, a neoliberal regulation favours an economy of resource extraction where economic and environmental policies and tax codes benefit the concentration of corporate wealth from oil, gas, and mineral development (Hursh, et al., 2015). This has negatively affected any environmental initiatives that are viewed as countering economic growth. In their book, *What Every Environmentalist Should Know About Capitalism*, Magdoff and Foster (2010) speak up against capitalism. They assert that capitalism is so much a part of our lives that it is as invisible as the air we breathe, and they oppose any suggestion that capitalism offers the solution to the environmental problem.

Most institutions face challenges in their efforts to implement EE in a climate where there are ideological contradictions between the rhetoric of public policy, actual program structure, and practices administered in an economy which primarily serves to reinforce a capitalist mode of production marked by high environmental impact (Stahelin, Accioly, & Sanchez, 2015). Such challenges are mostly encountered by institutions or organizations when they come up with environmental information that may question the activities of corporations. Such information is

viewed as anti-economic development. For example, the Conservative Government's pursuit of economic growth without regard for environmental consequences led to muzzling of scientists and cuts in funding for environmental research for about a decade, from 2006 to 2015

([http://www.huffingtonpost.ca/2013/04/30/science-cuts-muzzling-canada-conservatives\\_n\\_3112348.html](http://www.huffingtonpost.ca/2013/04/30/science-cuts-muzzling-canada-conservatives_n_3112348.html)). It may not be surprising that even though an EE policy has existed in Ontario since 2009, there has been no promotion of EE initiatives. This reveals the general, profound contradictions that exist when neoliberal environmental governance meets public environmental initiatives (Stahelin et al., 2015). Such situations create a challenge for teacher educators who are concerned about the development of environmental literacy among preservice teachers.

Hursh et al. (2015) argue that educators and researchers need to analyze how neoliberalism undermines education in general and EE in particular. Huckle and Wals (2015) suggested combining the emerging theory and practice of sustainability with *ecopedagogy* and citizenship education. Ecopedagogy is a combination of the critical pedagogy of Paulo Freire with future-oriented ecological politics, and involves teachers and students carrying out environmental projects in the classroom and community (Huckle & Wals, 2015). Freire (1998) advocated for dialogue between the student and the teacher, and that the dialogical action has to have both action and reflection in order for transformation to take place. Ecopedagogy therefore opens up spaces for dialogue that allows critical analysis of the discourses surrounding sustainability and enable students to become active participants. These suggestions are critical for educators as they provide a way to question the "business as usual" attitudes in order to bring about change.

### **Developing an EE Course for Concurrent Education Majors and Non-Majors**

In order to ensure that the EE course designed for concurrent education majors and non-education majors contained a balance of content and teaching strategies suitable for a diverse group of students, consultations with other educators and an Internet search were conducted to see if similar EE courses were being offered elsewhere. The search revealed a few EE courses at universities in the United States that were designed to meet the needs of both education-track and non-education majors, and a few more EE courses that were designed specifically for non-education majors. Consultations with colleagues in ITE programs in Ontario revealed diverse

perspectives in terms of the content and focus of the EE courses offered. Themes that could be identified across the courses included activities that involve: learning about the environment through ecological studies and the connectedness among living and non-living entities in the environment; experiential learning in the environment through inquiry, nature walks, and field trips; and learning for the environment through action projects and eco-mentoring activities. Some specific examples of EE courses offered by Ontario ITE programs included the EE/Outdoor Education course at Brock University, the Education for a Sustainable Future course at York University, Exploring Environmental and Sustainability Education at OISE, University of Toronto, and the Climate Change Pedagogy and Outdoor Ecological and Experiential Education courses at Lakehead University.

Common themes such as education *about*, education *in*, and education *for* the environment could be identified across the EE courses gleaned in the search process, and these themes provided a framework for designing the new EE course for education majors and non-majors at our university. The first part of the course focused on learning about EE in terms of its history and how it evolved over the past six decades, discussion of local and global environmental issues confronting our world today, and a look at the Ontario EE Policy. The second part of the course focused on strategies of teaching about the environment in the environment, and this included program and lesson planning, and teaching strategies focused on developing a sense of place, including experiential learning, inquiry activities, hands-on investigations, field trips, and project-based learning. During this part of the course, students are given the opportunity to go on a nature hike to explore the woods around the campus. As part of this activity, students work in pairs to observe and identify plant and animal species found in the local environment. The idea is to help students develop a sense of place by becoming more aware and conscious about other organisms with which they share their environment. The second experiential activity involves students going on a field trip to the Lake Laurentian Conservation area during one of the classes. To date, activities at the conservation area have been led by the environmental educator at the center who demonstrated the hands-on activities they do with school children. This activity was multifaceted in that it served as an experiential form of learning about the environment in the environment, while also demonstrating what non-formal EE looks like and what the job of an EE educator entails. Students were also introduced to

experiential projects they were to complete as assignments for the course, which focused on designing an eco-mentoring activity and an action project.

The final part of the course focuses on teaching for the environment, and this includes topics such as Education for a Sustainable Future, Indigenous Knowledge and Ways of Living in Harmony with Nature, Radical Environmentalism, and Ecological Justice. The new EE course, ENVI 2556, was offered for the first time during fall semester 2014, and a total of 28 students were enrolled. Given the elective nature of the course, students from different disciplines were enrolled, including 13 Concurrent Education majors, 8 Environmental Studies/Science majors, 1 Biology major, 1 Geology major, 3 Law and Justice majors, 1 Nursing major, and 1 Outdoor Education major. It is important to note that this is not a required course for Concurrent Education students, but is highly recommended. The next section outlines a self-study that was conducted to evaluate the effectiveness of the EE course.

### **Methodology**

A self-study research design was used to evaluate the effectiveness of the undergraduate EE course designed for concurrent education majors and non-education majors. Participants for this study included all of the 28 students enrolled in the ENVI 2556 course during the fall term of 2014. The participants majored in different undergraduate degree programs, and an anonymous survey was administered at the end of the course in order to provide the instructor with feedback about the effectiveness of the course and for improvement purposes. The survey included four items exploring: (a) factors that motivated students to enroll in the course; (b) perceptions about their EE knowledge before and after taking the course; (c) aspects of the course that may have impacted their thinking and views about environmental issues; and (d) suggestions for how the course could be improved. To ensure that the rights of the participants were protected, the researcher sought approval from the research ethics board before data collection. The ethics board approved the use of an anonymous survey on the condition that the data were only going to be analysed after the course ended and after students' marks were published. An anonymous survey was used in order to protect students' identity as well as to ensure that they would be free to provide more honest responses without fear of their views jeopardizing performance in the course. The following section provides a description and discussion of the findings.

## Findings and Discussion

**Students' expectations about the course.** The survey results indicate that students had different expectations in terms of what the course was about or the focus that the content would lean towards. Students' expectations were almost equally divided: one third said they thought the course was about teaching *about* the environment to young children in non-formal settings; approximately one third thought the course was about teaching in a school setting; and one third thought they were going to learn more about environmental content and environmental issues. The syllabus for this course indicates that the course presents methods of teaching about the environment both in the formal and non-formal education settings. However, the findings seem to indicate that this description had different meanings for students depending on their prior knowledge and motivations for taking the course, as shown in the following quotation from a student: "This course was essentially how I thought it would be, while I thought it would be more heavily influenced by education in the classroom." Another student wrote: "I thought this course would give me different tools on how to address a group of students about different environmental issues." On the other hand, one third of the students indicated that they had expected the course to focus more on environmental issues and providing facts on how to help people change their attitudes and behaviours. In this regard, one of the students wrote: "I thought this class was just a good class about environmental issues, I have looked into many of the topics talked about in this class before but it was nice to learn about educating others about the issues," while another reported, "I thought this class was gonna be more on how to change the conventional way of thinking. Also, I thought it was going to present an issue and give ideas on how to help."

These responses were not surprising given the diversity of students' academic interests. More importantly, the findings provide a glimpse into different students' motivations for taking the course regardless of what the official course description says. The Concurrent Education majors were more likely to be drawn into the course by its promise to teach them how to teach children in school, while the Environmental Studies/Science majors may have been drawn to the course because of its promise of teaching them how to teach in non-formal settings. Most of the Environmental Studies/Science students were in their upper years and had taken a lot of environmental courses, therefore they were likely to have been drawn to the course by its promise to help them disseminate environmental knowledge. On the other hand, non-education

students who had no environmental background were more likely to have taken the course to be educated about environmental content.

Given the diversity of interests and expectations among students coming into this course, one might ask: How diverse can an EE course for a diverse student body be? I think the answer to this question lies in the inherent nature of EE itself which has been described by such metaphors as “a tree with many roots and branches,” and “a river with many tributaries” (Palmer, 1998). This course managed to meet the diverse needs of students by including a diverse range of themes, experiential and hands-on teaching methods, and a variety of positive learning experiences.

### **How the course impacted students’ thinking and views about environmental issues.**

*Environmental education as developing a sense of place.* In order to emphasize the need to connect with nature and to demonstrate that this course was more experiential in nature, the first class was held outside the classroom in an area where students could sit on rocks. The experiential nature of the course was emphasized again during the second class by taking students on a nature walk along the campus trails. The major goals of these experiential activities were to demonstrate how to teach *about* the environment *in* the environment, and to help students develop a sense of place through reflective practice. This is in agreement with Lewis & Williams (1994) who assert that experiential education first immerses learners in an experience and then encourages reflection about the experience to develop new skills, attitudes, or ways of thinking. Being in Northern Ontario, the university is surrounded by woods, and students found this exercise to be eye-opening as they had never really thought about looking closely at the nature surrounding them. In their reflections, students mentioned how, after the nature walk, they walked the trails more often, and noticed the diversity of plant and animal life they had never thought about before. As one student wrote:

After the first exploration around campus, I began to appreciate what was around me and notice all diverse species living together in the same area to create a beautiful environment. Now after having gone on this nature walk I am more reminded of the beauty and diverse nature around me.

The experiential learning theme was extended by taking students on a field trip to a community EE center about 15 minutes from campus. The major goals of this activity were: to



demonstrate strategies for teaching children *about* the environment *in* the environment; to provide an example of what the job of a non-formal environmental educator entails; and to show how teachers can use a non-formal EE center as a resource to teach about *the* environment *in* the environment. The class was led by an environmental educator who engaged students in hands-on learning activities that they do with school children who visit the center. This field trip was appreciated by all students, and they found the learning experience to be valuable and something that they could use in the future. According to one of the students, “Going on the field trip was awesome and gave us a new perspective to look at. It’s important to have hands-on activities as students of all ages respond well to it.” Another student wrote: “I did not realize it [the course] would teach us the importance of learning about the environment and how to incorporate the environment into everyday education.” Yet other students just loved the idea of connecting with nature in addition to the lessons learned, stating: “Overall the trip had a very positive effect on me. It has not only given me insight to the importance of exposing students to nature and learning hands-on, but has also allowed me to gain further appreciation of nature.” It was clear from students’ experiential reflections that this activity was all-encompassing; students were able to see the possibilities of using the games and hands-on activities they experienced at the centre and what the position of an environmental educator in non-formal settings could involve. This is in agreement with Reid & Nickel (2008) who showed how cognitive and situated teaching strategies place participation at the center of learning. The feeling of being outside and learning how to teach about the environment as well as experiencing the environment is something that cannot be captured in a lecture.

***Environmental education as taking action through projects.*** Students completed two group projects for this course. One of the projects was an eco-mentoring activity and the second project involved planning and taking action on an environmental issue around campus or in the community. The two projects aimed to show students how they could teach about the environment in everyday life to peers, family, friends, and children, and to show how they could lead or teach through civic engagement to address environmental issues both in formal and non-formal settings. Students found these projects to be empowering, and the projects helped them realize that they did not have to be education majors to teach others about the environment, as one student indicated:

I was surprised a bit about the Environmental Action project and teaching strategies because I thought that only Con Ed students would be able to do well at teaching, but it is easy for anyone to get involved, makes me want to teach more people and not be afraid of their reactions.

In the same vein, another student wrote: “I understand more that individual people can work towards improving the environment. Simple actions, even on social media, can be a useful tool to raise awareness about issues you feel are important.”

This mentoring component of the course was equally important for both education majors and non-majors as their interests involved teaching youth at different stages and in different settings. On this issue, one student stated: “The thing I found most helpful about this course was the emphasis placed on voicing your opinion on, and telling others about, environmental issues.” The students realized that youth participation is a component of civic engagement which enables youth to voice their opinions about issues that are important to them while making a difference in the development of a more sustainable future. Students got to practice components of civic engagement and service learning through the action project. One student described his experiences as follows: “I understand how to carry out a campaign or action for an environmental issue on campus or in the city.” From the class presentations, students were able to see the different action projects that their peers performed, and they realized that the possibilities were endless. The action project opened up space for dialogue as students presented their projects, and it gave students an opportunity to critically analyze environmental issues on campus and in their neighbourhoods (Huckle & Wals, 2015). Working on the action projects in groups demonstrated that participation should not only be seen as something students do as an extension of their classroom learning, but, rather, that it is more effective when it is integrated in the learning process by engaging teaching perspectives that view learning as occurring within a community (Lave & Wenger, 1991).

***Learning for the environment: Questioning our campus sustainability.*** Questioning the sustainability of our own lives is one way to make more meaningful sustainable lifestyle changes. With this goal in mind, students participated in a trash audit to see how much recycling was happening on our campus and the type of garbage the campus sends to the landfill. The whole class was shocked by the results of this audit, which showed that our campus lagged so

much in terms of recycling. Students in the class noted how they had not paid much attention to recycling and would try to recycle more. On this topic, one student wrote:

I now try to recycle as much as I can. If I can take these things I have learned about in this course and apply to my everyday life which I have been trying to do I can be more involved and continue to helping the environment.

Students were also happy to realize that the university was taking some action to make the campus greener, as noted by one student in the survey: “This course helped me to learn about some of the environmentally friendly impacts and actions the school is taking and I was happy to be able to look at the more positive environmental acts.” In general, students were happy to learn about the campus sustainability strategies that were shared by the university’s sustainability manager, and they showed a willingness to be involved in making the campus more sustainable. One feature distinguishing an EE course from an environmental information course is that the former promotes the development of critical thinking and encourages students to come up with solutions. Students felt motivated to do more in order to make their lives on campus more sustainable. Youniss & Levine (2009) noted the importance of translating theory into practice, and how this is critical in terms of empowering young people to fully participate in their communities. This course was successful in the sense that students were able to identify the environmental issues on their campus, and they were able to come up with solutions that they shared with the campus sustainability manager.

***Radically rethinking environmental sustainability in the 21st century.*** By beginning the course with an analysis of environmental issues on a global scale and concluding with a critical stance on the challenges confronting our planet, students were able to critically analyze their own lifestyles and determine what needed to change. In the course, students also realized that what we do in our part of the world impacts other parts as well, and that there is a need for everyone to live responsibly. The following two reflections articulate students’ understanding of the intricate nature of the current environmental crisis. One student commented, “This course impacted my thinking and views by opening up my eyes to the bigger picture. There are so many contributing factors associated with the environment that I previously was not aware of,” and another said:

It made me realize there are really more issues out there than I thought and it shocked me how so many are not doing anything about it. This allowed me to be more critical when

thinking about alternatives to what we do in our daily lives or how to keep doing what we are doing and making it more environmentally friendly.

Considering the challenges confronting our world, EE for the 21st century means that we need to prepare young people to be critical thinkers who can radically rethink how to change the lifestyles that have led to the current environmental crisis. In the course, students also practiced civic engagement through a classroom debate based on issues surrounding the “Ring of Fire,” a chromite mining project in Northern Ontario. Students’ reflections about the debate showed that they appreciated the opportunity to openly express their opinions. According to one student:

This debate gave everyone a chance to make their voice heard and address any concerns they may have had on the issue. In conclusion, this debate was informative, and gave the class a chance to be very open and express their opinions freely.

Through the debate, students became more aware of the intricate nature of the environmental issues involved in a high profile project that promises to bring billions of dollars to the province. Students became knowledgeable about the environmental impact of the chromate project as well as the social justice issues confronted by First Nations communities in the area.

Overall, students benefited from taking this course in terms of having gained an overall understanding of a variety of global and local environmental issues, and, as a result, they felt more prepared to teach others about the environment. One student clearly summarised her overall experience as follows: “For a second year environmental studies course, I think this course works well with its existing content. It was refreshing to work in hands-on settings, as well as having guest speakers, but balanced out well with the lecture material.” Another student wrote, “I believe this course was perfectly operated as we had in-class lectures and plenty of hands-on experience, which got us involved to write about our experience.” In general, there is need for EE to be taught in a way that promotes the translation of theory into practice and that promotes embracing the sustainability action process (Cutter-Mackenzie, 2010). This course managed to provide a balanced model where the theory presented through lectures was translated into action through experiential activities and action projects.

**Suggestions for course improvements.** Approximately one third of the students in the course suggested that the course could be improved by engaging students more in experiential, practical experiences. Throughout this course, students were engaged in several experiential activities as described previously, and they were given the opportunity to write reflections of

their experiences and feelings. This suggestion could be reaffirming the fact that students did enjoy the activities and found them to be great learning experiences, which is why they felt the need for more such activities. This is reaffirmed in the following quotation from another student: “More outside education such as the conservation area field trip and more active engaging projects like the eco-mentoring project.”

Teaching *about* the environment *in* the environment is an effective teaching strategy that brings students to experience the natural environment as opposed to hearing about it in a lecture. Experiential learning is the major focus in non-formal environmental settings, and schools also need to include more experiential learning activities in their EE programs. Perhaps, in the future, we will consider adding another field trip to a non-formal environmental learning center such as Science North to provide students with yet another experience of teaching about the environment in non-formal settings.

Five of the respondents to the survey suggested that the course could be improved by focusing more on teaching skills and practicing skills such as communicating ideas about the environment. One student made a suggestion that: “Environmental education is a huge topic to cover everything and there isn’t enough time for it, I think focusing on teaching skills and improved communication about environmental issues would be a better focus.” This is a great suggestion, given the fact that this is the only EE class that most non-education majors would be taking in university. Certainly, they would appreciate more time to practice in order to feel more confident in their communication skills.

In the course, students learned about program planning, and planning lessons and lesson activities, but no practical peer-teaching session was included. However, the eco-mentoring project enabled students to plan a lesson that they taught either to their peers or school-age students. In the future, it would be important to consider including a micro-teaching activity in order to give students the opportunity to teach a lesson or lead an activity with their peers. Literature shows that practicum experiences are critical to improving student teachers’ self-efficacy and teaching skills (Hascher, Cocard & Moser, 2004). In this course, it may not be possible to include practicum placements due to class schedule conflicts. An alternative would be a weekend camp for school-age students, where university students would plan the programs, lessons, and activities that they would engage students in for one or more weekends. This would be evaluated as a major course project and replace the final examination. One student suggested:

“This course could be improved by more outdoor classes or fieldtrips and maybe not an exam but rather a bigger action project that would go further in-depth to making a difference.” Weekend camps could be used as such an ongoing project where students can practice their communication skills, and where they can be evaluated for their abilities to plan an activity and engage students in hands-on environmental inquiry.

Three students suggested that the course could focus more on environmental issues and not just education. According to one of these students: “I would suggest having a more structured schedule that would allow to present various issues, explain why it’s happening and how to help. I think factual information is great and would help overall understanding of current environmental issues.” Although we discussed environmental issues on the local and global scale at the beginning of the course, students who had not taken any environmental courses prior to this course felt that they needed to learn more about environmental content. I happen to teach an Introduction to Environmental Studies course that most of the students who were enrolled in the EE course had taken before. This introductory course focuses on providing environmental information both at the local and global scale. In the future it would really work well if the introductory course were to be made a prerequisite to the EE course. This would ensure that students have a deeper understanding of environmental issues before taking the EE course.

### **Conclusion and Future Directions**

The environmental education course described in this chapter was designed for the School of the Environment at Laurentian University to meet the needs of a diverse group of students, including Concurrent Education majors, Environmental Studies/Science majors, and students from various majors across campus. The course focused on developing critical thinking skills among students with regards to local and global environmental issues, and it enhanced their problem solving and decision making skills through participation in hands-on and action projects. It also provided a balanced outlook on EE, both in formal education and non-formal education. The end of course survey results showed that students found the course to be well balanced in terms of lectures, hands-on, action-oriented activities, invited guests, and opportunities to voice their opinions. Students reported that the course changed, or enhanced, their positive environmental behaviours, and that it provided them with more ideas of how they

can help others change their lifestyles. The students felt empowered and more confident to teach others about environmental issues and ways to protect the environment.

These findings indicated that the course was successful in developing environmental literacy among future teachers for the formal education sector and among environmental educators for “the masses.” In order to have a greater impact, this course should be made available to more undergraduate students. More importantly, there is a need to make this course accessible to all concurrent education majors at Laurentian University. Considering that almost 50% of the students enrolled in the course were Concurrent Education majors, it is clear that this course can make significant contributions to preparing preservice teachers to teach about the environment. Teachers who are more knowledgeable and show concern for the environment are likely to develop students who are more environmentally literate (Tuncer et al., 2009). Currently, this course is not required, but highly recommended, for Concurrent Education majors. However, making it a required course will greatly help to ensure that student teachers from the program will be prepared to integrate EE in the school curriculum as mandated by the Ontario Ministry of Education. Since the course is offered in the second year, Concurrent Education majors can take it as an elective in their undergraduate program where it does not compete with the compulsory, Professional Year, teacher certification courses.

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## **Chapter 5**

### **Rising to the Challenge: Promoting Environmental Education in Three Ontario Faculties of Education (Ontario)**

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### Abstract

In this chapter, we describe the efforts of three faculties of education in Ontario, Canada, in addressing Environmental Education (EE) in their Initial Teacher Education (ITE) programs. We also discuss the tensions inherent in designing and implementing EE programs in educational environments where EE continues to be marginalized. Beginning with a brief overview of Earth's environmental degradation and the state of well-being of Canadian children, we suggest that formal education systems—especially faculties of education—have a critical role to play in promoting and supporting the health of the planet and the children who inhabit it. We discuss the impact of government-mandated EE policy, and the subsequent potential of ITE programs to effect change within the education system. We ask the question: How can a faculty of education effectively prepare teachers to embed studies *in, about, and for* the environment in their teaching practice? To help us understand this question from a pedagogical and curricular perspective we outline the characteristics of various theoretical frameworks such as inquiry-based learning, experiential and place-based education, and a range of integrated curriculum models. Three field narratives are presented from three different faculties of education. Despite the unique nature of each, the narratives demonstrate strong commonalities in the approaches taken to address EE and the challenges associated with program implementation.

*Keywords:* mentoring, extracurricular, narratives, challenges

## Abstrait

Dans ce chapitre, nous soulignons les efforts de trois facultés d'éducation en Ontario, Canada. Ceux-ci impliquent l'éducation de l'environnement (EE) dans les programmes de la faculté d'éducation (ITE). Aussi, nous voulons discuter des tensions intrinsèques en ce qui a trait à la conception et l'application des programmes (EE) dans les programmes d'éducation de l'environnement. Nous continuons de mettre de côté le EE. Tout d'abord, commençons avec la dégradation et l'état d'être des enfants canadiens, nous suggérons que les systèmes d'éducation, surtout les facultés d'éducation qui jouent un rôle critique afin de promouvoir et d'appuyer la santé des enfants en tant qu'habitants de notre planète Terre. Nous devons discuter de la politique EE mandatée par le gouvernement et la possibilité ultérieure des programmes ITE afin de marquer des changements significatifs dans le système d'éducation. Nous posons la question: Comment est-ce que la faculté d'éducation peut effectivement préparer les enseignants à intégrer les études *dans, au sujet et pour* l'environnement dans leur pratique d'enseignement? Afin de comprendre cette question d'une perspective pédagogique et curriculaire, nous soulignons les caractéristiques de variétés de l'apprentissage basée sur l'enquête, l'apprentissage sur terrain et une variété de modèles de curriculums pluridisciplinaires. Trois champs de renseignements sont présentés de trois facultés d'éducation. Malgré leur nature particulière de ces dernières, leurs récits démontrent des éléments communs marqués dans les approches faites afin d'adresser EE, et les défis associés à la mise en oeuvre du programme.

*Mots clés:* programme de mentorat, les activités parascolaires, les récits, les défis

## **Rising to the Challenge: Promoting Environmental Education in Three Ontario Faculties of Education**

### **The State of the Planet and the Well-Being of its Children**

In the wake of relentless environmental degradation, society must overcome its inertia and act quickly to address the anthropogenic threats to Earth's biosphere. Climate change, habitat destruction, and biodiversity reduction are among the factors seriously harming Earth's ecosystems on which all life depends. Some of this harm is irreversible. For example, recent data from the International Union for Conservation of Nature (IUCN) indicate that current extinction rates exceed the normal background rate by 100-1000 times (IUCN, 2004; Pimm et al., 2014). While the impact of such threats can seem to be far off, their effects are being felt now. Furthermore, Canadian children entering Kindergarten this year can expect to still be alive in 2100, when average global temperatures are likely to be at least two degrees Celsius warmer (Intergovernmental Panel on Climate Change, 2014). Given the implications of these and other pressing environmental concerns, one might expect them to be at the top of political and educational agendas. Instead, we often witness individuals and institutions adopt a "business as usual" approach to managing the planet. Education systems, in particular, struggle to prioritize Environmental Education (EE) when political and strategic decisions focus on preparing young people for roles in an unsustainable economy.

In our view, the education system has a critical role to play in steering society toward sustainable ways of life. While formal education cannot be expected to provide all of the leadership, it is in the unique position of being able to inform, reform, and transform successive generations of youth. This is especially important given the changes in childhood that have been experienced in much of the world, including Canada, in recent decades. While there is growing appreciation that spending time outdoors benefits children physically and psychologically (Faber Taylor & Kuo, 2009; Wells & Evans, 2003), many of today's children lead more sedentary lives than their parents or grandparents. Authors such as Louv (2005, 2012) have made a powerful case for the benefits that flow from helping young people reconnect with nature in their local environment, and Chawla (2009) has shown that when children receive frequent access to natural areas and the mentorship of well-informed adults, they are more likely to develop into adults who have a deeper interest in, and empathy for, nature. The task for education is surely to help us

move toward the day when the term “environmentalist” is redundant because ecologically responsible behaviour, at individual, governmental, and corporate levels, is the norm. In terms of Initial Teacher Education (ITE), there is an urgent need to nurture future generations of teachers equal to this challenge.

### **ITE as a Driver of Change**

Faculties of education have always been in the powerful position of fostering change in the education system, given their dual role of educating new teachers and conducting education research. In particular, they can introduce teacher candidates (TCs) to novel, evidence-based approaches, and sow expectations that challenge and disrupt traditional practices. From this perspective, TCs can be seen as potential “Trojan horses,” smuggling new ideas and alternative frameworks into established school systems. All of this is good news when it comes to promoting innovative EE through the supply chain of newly qualified teachers.

### **Theoretical Frameworks**

Environmental Education, as education *in*, *about*, and *for* the environment, inherently entails cognitive, affective, and empirical/practical dimensions (Hines, Hungerford, & Tomera, 1987). The cognitive element essentially involves development of knowledge and understanding of environmental processes and issues, and strategies for addressing environmental problems. The affective domain primarily concerns values and ethics education, and the development of sensitivity, forethought, appreciation, and responsibility. Laura Bush, in her 2003 address to Summit of the Hemisphere, stressed that “children must learn . . . how to live . . . and to have the strength of character to make the right choices” (U.S. State Department, 2003). To “make the right choices” usually involves doing the right thing in the face of injustice or danger. The empirical and practical dimensions of EE involve the development of awareness of environmental issues through direct engagement with the environment and planning for and taking appropriate action to prevent and mitigate environmental harm and degradation. In a pedagogical and curricular sense, the cognitive, affective, and empirical/practical dimensions of EE may be understood through the perspectives of inquiry-based learning (Chiarotto, 2011; Moyer, Hackett, & Everett, 2007) and experiential and place-based education frameworks (Gruenewald, 2003; Kolb & Fry, 1975; Sobel, 2004).



## **Pedagogical Perspectives**

**Inquiry-based learning.** Inquiry-based learning is a student-centred, constructivist approach founded on the premise that “all people normally try to make sense of their world” through direct observation and analysis (Moyer et al., p. 12.). Essentially, inquiry-based learning involves iterative cycles of observing, questioning, inferring, collecting evidence, testing, analyzing, justifying, and communicating. Ideally, the process is collaborative, with groups of students “engaged in critical discourse about the world,” and teachers facilitating learning by “creating a context for questioning and helping [students] along their journey of discovering of ‘big ideas’” (Chiarotto, 2011, p. 1).

**Experiential and place-based education.** Experiential education involves teaching and learning that is empirical in nature, grounded in concrete experience, and reflective (Kolb & Fry, 1975). In a related way, place-based learning is learning that takes place in a student’s local environment or community, taking advantage of the unique social, economic, political, cultural, and historical resources of the “places” in which students live (Gruenewald, 2003; Lim, Tan, & Calabrese Barton, 2013; Smith, 2002). Sobel (2004) describes place-based education as:

The process of using the local community and environment as a starting point to teach concepts in language arts, mathematics, social studies, science, and other subjects across the curriculum. Emphasizing hands-on, real-world learning experiences, this approach to education increases academic achievement, helps students develop stronger ties to their community, enhances students’ appreciation of the natural world, and creates a heightened commitment to serving as active, contributing citizens. (p. 7.)

Historically, EE has been addressed in courses such as science, geography, and environmental science. However, EE is distinct from these particular subject areas because it focuses on the relationship between people and nature, and on issues arising from that relationship. Thus, EE involves study of the basic principles of science, geography, and environmental science, as well as relevant aspects of economics, law, political science, sociology, psychology, philosophy, literature, and the arts. EE is therefore inherently multi-disciplinary and cross-curricular in nature (UNESCO, 1977). As such, school systems often have difficulty determining if EE should be integrated across the curriculum or offered as a stand-alone course. Adding or integrating an additional course to an already over-crowded program can

be challenging. Presently, only a few Ontario faculties of education have instituted discrete elective or compulsory EE courses, while most have endeavoured to integrate EE across the curriculum—with varying degrees of success (Inwood & Jagger, 2014). The integration of EE into other courses may be analyzed through models of imposition, insertion, infusion, and framing (Heimlich, 1992; Monroe & Cappaert, 1994).

## Curricular Perspectives

### Integrated curriculum models.

**Imposition.** Imposition involves the incorporation of discrete EE exercises into a curriculum not exclusively focused on the environment. Such exercises often focus on a specific topic, such as pollution, global warming, alternative energy, or water quality, and may be implemented in response to government, community, or institutional initiatives, such as Earth Week or Energy Watch. Imposed activities may provide excellent opportunities for students to engage in EE; however, the depth and breadth of learning is limited, and the concepts and issues are often addressed without due regard for the complex, highly interconnected, and interdisciplinary nature of the subject.

**Insertion.** Insertion is similar to imposition in that it involves the addition of a discrete environment-based unit of study into an already existing (non-EE-based) program (Monroe & Cappaert, 1994). However, in this case, the unit is more extensive in breadth and depth of coverage, and would typically involve the insertion of an extensive unit of study, a compulsory or elective EE course, and/or extracurricular program. When an EE unit, course, or program is inserted into an already existing program, a variety of conflicts may arise that need to be reconciled, including timetable and space conflicts.

**Infusion.** In the context of EE, infusion involves the unified incorporation of extensive environmental content into non-EE courses, such as science, geography, mathematics, social studies, literature, and the arts (Heimlich, 1992). In this approach to EE curricular development, educators look for opportunities to connect EE concepts and issues with a mainstream course's curricular content. Various organizations, including school districts and ministries of education, have developed resources to assist in this process (Ontario Ministry of Education, 2011a, 2011b). According to Disinger and Howe (1992), if not applied skilfully, infusion may result in compromised outcomes because it: “may adversely affect the rigor of the host subject, and . . . [the] intellectual investment needed for thorough understanding of specific detail . . . not directly

pertinent to the discipline at hand” (p. 6). Moreover, Karrow and Fazio (2015) claim that infusion is a “reductionist” strategy of curricular integration that results in only superficial treatment of EE within established subjects such as science, geography, and mathematics, and that “superficiality . . . creates the impression . . . that EE is occurring within schools, when in fact only a very rudimentary and superficial curricular form of EE is being practiced, if at all” (p. 98).

**Framing.** Framing is a pedagogical approach in which the arbitrary boundaries of traditional subject areas are eliminated, and a highly integrated and inter-disciplinary framework for teaching and learning is implemented (Heimlich, 1992). Framing is more commonly practiced in elementary grades, where a particular teacher is typically responsible for a number of different subjects, and is less common in middle and secondary schools where subject discipline divisions tend to be less flexible.

### **EE in Ontario ITE**

After years of neglect, the status of EE in the Ontario school system received a boost in 2007 with the publication of *Shaping Our Schools, Shaping Our Future* (SOSSOF), a report produced by the Ontario Curriculum Council’s Working Group on Environmental Education (WGEE), chaired by Dr. Roberta Bondar (Ontario Curriculum Council, 2007). The Ontario Ministry of Education (OME) accepted the 32 recommendations in the SOSSOF report and used them to help create *Acting Today, Shaping Tomorrow: A Policy Framework for Environmental Education in Ontario Schools* (ATST) (OME, 2009). This policy framework requires that EE be embedded in all subjects and grades of the Ontario curriculum. However, ITE programs were already quite intensive and focused on a number of mandated curriculum emphases, including numeracy and literacy, which steered attention away from EE. Nevertheless, studies by Tan and Pedretti (2010), Marcum-Dietrich, Marquez, Gill, and Medved (2011), and Blatt and Patrick (2014), among others, made the case for enhancing EE in ITE in Ontario. However, finding space in busy timetables, recruiting capable faculty, and convincing sceptical and poorly informed colleagues of the importance of EE in ITE have been significant challenges.

Discovering that there are individuals and organizations that support efforts to enhance EE in ITE provides the inspiration new teachers need to persevere in the face of resistance. Faculties of education that introduce TCs to local environmental heroes, especially those who have succeeded within the constraints of the school system, go a long way in inspiring TCs to make a

difference. Furthermore, by showing TCs and children that concern for and interest in the environment extends beyond the school walls, we demonstrate the advantages of integrated thinking and the power of making real-world connections. The time is ripe to examine how faculties of education can empower new teachers to become effective and hopeful environmental educators who take on leadership roles in environmental protection and sustainability. Many faculties of education, including the three discussed here, are meeting the challenge by providing effective EE in the face of formidable practical, political, and perspectival tensions.

### **Three Field Narratives**

In the three field narratives presented below, we discuss programs and activities that have been implemented in our respective faculties of education to address EE in our ITE programs in light of the pedagogical and curricular theoretical frameworks discussed above.

#### **Field Narrative 1: Eco-Mentors at Trent University**

Launched in 2003, the consecutive Bachelor of Education (B.Ed.) program at Trent was initially lacking in EE content. There was some infusion of EE in some courses, but the extent depended on individual instructors. There was no elective in EE or outdoor education. To address the perceived shortfall, and encouraged by the publication of ATST (OME, 2009), a working group was struck in 2009 to identify opportunities for the development of ecological literacy and sympathetic pedagogies. Various ad-hoc contributions to EE in the B.Ed. program were elicited from community members during the 2010-11 academic year. As these workshops occurred near the end of the program, however, it was too late for TCs to make use of the content and techniques during their school-based practica. The main contributor of workshops was Camp Kawartha, a nearby, outdoor education centre. In subsequent discussions with the camp director, it was suggested the workshops could be offered earlier in the year, so that TCs would be able to apply their learning during their placements. From this arrangement, Trent's *Eco-Mentor Certificate Program* emerged and was subsequently launched in the autumn of 2011. Trent University TCs are invited to sign-up for an Eco-Mentor program. Collaboration with various community members is central to the program's philosophy: it shows a TC that there are people and organizations locally that can support them in their quest to become an Eco-Mentor to students. Partnership gives access to expertise that can enrich and support curriculum delivery and provide professional advice and encouragement

The Eco-Mentor program consists of four half-day workshops, which are themed: Nearby Nature, Overcoming Barriers, Inspiring Hope, and Cross-curricular Connections. Workshops are extra-curricular, bear no formal credit, and attendance is voluntary. These features give the program an unusual degree of freedom compared to standard university offerings, and they enabled the program to be established efficiently and with limited bureaucracy. Workshops are held in Camp Kawartha's Environment Centre (a satellite building to the main camp) and timetabling conflicts are avoided by holding workshops on Saturdays (Monroe & Cappaert, 1994). The Environment Centre was built by faculty and students from Sir Sandford Fleming College's Sustainable Building Design and Construction Program on the edge of the Trent University Wildlife Sanctuary, and it provides a highly conducive learning environment. TCs who participate in the full program are invited to submit a report demonstrating how they incorporated ideas and philosophies from the workshops into their teaching. Each year, 30-50 TCs have signed up for the program, representing 15%-25% of Trent's TCs. Candidates who submit a report are awarded an informal certificate in recognition of their commitment.

The Eco-Mentor workshops are jointly coordinated on a volunteer basis by a small group of faculty and the director of Camp Kawartha, but importantly, each workshop also reaches out to involve additional faculty and other community members. The community contributors are experts, not only in fields of teaching, but in journalism, photography, nature conservation, community gardening, and Indigenous studies. These experts not only share their expertise in various subjects, but they also serve as role models for a range of pedagogical approaches. Many of the contributors incorporate outdoor experiential activities in their sessions to reinforce, explicitly and implicitly, the underlying message that the outdoors provides a stimulating place-based learning environment (Lim et al, 2013; Sobel, 2004).

Among the experts are local teachers who have championed EE in their schools and have inspiring stories to tell. These have included a recently retired teacher who worked with children, parents, and colleagues for over 25 years to transform the grounds of his elementary school from a barren monoculture of grass and hard surfaces into a child- and wildlife-friendly series of habitats. Another local teacher works with at-risk youth with whom he has developed a vegetable garden whose produce they use to make salsa, which is then sold (along with items they make from recycled materials). Other presenters have come from organizations that can support teachers by providing classroom speakers and venues for school outings. These include a

regional conservation authority that runs a water stewardship program in schools, and the Peterborough Ecology Garden that promotes sustainable, wildlife-friendly gardening techniques. Furthermore, members of the Camp Kawartha teaching staff provide TCs with information about facilities available to school groups at outdoor education centres. TCs are also made aware of employment opportunities through exposure to the work of a range of educators, many of whom do not work in traditional classroom settings. Some of our students have gone on to secure internships with our community partners for the final phase of their B.Ed. program—in an Alternative Placement setting—by working at the Peterborough Ecology Garden, for instance, helping to plan and run sessions for visiting school groups.

The Eco-Mentor sessions challenge preconceptions and provide curriculum support ideas and enrichment opportunities. Outdoor activities are incorporated in every workshop—whatever the weather—and provide TCs with first-hand experiences of how curriculum expectations may be met outside the four walls of a classroom, which demonstrates the value of experiential and place-based learning in EE (Gruenewald, 2003; Smith, 2002). This aspect of the program helps to raise awareness of growing calls to reconnect children with the outdoors and with nature (Kozak & Elliott, 2014; Louv, 2005; Sobel, 2004). The pleasure and stimulation that TCs display in response to outdoor activities makes it easy to convince them that they should be planning to incorporate such opportunities with their own teaching (Figures 1 & 2). Moreover, many of the activities can help fulfill the expectation that children in elementary schools in Ontario experience daily physical activity (OME, 2005) (Figure 3).





*Figure 1.* “Meet a tree” exercise.



*Figure 2.* Tree identification exercise.





*Figure 3. Modelling a skein of geese.*

The Ontario curriculum recommends an inquiry-based approach to learning (e.g., OME, 2009, 2013) and some of the workshop activities demonstrate how this can be achieved in outdoor settings by, for example, developing children’s inquiry skills, including observing, questioning, and seeking answers (Chiarotto, 2011). By providing concrete examples of inquiry learning and other activities, we believe that TCs are more likely to have the confidence to try these strategies for themselves. A workshop on cross-curricular links specifically examines how environmental and Indigenous education can be integrated and used to support each other—an example of curricular infusion (Heimlich, 1992). This particular workshop has included traditional teaching by an elder, which was a new experience for most participants that they often find profoundly motivating and thought-provoking. One Eco-Mentor TC commented: “I loved having the elder come in. I could have listened all day.” Showing our TCs how Indigenous education can be infused with environmental subject matter in inspiring and mutually beneficial ways is an important aspect of the program.



By exposing participants to the ideas of a range of educators from a variety of backgrounds, we hope that they will be encouraged to try new things and gain confidence. Some participants reported finding themselves completing placements in schools where no other teacher is interested in EE and where there is no tradition or expectation that students should experience outdoor learning opportunities. One TC reported: “My Associate Teacher was not always on-board with going outside. She did not want to take responsibility for children outside. The focus was on math and language.” In such environments, TCs can feel isolated, and so we encourage our Eco-Mentors to reach out to people and organizations for support and collaboration. In questionnaire surveys and focus-groups conducted after the program, TCs often reported that the highlight of the program is working with like-minded people and discovering others who want to prioritize EE in their teaching. As one TC said: “My passion for being outside became something I really wanted to share because of the excitement of the program and seeing how many other people felt the same way.” By working with like-minded others, it is possible to build a team spirit that nurtures and sustains us when faced with negativity and institutional/developmental barriers.

**Teachers as Eco-Mentors.** We are inspired by the outcomes of the Eco-Mentor program. After completing the workshops, TCs are challenged to implement an environmental focus to any area or theme during their practica. TCs then report on what they did, how they connected with students and community members, and how they tackled the challenges they encountered. The reports provide insights into how informative and useful the TCs found the workshops. In general, the outcomes reveal how TCs: (a) acquaint themselves with the school community and connect a sense of place to environmental inquiry (Chiarotto, 2011; Lim et. al., 2013; Sobel, 2004); (b) support and inspire environmentally-focused activities; and (c) foster and manage the development of environmental leadership in themselves. The following sections expand on these three outcomes.

**Sense of place.** According to Lim et al. (2013), place is a “conceptual framework that helps us to understand the importance of relationships between the individual and the society and also the local and the global” (p. 192). In practice, we propose ways in which awareness for one’s place can foster environmental connections, locally and globally. We recognize our role in society as educators, sharing knowledge about sustainability and environmental stewardship. Yet, the challenge is how to take what one has learned about place during the Eco-Mentor

program and move theory into practice. For many TCs, placements are in unfamiliar communities where they have to discern and adapt to school dynamics and connect with student interests.

A place-based educational framework is witnessed in several TC reports. Some emerging themes include facilitating excursions, getting students outside of their classrooms, and piggy-backing on initiatives in the local community. For example, one TC shared information about an excursion to a logging company where students learned about the company's ethics on sustainable forestry practices. In another example, a TC harnessed the power of getting youth outside to perform a play on the open field in their schoolyard. Another TC had students perform math tasks outside, searching for angles among the natural and built environments (Figure 4). Lastly, a TC collaborated with the local Rotary club on their Annual Spring Clean Up. Getting to know the community in terms of clubs, centres, and local organizations proved to be worthwhile for new teachers wanting to get their students to participate in meaningful outreach and partnerships. Each of these experiences cultivate a sense of place in TCs.



*Figure 4.* Grade 6 students using a tablet to record angles in the outdoors.

**Support and inspire.** Several TCs reported learning opportunities that encouraged students to think critically about privilege. One TC described how students' exploration of clean, fresh drinking water provoked their thinking: "We discussed how fortunate we are in Canada to have access to fresh drinking water. We compared our situation to other countries that are not as lucky to have the water that we do." Another used the Jay-Z documentary, *Water for Life*, to raise awareness on what we can do to help those who do not have clean water. Creating a reflective space to inquire and discuss water usage inspired the students to create their own "Charter of Water Rights and Responsibilities" (Figure 5). Subsequent activities engaged students in better practices to conserve water and to research and advocate for water conservation in their school, homes, and communities.

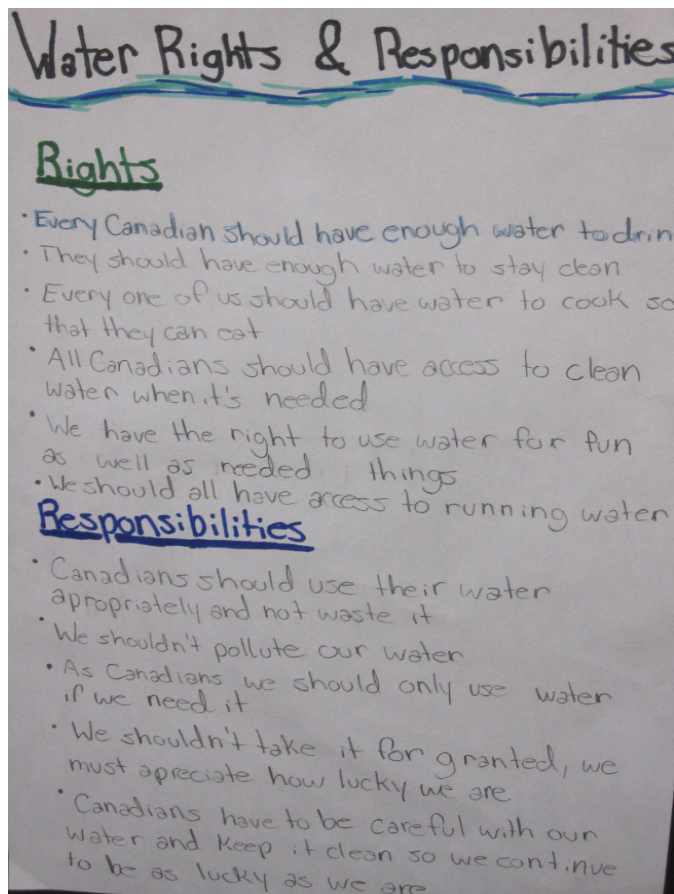


Figure 5. School students' water charter.

Another example activity promoted a recycling initiative with students. In this case, a TC reported how, “Many parents shared that their children had gone home and spoken at length about the initiatives undertaken in the classroom,” and how the children’s misconceptions were rebuked, “The fact that plastic never really goes away blew their minds!” Here the TC was able to answer critical questions through the knowledge they shared about waste and plastics—it resonated with the students who spoke about it at home and then demonstrated their growing concern by completing a classroom recycling project.

In both of the cases above, students were inspired to act. We believe some of the most encouraging projects reported are those that make a call to action among students. Scholarship that appeals to student agency (e.g., Hodson, 2010) strengthens how motivation and engagement in learning is supported when students understand their social responsibility and take action on issues of local and global concern. For example, litterless-lunches helped nurture behaviour and cultivate habits that a TC reported as lasting: “Students will continue the Recycling Rangers program that was put in place and will also continue to empower the students to make a difference.” Importantly, in terms of EE, TCs explored how their action has a ripple effect on the world, as exemplified in posters they made (Figure 6).



Figure 6. School students’ recycling posters.

**Fostering leadership.** One critical triumph of the Eco-Mentor program is the fostering of leadership through the development of mentors or leaders who can confidently infuse EE into their practice as well as encourage their colleagues to do so. The reports produced by TCs after completing the workshops and venturing into their placements offered insights here as well: “I was able to bring with me and teach others (teachers and students) what I know about environmental conservation.” Assurances like this are inspiring and hopeful. While it is difficult to measure, a number of TCs also made claims that can be interpreted as a personal victory as they take on the role of an Eco-Mentor. One participant said, “When I recognized the science and environmental infusion that was possible, and when I was able to see it work and how excited the students got, I knew it was worth the effort!”; another commented, “I made it my mission throughout my placements to incorporate the natural world into as much of the curriculum as possible and make environmental education a ‘normal’ part of everyday school life.”; and another reflected that, “I felt a sense of satisfaction with this lesson that I didn’t feel with many other lessons. The students were engaged and participating, and in the end, isn’t that what we strive for as teachers?”

**The future.** The Eco-Mentor program will continue to evolve, most notably as we move from a one- to two-year Bachelor of Education degree program. In the B.Ed. program, we will run a new core course in EE, and the Eco-Mentor program will now offer experiences to complement this addition. Fuelled by the positive reception our TCs have given to the Eco-Mentor workshops, and by the successes our TCs have experienced in schools as they served as Eco-Mentors, we will continue to forge opportunities for EE to be highly valued in our faculty as a prerequisite for preparing TCs and their future students to live sustainably and ecologically.

## **Field Narrative 2: E4E at Nipissing University**

**Beginnings.** Prior to 2005, Nipissing University’s School of Education did not offer any EE course. At that time, practices involved infusing snippets of EE into other courses such as Science and Technology, depending on the interests of the instructor and time available. Consequently, a group of determined faculty members developed a 36-hour course titled “Outdoor and Experiential Education” (OEE) which ran from 2005 to 2012. In its heyday, the OEE course was heavily subscribed by many TCs who had an interest in developing and

implementing outdoor education programs, and who desired to work in non-traditional venues, such as outdoor education centers. Participants were required to pay approximately \$700 for tuition and an additional \$250 to cover the costs of four off-campus weekend experiences. By 2012, to the disappointment of founding faculty members, declining enrolment and rising costs led to the cancellation of the OEE course.

Unable to resurrect the OEE course, or introduce a new EE course into an already packed ITE program, we, like many other faculties of education were at a loss (Monroe & Cappaert, 1994). How could we infuse or insert EE into the program? Fortuitously, in the spring of 2012 we learned of the Eco-mentor program at Trent University, and the proverbial light bulb began to blink! Of course, what works at one institution doesn't necessarily translate well to another, but the concept of weekend workshops for TCs struck us as entirely possible. And, so was born the idea for the "E4E" (Educating for Environment) workshops. In essence, we wanted to offer our TCs an opportunity to explore and participate in training for infusing/inserting environmental and sustainability issues throughout classroom curricula. This was different from the OEE elective course, which focused on outdoor and experiential learning and the development of outdoor education skills and programs.

**The E4E workshops.** In all, we (the authors) currently offer four E4E Workshops at Nipissing University: two in the fall and two in the winter, each addressing different topics. The two faculty members advertise the workshops through posters and the school of education electronic newsletter. Generally, about 24 TCs register for these workshops, with the understanding that, in order to qualify for an informal certificate of completion, they must attend all four workshops and provide evidence of integrating EE during an instructional period. The workshops take place on a Friday evening and the following Saturday (all day). Participants pay a nominal fee of \$25, which covers honoraria for guest speakers, supplies, and snacks. The workshops are each designed to provide TCs with ideas for both indoor and outdoor activities that focus on some aspect of learning in, for, and about the environment, while deliberately identifying potential opportunities to infuse EE throughout the mandated curriculum. Furthermore, opportunity for discussions about various concerns that TCs might have, including details about taking groups of students outside their classrooms and schoolyards, are provided throughout all four sessions. Guests, including teachers, graduate students, and faculty members from other programs, provide a diverse and rich opportunity for students to engage in discussion.



The surrounding landscape of Nipissing University is beautiful and varied. The campus sits atop an escarpment, beside a large pond, bordered to the west by rugged, mature hardwood forests. An extensive trail network exists for hiking, biking, and snowshoeing. In other words, we do not have to travel far from our door to be immersed in a natural world that offers many EE-related learning experiences. We encourage our E4E participants to be prepared to go outside in all types of weather, keeping in mind the maxim of one of our guest speakers (who is a teacher in the primary panel): “There is no such thing as bad weather, only poor clothing choices.”



*Figure 7.* E4E participants consider the possibilities for their students in the outdoor classroom.

Typically, fall workshops have included: a theoretical introduction to EE in Ontario; delivery of EE lessons through the eyes of a classroom teacher; a night hike that provides inspiration for poetry writing; and a social studies activity called “Global Morning,” taken from the “Teaching Green” series (Grant & Littlejohn, 2009), in which participants track on a hand drawn world map the world-wide sources of everything we might encounter in the first hour of our morning, including our alarm clocks, running shoes, and breakfast choices. This leads to a robust discussion around socio-environmental concerns. In addition, TCs are introduced to a series of environmentally-focused physically active games, such as “Quick Frozen Critters” and “Oh Deer!” (Canadian Wildlife Federation, 1992), and the utilization of a digital microscope outdoors to enable participants to see the world of the “tiny.” Winter workshop activities have included a history of materials and the design of snowshoes; an outdoor adventure on snowshoes, including races and games; and the creation of snow art as an expression of visual arts. In the style of an environmental science class, TCs complete a snow study, identifying snow layers and varying temperatures in the snow profile, etc., and discovering the amazing world of the pukak.<sup>1</sup> Over lunches, we encourage conversations that challenge the personal views and actions of our participants (e.g., discussions about climate change, food security, consumerism, and environmental toxins).

After attending all four workshops, participants are encouraged to take their newfound understandings and resources, and apply these during practicum placements to design and implement a minimum of one lesson that integrates EE. Upon submitting evidence of their lesson (a lesson plan or detailed description), the participants are issued an informal certificate verifying completion of the E4E Workshops. The lessons submitted by the participants address a large range of subject areas and grades, such as: Grade 1 Art with natural materials gathered outdoors; Grade 6 Consumerism/Wants and Needs; and, Grade 8 Five Senses Snowshoeing. Response to the E4E Workshops has been tremendous over the last three years, with workshops over-subscribed (of course, we accommodate all who register), and with more women represented than men. Using social media, participants share resources and ideas that extend beyond the workshop topics and times.

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<sup>1</sup> Pukak is an Inuit word for the space between ground cover (grasses and herbs) and the snow layer where temperatures hover around 0°C; in the winter various animals like shrews and voles are active foragers in this layer (Nelson, 2003).



**The E4E school project(s).** As an extension of the E4E Workshops, we have partnered with the local public school board (Near North District School Board) to connect interested TCs with local classrooms. For the last three years (2013-2015), we received generous Schulich School of Education funding to hire 5-6 newly graduated TCs as facilitators. These facilitators—most of whom had participated in the E4E workshops— collaboratively designed (with the classroom teachers) and then implemented a number of EE learning experiences for local elementary students in formal and non-formal settings. The facilitators met and planned with the classroom teachers to create learning experiences that embedded EE in the curriculum being covered in the classes at the time rather than a special topic suitable only for field trips to informal centres. For example, in the 2015 E4E School Project, Grades 3-6 themes included spatial reasoning (a numeracy initiative) and persuasive writing (a literacy initiative). The themes were addressed through learning opportunities including writing about “Environmental Heroes” and constructing outdoor shelters using found materials.



*Figure 8.* Thinking and writing about what it means to be an environmental hero.

**Looking to the future.** In the fall of 2015, our school of education launched a two-year Bachelor of Education program, as required by provincial legislation. We see the extra year of

teacher preparation as an opportunity to provide additional EE for our TCs. In particular, the following three EE-based electives will be offered: Environmental Education across the Curriculum; Environmental Science; and Teaching, Learning and Being in the Outdoors.



*Figure 9. Teaching, learning and being in the outdoors.*

### **Field Narrative 3: Environmental Education in the University of Ontario Institute of Technology's ITE Program**

EE in University of Ontario Institute of Technology's (UOIT's) Bachelor of Education program developed by fits and starts until 2012-2013, when more organized EE programming began to take root. Previously, environmental topics were mainly addressed in the context of the environmental science/ecology components of Intermediate-Senior (I-S) Science and Geography methods courses, and the science and geography components of Primary-Junior (P-J) methods courses. In September 2012, a group of UOIT TCs and instructors, motivated by the Ministry of Education's recommendations for enhancing EE in ITE programs (OME, 2007, 2009), and their

own personal concern for the environment, formed the faculty's first "Environmental Education Committee" (EEC) to: (a) examine the degree to which EE was being addressed in the faculty's B.Ed. teaching methods courses; (b) raise the community's awareness of local and global environmental issues through community-based environment action projects; and, (c) connect with other UOIT faculties and departments, local school boards, other Ontario faculties of education, and relevant community organizations to explore common interests and concerns.

**B.Ed. course reviews (2012-2013).** The B.Ed. course reviews carried out in 2012-2013 involved examining syllabi for evidence of EE content, especially EE-based learning activities. Results of these reviews indicated that most courses included no EE learning activities at all, while others, such as I-S English and P-J Language Arts had some optional, project-based EE activities; and only P-J and I-S Science and Geography courses included compulsory, highly infused (Monroe & Cappaert, 1994), curriculum-driven EE exercises. In the review process, the reviewers included some suggestions that instructors might consider for infusing EE in their courses, many of these suggestions drawn from the Ontario Ministry of Education's Grades 1-8 and 9-12 "Environmental Education Scope and Sequence of Expectations" resources (OME, 2011a, 2011b). Further to the course review activity, a Grade 9 Geography "Web-Quest Activity Kit" was developed by a geography instructor and his TCs that focused on the topic of "Human-Environment Interactions," with specific connections to Grade 9 History and Grade 9 English curriculum outcomes—a good example of EE cross-curricular infusion (Monroe & Cappaert, 1994).

**Community-Based environmental action projects (2012-2013).** The TCs and faculty who started the EEC were also concerned by the apparent lack of personal and institutional interest in local and global environmental issues. Consequently, the committee joined forces with other UOIT faculties to conduct an electronic device recycling drive and also planned to enhance the Faculty of Education's dull interior and exterior spaces with plants and nature-themed wall murals. The recycling drive was well-received and highly successful, but plans for greening the campus and painting murals were fraught with administrative and financial difficulties, resulting in extended delays for the mural project and outright cancellation of the campus greening project. Eventually, with some faculty of education support (including financial support), the first phase of mural painting began in the fall of 2015.

Early in its mandate, the EEC made a commitment to forge stronger relationships with: members of UOIT's faculty of education; other UOIT faculties, including the Faculty of Science and the Faculty of Engineering; UOIT's Baagwating Indigenous Student Centre; the Environmental and Sustainability Education (ESE) program at the Ontario Institute for Studies in Education of the University of Toronto (OISE-UT); and with the Durham District School Board's Science and Technology Program facilitator and Waste & Energy officer. The primary goal of these efforts was to explore common interests, share useful resources, and consider collaborations that could enhance EE in our respective organizations.

**Recent developments (2013-2015).** The EE program in UOIT's Faculty of Education continued to evolve through the 2013-2014 and 2014-2015 academic years, including the development of: (a) UOIT's "Enviro-Mentor" program; (b) UOIT's first Environmental Education Conference; (c) UOIT's first Environmental Education course; and, (d) UOIT's School Garden research program.

***UOIT's Enviro-Mentor program (2013-2015).*** Inspired by Trent University's Eco-Mentor program, UOIT's "Enviro-Mentor" program (Figure 10) was created to provide TCs with opportunities to: learn about EE in local, regional, national, and global contexts; engage in local environmental action projects; and learn about ways in which they may infuse EE in their practicum placements and beyond. The Enviro-Mentor program is a voluntary program in which participating TCs attend three half-day workshops and one full-day workshop throughout the academic year, facilitated by a team of cross-curricular instructors and invited experts, including Aboriginal elders. Each session, which takes place on Saturdays, engages Enviro-Mentor TCs in a large variety of place-based, experiential, and classroom-based EE activities, including ecological stream and field studies, citizen science projects, exploration of "best practices" in environmental sustainability, strategies for integrating Indigenous Traditional Ecological Knowledge and Wisdom (TEKW) into elementary and secondary classrooms, and the integration of Information Communication Technology (ICT) and other technologies in EE activities (Figure 10).





*Figure 10.* UOIT Enviro-Mentors using iPads and microviewers in a local stream study.

In their weekend workshops, Enviro-Mentors are encouraged to develop lesson activities that they may implement during their practicum placements, and their strategies and successes are shared over noon-hour informal get-togethers. In addition to participating in the weekend workshops, Enviro-Mentors regularly contribute to the growing EE mural and to the Faculty of Education's annual EE conference. The mural project, in particular, was developed to be an ongoing activity in which each new cohort of Enviro-Mentors will be expected to contribute to the mural's evolution (Figure 11).



*Figure 11.* Environmental mural painting at UOIT.

In order to highlight the importance of integrating EE in all curriculum areas, Internet matrix barcodes (QR codes) linked to environmental organizations and websites containing EE lesson ideas will be added to the mural on a regular basis. In addition to contributing to the on-going wall mural project, Enviro-Mentors are also expected to contribute to planning, organizing, and hosting UOIT's annual EE conference.

***Environmental education conference (2014-2015).*** Following on the early plans by the EEC to host an EE conference at UOIT, and after securing a TD Friends of the Environment Grant, the faculty's Enviro-Mentor facilitators and a group of Enviro-Mentors took on the task of planning and organizing UOIT's first EE conference in March, 2015. Participants included students, faculty, local teachers and school board representatives, and displays by a number of EE resource providers and environmental non-profit organizations. The 2015 conference comprised 23 presentations and workshops with titles such as: Climate Change: Teaching the Reality and Addressing the Deniers; Citizen Science and Education: Opportunities and Challenges; Using Eco-art Education as Environmental Activism; and Where is the Learning? Designing a Learning Garden and Eco-Justice Education across the Curriculum. Several Enviro-Mentor TCs presented sessions at the conference that provided a unique learning opportunity for

them. Although the EE conference is planned to be an annual event either at UOIT or elsewhere, the procurement of adequate funding, suitable space, and other resources will be a perennial challenge.

***Environment education course (2014-2015).*** Since its formation, the EEC discussed the need for enhanced EE programming at UOIT, and, in particular, the possibility of offering a compulsory or elective EE course within UOIT's B.Ed. Program. After lengthy discussions with university administrators, and in light of the Ontario Ministry of Education's introduction of a 2-year ITE program, the committee received approval for developing an elective EE course, first offered in the 2014-2015 academic year. In this EE course, TCs were provided with opportunities to develop critical skills for implementing EE in the Ontario context. The course employed a project-based approach, enabling TCs to develop resources for infusing EE in their academic, professional, and everyday lives.

Activities in the course were centred on digital technology-based learning (e.g., blogs, discussion boards), field studies (i.e., experiential, place-based learning activities), and traditional Indigenous environmental knowledge. Each week, current environmental topics were discussed and debated, which provided real world contexts that TCs could use in developing stronger connections to the issues. For example, in the first year of the course, TCs selected the topic "GMOs will save the planet" for a whole class debate, and conducted extensive research to support their arguments. For many of the TCs, this was their first experience with classroom debating. The major assignment in the EE course involved the creation of a problem-based learning module on a local environmental issue. Topics included: Chemical Valley: Harmful Emissions and Pollution; Bee Decline and Crop Pollination; Environmental Stewardship; and Reconnecting with Nature. Student groups researched their topics and presented their findings through interactive town hall sessions, case studies, and web-based strategies.

***School garden research program (2013-2014).*** In the 2013-2014 academic year, UOIT faculty began case study research projects on the development and implementation of learning gardens at three elementary and middle schools. In addition to examining the benefits, drawbacks, and challenges of developing and implementing school-based learning garden programs, these studies explored: the types of gardens students and teachers have constructed at their schools; how garden-based learning activities connect with the Ontario curriculum; how garden-based learning fosters development of creativity, communication, collaboration, and

critical thinking skills; and the extent to which school garden programs promote the development of environmental sustainability, stewardship, and well-being. In 2014-2015, the school garden research program was expanded to include a fourth case study involving a Southern Ontario high school where an extensive herb-vegetable garden has been developed. At this school the produce is regularly donated to the culinary section of the school's Specialist High Skills Major (SHSM) program in Hospitality, or processed and sold for proceeds, which have been used to make international micro-loans through the Kiva organization ([kiva.org](http://kiva.org)). This particular research project endeavours to explore the relationships among garden-based learning, nutrition, food supply, healthy living, and social justice (Figure 12).



*Figure 12.* University of Ontario Institute of Technology's School Garden Research Program.

**Future developments.** UOIT's Faculty of Education EE programming continues to grow and evolve. The elective EE course will continue to be offered, with plans to recommend that it become compulsory for all B.Ed. students. The resounding success of the faculty's EE conference has led to calls for the conference to become an annual event, possibly hosted by



different faculties of education on a rotating basis. The Enviro-Mentor program will continue to be offered, and the School Garden Research Program will continue its investigations into the foreseeable future. Though great strides in enhancing EE have been made in a relatively short period of time, there is still much to be accomplished. Together with the wisdom gained from past experience and dogged determination, UOIT's EE visionaries will continue their mission of moving EE from the periphery of the B.Ed. program to the mainstream.

### **Analysis and Discussion**

The commitment to enhancing EE in these faculties of education is inspiring and hopeful. Each of the EE learning opportunities offered was designed and implemented to meet specific and unique local needs. However, analysis of the cases also reveals that the three institutions had some common experiences and similar challenges. Each case study describes responses to a perceived lack of EE pedagogy and curricula in ITE programming fed by frustrations that the requirements of the government's EE framework were not being given appropriate weighting and the view that many environmentally-conscious TCs were being poorly served. In each case, passionate faculty members and enthusiastic community partners created opportunities to meet previously underserved goals, often through efforts well beyond the call of duty.

TCs in each of the programs committed to attend weekend workshops. This helped alleviate the practical constraints of timetabling, staffing, and room allocation. Additionally, extra-curricular workshops benefitted the programs by avoiding the more unnecessary requirements of standard university courses, including formal enrolment and assessment procedures. An unanticipated advantage of the model was the degree to which participants developed a sense of community and common purpose. Though there may have been no monetary or non-monetary reward for running or participating in weekend workshops, these activities constituted some of the most rewarding students and faculty have done (and continue to do). One of the most interesting features of the programs described is the involvement of community partners. Working collaboratively with local organizations and individuals with expertise and enthusiasm, each faculty was able to draw on a rich source of ideas. Not only did TCs benefit directly from such resources, they were additionally alerted to people who might support them in their future teaching careers, via advice, classroom visits, visit venues, and teaching resources.

Also noteworthy were the offshoots of the workshops at each faculty. In each case, EE learning and teaching did not end with the final workshop session. In all three faculties, workshop participants brought EE into their practica, creating EE learning experiences within formal curricula for their students. The workshops also became stepping-stones for other action projects, unique and meaningful to each faculty of education and beyond—rich evidence of the rippling outward effect of EE awareness, knowledge, and commitment amongst participants and partners. The workshops and other EE-based activities in the cases also provide evidence for the continuing need to impose, insert, infuse, or frame (Heimlich, 1992; Monroe & Cappaert, 1994) EE within each of our ITE programs (and, by extension, all ITE programs) since EE is recognized as an essential element of education in Ontario (OME, 2007, 2009) and many TCs wish to engage in effective EE learning in their preservice programs.

### **Issues Inherent in EE Programming**

We began this chapter with the question: How can a faculty of education effectively prepare teachers to embed studies *in*, *about*, and *for* the environment in their teaching practice? The answers provided by the field narratives discussed in this chapter demonstrate that ITE programs have found ways to offer EE opportunities both within, and in addition to, the formal program and schedule at each institution. There is an implied sense that the implementation of an elective or compulsory EE course within a formal ITE program is a victory, but this notion is troubling for some scholars, including Disinger and Howe (1992) and Gruenewald and Manteaw (2007).

**Infused or siloed? Core or elective?** The question of whether EE should be offered through stand-alone courses or be embedded/infused within existing courses continues as Ontario moves from one-year to two-year B.Ed. programs, with each faculty of education finding its own way forward. Despite shared commitments to EE, teacher educators bring different perspectives to the conversation. For example, one might argue that if EE is truly to be afforded the same curricular status as mathematics, language arts, or science education, then it should also have its very own course, and, indeed, each of the faculties highlighted in this chapter has since created an EE-based course or two in its program. On the other hand, by infusing EE learning into existing courses we might promote its importance in the same way as infused language literacy informs teaching and learning across curricula. Gruenewald and Manteaw (2007) point out that an EE stand-alone course can become a form of fragmentation that works against the

holistic or systems-thinking approach considered to be at the heart of EE. Furthermore, Disinger and Howe (1992) indicate that EE courses “place a premium on the divergent thinking needed to encourage the development of generalizations based on data from multiple sources and disciplines . . . [and] . . . creative teachers who are able and willing to go beyond their own disciplines” (p. 6).

The apparent contradiction can confound our thinking and frustrate our efforts to offer EE in a suitable format in our ITE programs. Perhaps the answer lies not in whether EE should be infused into existing courses or “siloed” in a compulsory or elective course in an ITE program, but rather, and far more importantly, whether it will provide participants with opportunities for critical inquiry (Disinger & Howe, 1992). Maybe our questions should become: What is the most effective format or venue for presenting teacher candidates with the knowledge and skills associated with EE to support their inquiries into how EE can be utilized as a tool to critique education and the structures within which it functions (i.e., unlimited economic growth and consumerism)? How can we support our preservice teachers in effecting positive change? And, how can we inspire confident and committed preservice teachers to pursue such difficult and long-term goals?

### **Conclusions**

To avoid ending this chapter with questions—despite our commitment to inquiry learning—we leave you with these closing thoughts. Although the narratives presented are unique to three different faculties of education in Ontario, the individuals who were inspired and committed to address EE in each of them did not work in isolation. We are friends and colleagues who continually search for creative ways to address EE in our preservice programs, and the actions of one become inspiration for the others. Pedagogies and theoretical frameworks aside, we recognize that the foundation of environmental education is relational—we are all connected, and that is our most important asset.

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## **Chapter 6**

### **Contextualizing Education for Sustainability in Teacher Education in Manitoba Faculties of Education (Manitoba)**

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### Abstract

Teachers play a significant role in educating youth so that they may help create, contribute to, and live harmoniously in a more just, sustainable, and viable society and planet. As such, initial teacher education can be instrumental in developing values and practices so that teacher candidates may develop a pedagogical approach needed when facilitating an education that supports a transition towards sustainability. As those values and practices emerge for beginning teachers, those teachers may in turn transform the learning experiences of their students. In faculties of education, this complex process requires a pedagogy that engages with diverse perspectives and is oriented to inquiry, problem-solving, and systems thinking. This study examines such pedagogies in three Manitoba faculties of education. Narratives of teaching identify the theory-practice dialectic in the three teaching locations, as well as difficulties and enablers of reorienting teacher education towards sustainability in these Manitoba contexts. The focus is on the situated practice of three professors who intentionally focus on, and integrate, education for sustainability within their teacher education courses and professional practice. The individual professors' interpretation and analysis of education for sustainability in their teaching and learning locations attest to a place-based orientation, and to allow for an examination of the impact of context on their pedagogical approaches. Their collaboration made possible an exploration of the tension between intention and action, and the discovery of praxis.

*Keywords:* sustainability, teacher education, context, collaborative, transformative education.

### Abstrait

Les enseignants jouent un rôle significatif en ce qui a trait à l'éducation des jeunes. Cette jeunesse doit aider à créer, contribuer et habiter de manière harmonieuse dans une société viable et durable sur Terre. En fait, les débuts à la faculté d'éducation peuvent être instrumentals afin de développer des valeurs et des pratiques essentielles pour une approche pédagogique nécessaire. Nul doute que l'on vise à faciliter une éducation qui appuie la transition vers la viabilité. Puisque ces valeurs et ces pratiques émergent pour nos enseignants débutants, ces derniers peuvent transformer l'apprentissage des expériences de leurs élèves. Parmi les facultés d'éducation, ce processus complexe requiert une pédagogie qui motive certaines perspectives différentes guidées par l'enquête, la résolution de problèmes, la pensée critique et systématique. Cette étude vise à examiner les pédagogies enseignées dans les facultés d'éducation au Manitoba. Dans cette situation, on a identifié la théorie en pratique de trois emplacements d'éducation ainsi que les difficultés que les facilitateurs doivent affronter afin d'assurer la viabilité dans le contexte manitobain. Il faut donc se concentrer sur la pratique de trois professeurs qui ont fait une mise au point de comment intégrer l'éducation viable durant les cours d'éducation ainsi que leurs pratiques professionnelles. L'interprétation individuelle et l'analyse de la viabilité de l'enseignement des professeurs témoignent une orientation basée sur l'emplacement et permet l'évaluation de l'impact en contexte de leurs approches pédagogiques. Cette collaboration a été possible en explorant l'écart entre l'intention et l'action par l'entremise de la pratique.

*Mots clés:* la viabilité, la faculté d'éducation, le contexte, la collaboration, l'éducation significative

## **Contextualizing Education for Sustainability in Teacher Education in Manitoba Faculties of Education**

Teachers play a significant role in educating youth to value a sustainable way of living, one that respects the human and more-than-human environments of which they are a part. Teacher education can be instrumental in developing values and practices so that teacher candidates may develop pedagogical approaches that support a transition towards sustainability (United Nations Economic Commission for Europe [UNECE], 2012). These future teachers may in turn transform the learning experiences of their students. In faculties of education, this complex process requires pedagogies that engage with diverse perspectives and that are oriented to experience, the natural environment, inquiry, problem-solving, and a systems approach. This chapter examines such pedagogies in three Manitoba faculties of education: University of Winnipeg, Université de Saint-Boniface, and Brandon University. The theory-practice dialectic is explored in the three teaching locations, as well as constraints and enablers of reorienting teacher education towards sustainability in these Manitoba contexts. The focus is on the situated practice of three professors at these three different institutions, who intentionally focus on, and integrate, education for sustainability within their teacher-education courses and professional practice.

Through our collaboration on this paper, linkages between our practices arose despite our differing theoretical perspectives. As these linkages emerged, our understanding of our positions and practices deepened and became more nuanced. In the process of writing and talking together, we noted several themes common to all of us. The first theme is the structural nature of the constraints on our teaching practice, in that which divides or restricts us from what we would like to do often occurs at a cultural and institutional level. Faculties of education, like other institutions, have dominant perspectives. Education for sustainability tends to be viewed as either radical, novel, and unproven, or a discipline whose time has long passed. Often, education for sustainability is considered a specialized discipline without broad relevance to educational practice. These perspectives cannot envision a relationship with the more-than-human world other than the relationship modern Western culture currently enacts. The second theme that emerges in our work is an awareness of other structures which tend to permit, authorize, or legitimate our practice. In all contexts, and despite marginalizing influences, some policies,

rules, or governing direction has allowed us to teach and research in this area. In our individual sections, we have explored these enabling and constraining structures. Finally, all of the authors have found themselves, in their roles as teachers, to be engaged in work involving some kind of transformation (or the shifting of position by teacher candidates) than simply performing the transmission of information. Our own teaching positions, at times, provoke and sidestep this transformative stance.

The process of writing this chapter together was designed for sustainability. We wanted a balance between writing our own ideas and interweaving these individual contributions in shared sections. Our intent in the writing was for this to be a fully collaborative process, and that we would be responsive to each other, not only in writing, but also in our future practice. As part of the idea of a sustainable project, then, we would learn from each other and allow the process of our own learning to influence the learning of our students. Somewhat self-consciously, we have therefore occasionally employed the term *organic* to describe our desired process. This paper is divided into sections: one section for each author, and the last for a collaborative discussion. In each author's section, we consider the relationship between what we want to do in our teaching practice (i.e., our ideals) and what we actually do in our teaching practice. We also examine the factors that limit, worry, and constrain us, and the factors that excite, feed, and sustain us.

For the purpose of simplicity, and to recognize the diversity of perspectives in this chapter's theorizing and in the literature, we have adopted the acronym *EfS*, meaning "Education for Sustainability." Manitoba's provincially-directed mandates for Education for Sustainable Development (ESD) have been in place for over a decade. The curriculum document, "ESD in Manitoba Curriculum" (Manitoba Education, 2014), presents the three pillars of sustainability: the economy, human health and well-being, and the environment. While the focus of this policy may be challenged on the grounds of where emphasis ought to be placed, its existence provides a basis for challenging some conventional EfS teaching practices and ideas.

### **The Places I Teach From: Education for Sustainability**

**Lee Anne Block, University of Winnipeg**

Integrating sustainability in teacher education is a path for enacting the values I grew up with, interrogated, adapted, and adopted. Having once conceptualized "teaching for change" and "teaching to conserve" as opposite ends of a continuum of teaching philosophies, I find teaching

for sustainability connects both. EfS includes a focus on place and intergenerational learning, as well as a critique of the socio-economic disparities that feed the environmental crisis and threaten cultural sustainability. Place-based education resonates for me because my connection to place is prior to my connection to global environmentalism. Critical place-based education (Gruenewald, 2003) is the framework or “current” (Sauvé, 2005) that I apply in my teaching. I teach undergraduate courses in Social Studies (early and middle years curriculum, instruction, and assessment), Foundations of Teaching and Learning, Social Justice, and a post-baccalaureate course in Cultural Sustainability. A place-based focus on time and space connects to the social studies disciplines of history and geography. A focus on place is a good fit for teacher candidates in the early and middle years stream who will teach young people. Teaching is a context where I experience conflict between my intention to find what “fits” the students and my intention to disrupt what is “fitting.” Finding a place where these two intentions can meaningfully coexist directs my pedagogy and my approach to EfS.

How, then, is EfS effectively integrated with social justice issues? This becomes a critical question when one’s definition of EfS includes social justice issues and cultural sustainability. A post-structural feminist praxis fuses an understanding of the human and more-than-human world as mutable and complex with “the desire for real social change” (McKenzie, 2005, p. 180). The inherent tensions of conceptualizing and concretizing can provide a pedagogical space (Stevenson, 2008) within which it becomes possible and necessary to act with intention. EfS can be a location for teaching and learning with an intention to conceptualize and address socio-environmental issues. As they work with the next generations that will tackle these issues, teacher candidates are a particularly important focus for EfS (UNECE, 2012). Teachers play a significant role in educating youth so that young people may help create, contribute to, and live harmoniously in a more just and sustainable society and environment. As such, initial teacher education can be instrumental in developing values and practices with teacher candidates that can facilitate a pedagogy that supports a transition towards sustainability (UNECE, 2012). Subsequently, beginning teachers can be instrumental in developing the learning experiences that help their students adopt sustainable practices.

Teacher candidates’ ability to take on sustainable values and practices is a function of how they are taught, as well as a function of how they learn in their particular subject positions. While teacher candidates enter faculties of education from varied subject positions (Feiman-

Nemser, 2001; Staunaes, 2003), the majority of teacher candidates in Manitoba faculties of education are of the dominant culture (Manitoba Education, Citizenship and Youth, 2006). Their varied personal experiences are rooted in a shared dominant perspective (Tupper, 2011), and a critical approach to sustainability issues requires a critique of this dominant perspective. My pedagogy, therefore, engages with teacher identities and with diverse perspectives, and it is oriented to inquiry, problem-solving, and a systems approach. It includes a pedagogy of discomfort (Boler & Zembylas, 2003) that assumes the presence and hegemony of a dominant culture. Dominance is constructed and maintained, in part, through marginalization, repression, or segregation of “Other” groups (Block, 2013). In examining their relative privilege, teacher candidates may experience the unease of questioning the assumptions and values that give them comfort and that weave the fabric of their everyday experiences.

As my position is that teaching and learning take place in socio-cultural contexts, I take up the specific contexts my students encounter in their practica. Our faculty focuses on inner-city education, and teacher candidates’ practicum schools are often in the poorest parts of the city. In teaching about poverty and its effects on students’ lives and learning, teacher candidates are expected to consider the causes of poverty. Too often, poverty is seen as a state of being caused by ineptitude or bad luck than as a result of economic inequities. Looking at this social issue systemically requires teacher candidates to shift their perspective from individual narratives of success and failure to collaborative understandings of shared responsibilities. In a similar way, teacher candidates can shift perception of Aboriginal culture, predominant in many of their practicum schools, by grasping the influence of systemic racism, colonialism, and power relations. When these experiences of social systems are taken up and integrated, teacher candidates may shift their teaching position as well as their perspective. Instead of perceiving the teacher’s role as “saving one child” (from poverty or poor parenting or social exclusion)—a thematic refrain in student reflections—teacher candidates will understand their agentic potential to act collectively for change in their class, school, or community.

For many teacher candidates, sustainability is a more comfortable issue to take up than poverty or racism. While building on “safer” issues can be productive for engaging with more complex environmental and social issues, EfS is too often demoted to picking up garbage. “Reduce, Reuse, Recycle” is a constructive activity, but is limited in its scope for changing broader values and practices. The undergraduate courses I teach neither have “sustainability” in

the course description, nor are they designated as courses in EfS. Rather, sustainability is integrated with existing social studies and social justice courses. The decision to integrate is a function of my values and pedagogy, and is mandated by Manitoba Education curricula. I structure the courses so that students who enter at different places of understanding can develop more complex approaches to both the content and process of teaching and learning. I design designed accordingly and give students options. For example, a required assignment in Early Years Social Studies is to plan a strategy built around a chosen sustainability theme, such as water supply and safety. Teacher candidates may be able to work with this theme in their practicums as well. Teacher candidates provide a lesson and a discussion of the rationale for working with their chosen theme in Social Studies, and explain why this issue is important to students and teachers. Key concepts in EfS are discussed in the students' rationales, such as the interdependence of living and non-living things, protecting the future, diversity, and collaboration. In a past semester's course, one teacher candidate wrote how she wanted to teach that our "disposable mindset" is harmful to the environment, which had her revisit the familiar "Reduce, Reuse, Recycle" model, and indicate the ways that it can be extended to a more complex examination of consumerism, such as a student presentation on Fair Trade.

The course designs reflect my orientation to sustainable living and my pedagogy. Pedagogically, I believe the course structure and the instructor must serve as a demonstration of the values of sustainability. Like Laura Sims (in this chapter), I configure the courses to provide choice and collaborative work. Teacher candidates are invited to take agentic positions and contribute to the process and the content of the course. However, I feel I could learn from Sims to better construct an environment that is honest, safe, and welcoming, and that better supports difficult conversations. Constructing such a milieu is an expectation I have for teacher candidates to enact in their classrooms, and thus I want to demonstrate that process in my courses. I believe that the limitations on constructing a more positive milieu result from my uncertainty about producing discomfort even though I am convinced that teacher candidates must examine their teaching positions critically. I am still constructing an effective praxis that must resist the dismissal of theory and the demand for teachable information that often emanates from teacher candidates. Building a sustainable, ethical, and equitable teaching practice is an ongoing process, and my teaching needs to demonstrate that process. I must challenge my own assumptions and be open to learning from my students.

What are the values, then, that ground this framework for EfS? How often do we interrogate those values to keep them clear and also to avoid getting mired in meta-narratives? Cultural and familial contexts are significant in how sustainability is taken up. I ask students to explore these contexts (such as a family educational history) in discussion and writing pieces. That we live in a world that is more-than-human is a value I wish to share with them, although I often feel reluctant to address this value as I may appear unworldly instead of grounded, place-based, and rational. That the more-than-human world is endangered through human actions and perceptions is a given; that we can easily address the problem without discomfort is not a given.

My own commitment to both the local and the global aspects of sustainability derives from my father. His relationship to sustainability grew from his experience, both local and global—from farming, the Depression, and World War II. That relationship was manifest in a “waste not, want not” approach to daily living and a deep connection to the beauty and magic of the natural and built environments. He was a water engineer by profession and a generalist who could build a fence, splint a finger, name all the rocks, grow a garden, cook, and darn socks. When I was a teenager, he brought me Rachel Carson’s *Silent Spring*, and E. F. Schumacher’s *Small is Beautiful*. He taught me his love of soil, water, and light, and how to be in a place. From that inheritance I make my sense; I interrogate, adapt, and adopt a critical pedagogy of place.

### **Education is Hope**

**Laura Sims, Université de Saint-Boniface**

I find it challenging to articulate how I try to enact, through my professional practice, the deep love and concern I feel for the natural world, including humanity. In understanding, even in broad terms, some of the challenges that we face as a global community, like climate change, loss of biodiversity, and numerous examples of gross human rights violations, I strongly believe that we have to learn to live differently in the world and with each other in a way that is much more gentle, respectful, equitable, and life giving. Perhaps I am naïve and idealistic, but I have a strong belief that education is hope and the only solution we have in the current situation. I believe that we must live and learn actively in the environment and the community in order to understand it and to create a relationship with it. In my courses, I want the learning process to be nurturing, place-based, authentic, experiential, and locally-relevant, yet situated within a larger context. At an undergraduate level, I teach courses on Cultural Diversity in Education,



Aboriginal Perspectives in Education, and Social Studies Curriculum and Instruction (secondary). At a graduate level, I teach a course in Values in Education and another in Education for Sustainability.

Building meaningful relationships with students and community allies is the most significant part of my pedagogical practice. In my courses, I try to create an honest, safe, and welcoming learning environment where we can discuss important, heartfelt, and oftentimes difficult and sensitive issues that affect us deeply. I try to begin the discussion where the students are, and build from there. I try to value the knowledge, experiences, and gifts that each student brings to the learning community. With this as a foundation, we can then support one another through the learning process. My exploration of this process in the Aboriginal Perspectives in Education course (Sims, 2015) demonstrates this approach.

I want my pedagogy to reflect, in practice, certain core values, including that it be *democratic* and *equitable*. I try to facilitate a pedagogy that is participatory, and where decision-making is shared. I want students to learn to be active citizens and responsible for their own learning. I engage students in the decision-making process around course content and activities in order to tailor the course to meet their needs. Building relationships with one's environment and becoming place-conscious (Gruenewald, 2003) is important. As such, my pedagogy is *community-based* and *community-focused*. I use the local community and environment as the learning context; I want students to learn in/about/from community. I believe that actually living, interacting, experiencing, and learning within our local environment helps us build a relationship with, and learn to care for, respect, and take responsibility for, those beings (human and other) around us. It also allows us to learn at a deep level how all things are interrelated and interdependent. As an approach, I use *inquiry* and try to facilitate *critical reflection*. In the process of experiencing our community and the environment, an inquiry approach (Chiarotto, 2011) is meant to push students to be curious, critically reflective, understanding of one's self in relation to others, problem-posers, and problem solvers. Creativity is strongly encouraged. Like Lee Anne Block (in this chapter), I want to build on what students know, but I also want to disrupt their potential complacency, enabling them to critique the dominant culture.

What do these values look like in practice? When I first meet with students, I provide a broad overview of my goals for the particular course, and then through discussion and having them do an individual reflective piece. I try to understand where they are at, and to ask what their

learning goals are for the course. From this initial encounter, I plan the course accordingly. As the course evolves, students are asked for ongoing input into decisions. For example, in the Aboriginal Perspectives, Curriculum and Instruction, Values, and Education for Sustainability courses, speakers, topics, and focus are decided, to a greater or lesser extent, together. Specifically, in the Aboriginal Perspectives course, following a sharing circle with students, we decided to visit the Manitoba Indigenous Cultural Education Centre. On another occasion, we decided to invite Larry Morrisette (Comack, Deane, Morrisette, & Silver, 2013) to speak about colonization and the impacts of residential schools as seen through gang violence in Winnipeg. In the Values in Education course, we decided together to visit the Canadian Museum of Human Rights to explore the exhibits, to analyze what stories are being told (and which ones are not taken into account), and to discuss our perception of what this means.

As for assignments, generally I try to give enough structure so that what is asked of students is clear, but enough flexibility remains so that students can be creative and pursue their own interests. For first year B.Ed. students in the Cultural Diversity and Aboriginal Perspectives courses, the assignments focus on three levels: (a) reflecting on their own learning through journaling; (b) connecting with people and communities through interviews, visiting community organizations, and participating in cultural events; and (c) linking course content with their future teaching practice.

For second year B.Ed. students in the Social Studies Curriculum and Instruction course, the focus of the course is primarily on their teaching practice since USB teacher candidates do a seven-month practicum in their second year. For this course, the first assignment focuses on learning how to enable experiential learning. Students must teach a curriculum-related lesson that integrates the local community as their classroom (Sims & Falkenberg, 2013). Activities must occur within a 10-minute walk of USB. One example includes going to a grocery store to investigate where our food comes from and to explore the impacts of consumer choices on the environment and society. Another example includes learning about the Calumet ceremony on the banks of the Red River by reenacting the voyageurs and bourgeois coming together to share food and songs, and then trading furs and goods. In the past, lessons have included studying the (historic) daily life activities of local first nations' migration by walking to Fort Gibraltar on a snowy October day with gender roles assigned and tipi in hand, to experience "establishing camp," and then to discuss locally-grown foods available to people at that time. Following these

experiential, community-based activities, we analyzed them in relation to the strategies of environmental and sustainability education as outlined by Kovak and Elliot (2011).<sup>1</sup> My intention is that these activities allow teacher candidates to learn: how to facilitate real life learning experiences in their community; how to encourage a process of inquiry with their future students; and how to enable activities where integrated learning occurs.

The second Social Studies Curriculum and Instruction assignment focuses on essential understandings (Wiggins & McTighe, 2005). Teacher candidates are asked to look at the curriculum (e.g., Grade 10 Geography) and to ask themselves: What are the essential understandings that their students should learn/explore with respect to this topic? Teacher candidates are then asked to propose learning-focused activities that would enable their students to engage in, and explore, these understandings. These activities must provide meaningful experiences that build bridges that link to the world outside the classroom. They must also provide students opportunities to ask critical questions guided by their interests and to learn how to research their questions.

I recognize that teaching at USB has certain place-based advantages. USB is located in the heart of St. Boniface—a 15-minute walk from downtown Winnipeg—making the location excellent for all sorts of community activities. USB is a small university. Class sizes in the faculty of education at the bachelor level are intimate, with about 40 students annually in the cohort. This allows some flexibility in terms of scheduling and outings. I teach the same groups of students from September to April, which gives more time for students to build relationships with each other and with me. I teach all sections of the same course, which allows me more control over course content and process. As an educator, I want to model the values that I aim to teach. Being able to skate and/or cycle to work year-round allows me to live certain aspects of an environmental ethic that I want to model for my students, especially with respect to the importance of individual choices.

I often reflect upon how my courses might better support teacher candidates' learning in terms of allowing them, and us as a society, to encounter the immense social and ecological challenges in an informed way with hope, courage, and creativity. My pedagogical approach—

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<sup>1</sup> Their strategies include: learning locally, providing opportunities for integrated learning, acting on learning, making real-world connections, considering alternative perspectives, enabling inquiry-based learning, and sharing the responsibility for learning with the learners.

through course content, guest speakers, community activities, and assignments—encourages teacher candidates to pose tough questions, to search for understanding, to be open to alternative perspectives, and to put their learning into practice through their teaching. I want them to feel genuinely inspired to see how they, as individuals, and their contribution through their teaching practice, can help build a more just, equitable, inclusive, and sustainable world. However, I would love to have a pedagogy which more deeply engages with the natural world as does Chris Beeman’s (in this chapter). I recognize that my approach more closely reflects aspects of “socially-critical” and “humanist” approaches (Sauvé, 2005). Acknowledging Beeman’s concern, I fear that my pedagogy still primarily facilitates an intellectual relationship with wild places.

One thing I find limiting in terms of engaging in broader-level discussion around big issues (like climate change) is a culture of practicality that is ubiquitous in faculties of education. I find that generally, topics must be seen as practical for B.Ed. students to be interested in them. That is to say, teacher candidates primarily, if not exclusively, want to learn about what they see as relevant for their future K-12 teaching. Further, time with students is limited to 36-39 hours per course. Like Beeman, I am concerned that quality of learning might be sacrificed for quantity of information. With respect to environmental issues, at a macro (political) level here in Canada (Rumak, 2014), environmental issues are actively being marginalized. At an institutional level, priorities are focused on other things, including the sustainability of the Franco-Manitoban community in a minority context (which makes sense considering that USB is the only French-speaking university in Western Canada). Consequently, addressing these complex issues, particularly environmental issues, is challenging, since, in light of competing priorities, they take time to explore responsibly; they do not necessarily lead to one “right” answer; and they are not easily broken down to particular classroom activities which teacher candidates often desire. Further emphasizing the importance of providing adequate time to dedicate to critical explorations of these complex issues is that they often lead to difficult discussions and reflections around our own behaviours. Students need to be supported in that process. Furthermore, teacher candidates might be hesitant to address these issues with their own students for fear of potential negative feedback from parents.

In order to stay inspired, I surround myself with people who inspire me, who push me in my thinking, and who hold me to a certain ethical standard. These people include colleagues,

whom I respect very much, and my friends and family, whom I hold very dear. My research in Central America, working with small-scale farmers, is deeply inspiring, particularly seeing how these ideas around learning for sustainability are put into action by changing peoples' farming practices. Living actively in the world by doing things that nourish my soul, my body, and my relationship with nature is very important. Wilderness camping, walking my dog, skating on the river, enjoying simple pleasures, and riding my bike help me do this. Finally, I am trying to reconcile certain contradictions, like owning a car or eating chocolate and fresh raspberries in February, whilst still being true to my values. Over the years, I have been blessed to have made friendships around the world. The result is that it has transformed my understanding of the local, and that I care about what happens elsewhere, for elsewhere is local.

### **Autochthony and Teaching Practice: Conceptualizing and Enacting a Living Practice**

**Chris Beeman, Brandon University**

My premises for learning and teaching in EfS are:

that wilder places/ "the land"/ the "more-than-human world" may speak and that we may listen to and understand what the land says;

that to understand the land, one must live and act in the world in certain ways, and that these ways of living and acting are characterized by the state of being of attentive receptivity, indigeneity, autochthony;<sup>2</sup>

that while the capacity for this way of being is broadly distributed amongst people, special efforts and learning must occur that resist the inclination of the global West, which tends to suppress this way of being; and

that learning and teaching practices of EfS ought to include possibilities for bringing forth a love of the more-than-human world and a listening to the land and that these

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<sup>2</sup> Attentive receptivity is an ontological condition, a state of being in which the human participant enacts, at each moment, an understanding of the lived interdependence between person and place. See Beeman (2008).

practices ought to be at the heart of educative action in and with the world (Roszack, 1990; Wilson, 1984).

In educative practices in the field of EfS, I teach in ways that enable the above to be understood and enacted, and I hope that a kind of learning, which is comprised in part of enacting different ontological positions, may occur. Yet, I also recognize that these principles may be linked to “competencies”—knowledge, values, and skill—that students may learn. The relationship between competencies and state of being might be described as a mutually interdependent one that is perhaps not predicated on, but relies on, a relationship with the world, such that the interdependent well-being of the more-than-human and human is, moment-by-moment, both known and re-enacted. The principles noted in the introductory passage above only occur when there is a changed ontological relationship with place. Otherwise, the land is only “talked about speaking,” “imagined to speak,” or “recounted to speak.” But, the land does speak. I know this on the authority of elders with whom I work, and from my own experience (Beeman, 2010; Beeman & Blenkinsop, 2008). It falls to us humans to be in the position in which we can hear what it has to say. Those of us from the modern, global West usually fail to be in that position.

Indigenous people—autochthonous people—understand this. They also live it. By “Indigenous people,” I do not mean by this only and precisely “Aboriginal (First Nations, Metis and Inuit) people.” I mean the preceding to be a kind of tautology, in that people who live in certain ways are able to understand the world in certain ways. This understanding tends to shape further acting “by it and with it and on it and in it,” as Ratty said about the River—his world in *The Wind in the Willows* (Grahame, 2007, p. 15). This is a praxis of being. It is the being that I think is at the heart of sustainable/ecological/environmental learning. But, for such a praxis to occur, it must reflect intent and underlying premise and theory. For the most part, sustainable/environmental/ecological education may be said to fall short in praxis, because it is at a “knowledge about” level, not a “being” level.

In my faculty, I teach three sections of an Aboriginal perspectives course and one section of an Environmental Science course. Many of the principles described above find their way into these courses, but none are fully realized. In the teaching I do in these courses, I focus on building a relationship with the more-than-human world, on seeing school as something that can

occur outside of a building designed with a particular model of learning in mind, and on learning context as being as significant in the learning process as the knowledge and ability of the instructor, and the motivation of students. I focus on an inquiry approach to learning, on community engagement and involvement, on land-based orientation, on learning through experiences—in short, on Indigenous modes of learning. Because these courses occur in a faculty of education, teaching in this way challenges conventional, school-based, and teacher-centered approaches to education.

The Environmental Science course is taught as an experiential, inquiry, and place-based course. It is normally held outdoors for about one class out of two each week. Because it is taught between January and March, I have begun to call it “Winter.” Like Sims (in this chapter), I offer students some choices about course content. Early in the term, I ask students what kinds of things they would like to do outside during the term. We come up with a list. In the past two years, this list has included building a quinzhee, skating on an open-air rink, cross-country skiing, tobogganing, and tracking animals through the prints and signs they make in snow. Then, combining our interests with learning, we choose from our list and make a schedule. Then we begin to ask science-based questions about these things. In building a quinzhee for example, we ask questions about snow structure, physical forces at play, and changes in crystal structure; in skating, we ask questions about friction, speed, acceleration, and direction. After I facilitate some of the initial sessions, students begin to take responsibility for teaching the sessions in which they have an interest. We use an environmental inquiry learning model throughout (Chiarotto, 2011).

The greatest challenge in teaching this course is to enable teacher candidates, who often express personal qualities of being responsible and goal-oriented, and who frequently think in terms of covering curricula, to consider the possibility that learning success may also include asking better and better questions. Some of the best questions have no answers. Early in this course, when I am questioned, I make a point of saying, “I don’t know the answer to that. I wonder how you could find out?” many times (enough that it becomes a standing joke). This is followed up by, “What other questions does that lead you to ask?” In other words, I model the way I hope they will teach, which may be very different from the way in which they were generally taught. As the course progresses, I cease to be the authority in the subject area, and start to be a person with skills in inquiry, able to support their own learning, as indeed I hope

they will be with their students. I do not disdain from giving answers at all—I merely refrain when it is possible to do so. But there is no doubt that this practice changes teacher as well as student. I find myself a co-learner, conceiving of my role as, for the time being, one with better-informed questions. My sense of wonder grows. As the term progresses and students develop expertise in terms of wanting to understand more in a certain area, I expect my questioning skills to be eclipsed, as, indeed, they usually are. Inquiry-based learning naturally works well outdoors. Opportunities for learning by observing are frequent. Such a varied context for learning seems to suggest, in its wider palette, more possible explanations. Almost any non-human controlled event may spark a question.

The three sections of the Aboriginal Perspectives course that I teach in the Fall are also held outside for about half of our classes. The pedagogical justification for this, in addition to that which is provided by the general research around the benefits of outdoor learning (Louv, 2005), is that to understand historical, cultural, economic, and political perspectives of Aboriginal peoples, spending time in their historical home—the natural world—is an excellent context for doing this. The learning we do there includes building a relationship with the natural world, fostering our own community in that context, and engaging in experiences as metaphors for relevant ideas in Aboriginal education. The natural world is a rich environment in which to situate experiences, because it provides nuanced contexts that are not reproducible in human-created environments. It allows for holding discussions that are “open,” “less-constrained,” and “peaceful” (some of the words my students have used to describe learning outdoors).

When I inherited this course, I was told that, because of the nature of the material (Aboriginal education), the context in which it is taught (Southwestern Manitoba), and because the course had become mandatory for teacher candidates, there was likely to be conflict, anger, racism, and antipathy between groups in my classes. In the first year I taught the course, I found this sometimes to be, though rarely, the case. However, more recently, there has been little evidence of this. It could be that the expectations of students for the course have changed or that attitudes have begun to shift. In any case, from my perspective, Indigenous modes of learning, Indigenous contexts for learning, and Aboriginal subjects of learning, are all a source of joy and interest. That these can take place outside of a standard school setting, which then means that a primary source of historical conflict between Aboriginal and non-Aboriginal people—the institution of the school—can be viewed from the outside, is another virtue in learning in wilder



settings. I follow Jickling (2014) in this, believing that the wilding aspect of *wild pedagogies* occurs, not simply through a changed relationship, but in the challenging of often unintentionally held expectations around what constitutes learning.

Still, while learning suited to Indigenous ways of being is more effectively taught in the more-than-human world, an orientation to the world that would characterize a position of attentive receptivity is for the most part lacking. The closest my students come to experiencing themselves differently within an ecosystem (i.e., when the ideals of this teaching philosophy are attained) come in only a few precious moments of teaching each term. Many students found the simple *nature sit*, the returning to a place one comes to know over a period of weeks, months, or years (Young, 2010) as gently powerful, unexpectedly transformative, and immensely rich (as described by students themselves).

The sweat lodge is another experience related to attentive receptivity that some students do in this course. The Dakota ceremony practiced in our area is linked to the world through the grandfathers, the heated stones of the earth, within a rooted pole structure. Fire, water, earth, and air elements are all recognized, and are part of the ceremonies. The sweat lodge is a spiritual practice shared by many North American first peoples. In this practice, participants are led through the four *doors*, which correspond to the four directions, phases of life, and aspects of identity, all of which comprise part of a conceptual organizational structure for First Nations' beliefs and teachings. An elder conducts the ceremony. After students participate, they present their experiences to those in the class, and prepare a paper based on what they learned. The discussions are usually wide-ranging and very engaging. While I greatly value the teachings accompanying the sweat lodge, I see the sweat lodge as a far more human-controlled process than the gentle nature sit. The sweat lodge is necessarily a more distinct kind of intervention in human thought than is the simple encountering of the more-than-human in a nature sit.

The initial limitations on my practice derive from a world view—that of the modern, global West—that sometimes imposes curricular structures. In this worldview, quality of learning—the kind that is generated in the soul of the learner—tends to be sacrificed for quantity of information received and processed. These kinds of limitations derive from a circumstance, not of ill-intent, but from a lack of consciousness that there could be another way of being in the world. I want my students to be aware of these limitations and to critically appraise them. My practice in these classes is justifiably limited by my responsibility to ensure that students are

introduced to modes of learning that are outside the usual modes understood in the global, modern West. I also seek to enable my students to identify ways of teaching that *they* consider necessary and desirable in their teaching practice. What sustains and recreates my practice? The lived relationship with the natural world, such that my place in it is altered from one of presumed dominance to one of shared well-being. This is a place of love.

### Discussion

The need for action born of hope and love for the human and more-than-human world is thematic for us. It infuses our approach to, and teaching of, EfS that is constructed through relationship to the human and more-than-human world. Actions are developed from critical inquiry, systemic thinking, and understanding of place. Although we share many values, those values are directed in contextually-specific ways and from within our situated teaching positions and philosophies. It seems worthwhile to explore how these three approaches to teaching enable teacher candidates to acquire competencies relevant to EfS. Sims and Falkenberg (2013) outline the United Nations Economic Commission for Europe (UNECE) (2012) core competences for education for sustainable development for educators.

The 40 competences are divided into four clusters:

- Learning to Know (refers to understanding the challenges facing society both locally and globally and the potential role of educators and learners);
- Learning to Do (refers to developing practical skills and action competence in relation to education for sustainable development);
- Learning to Be (addresses the development of one's personal attributes and ability to act with greater autonomy, judgment and personal responsibility in relation to sustainable development); and
- Learning to Live Together (contributes to the development of partnerships and an appreciation of interdependence, pluralism, mutual understanding and peace). (p. 9)

Similar to Sims and Falkenberg's (2013) findings, the collective pedagogical practices described in this chapter reflect many of UNECE's (2012) recommendations to integrate education for sustainable development approaches across the curriculum in a variety of ways, and to provide ongoing professional development opportunities for teachers through critically-

reflective practice. These approaches reflect a process of collaboration within and outside institutions, and with community members.

For instance, in the Aboriginal Perspectives courses, Sims and Beeman integrate cultural activities like the sweat lodge, place/land-based learning, and the sharing of key stories by Aboriginal community members in a safe environment. These activities are accompanied by students making meaning as they reflect on these new and often times alternative knowledges of the world and of history, understanding better their own world view and cultural assumptions, and seeking to understand those of others. Examining social issues in these and in other courses, like Block's Social Studies courses, may illuminate the need to transform the way we educate. This clarification of their own and others' worldviews, through dialogue and experience, allows us to learn to live together more sustainably. Within these courses, by modeling how to integrate community and the natural and built environment as a context and source for learning, and by creating opportunities for sharing ideas and experiences from different cultures, disciplines, and generations, without prejudice, teacher candidates learn and are able to build meaningful relationships with community and their environment. Beeman's teaching of so many of his classes in the natural environment, for instance, allows for a deeper understanding of systems thinking and how different cultural paradigms and the ecology are interrelated.

Our consensus is that competencies are necessary but not sufficient for EfS. For Block, the term "competency" incorporates both agency and understanding. Beeman values the altering of position—an ontological shift. In his view, the work of the professor was directed less to ensuring that certain knowledge is acquired, and more towards providing opportunities for a shift to take place. That shift can emerge from the production of knowledge, which can lead to a greater sense of agency in determining one's own teaching practice. Sims' perspective is that teacher candidates become motivated to make positive contributions to other people and the environment locally and globally, and to become inspired and creative practitioners who will facilitate their students' creativity and commitment. Having lived this potentially transformative pedagogy, teacher candidates are able, in their own teaching, to use a variety of natural and social environments as a context and source for learning—to communicate a sense of urgency for change and to inspire hope.

As we examine our teaching individually and collaboratively, it becomes clear that structures function both to enable and to constrain EfS. Beginning at the faculty level, in the case

of our practices, we are each one of very few faculty members with strong environmental orientations within our respective faculties. This gives us room to introduce our approaches to EfS and to innovate, but it also limits our ability to collaborate and to access resources. For Block, the science educators in her faculty have been a support as their practices and values have sustained her exploration of EfS. She collaborates with two early- and middle-years science educators, one of whom now also teaches an elective special topics course, *Educating for Sustainability*. Together they plan joint field trips with their individual cohorts and share resources, while modeling cross-disciplinary integration.

At the university level, each of our universities has some interest in environmental issues. However, the actual changes made to university structures around waste, energy use, and intellectual orientation—the radical notion that all learning and thinking necessarily occurs within an ecological context of some kind—tends to be missing. Again, being in a minority limits the capacity for a stronger environmental orientation to emerge. It is true that Manitoba's Department of Education has provided initiatives, funding, and resources to teachers and schools. Also, the provincial government's Education for Sustainable Development Committee has worked with faculty of education representatives from across the province. Its mandate is: to promote sustainability education in faculties of education; to provide the ministry background on existing practices; and to support linkages within the province, nationally, and internationally. These linkages have benefitted Sims and Block in accessing ideas and resources. However, all of the authors of this chapter have critiqued the limitations of the provincial focus on "development." Moreover, in spite of the provincial Education for Sustainable Development mandate, core courses in EfS do not exist at the undergraduate level in any of the three institutions. Integrating EfS in initial teacher education programs remains an initiative of individual professors.

Culturally, we live in spaces increasingly divorced from the ecological world that is the actual source of our living. Human culture in the modern, global West, tends to be predicated on the avoidance of the inconvenient likelihood of human-caused ecological decline. Although there is acknowledgement of a theoretical interdependence with the more-than-human world, we act as though the more-than-human world had an unlimited capacity to absorb the ecological interference caused by human culture. What is needed lies in the order of transformation than simply in information. Transformative learning, then, can be understood as a movement which

shifts how one positions oneself. (Mezirow, 2008). It is central to EfS. Our intention is for our students to take up positions that connect them to the human and more-than-human world through meaningful actions that sustain relationship.

In reflecting on our practice, we ask ourselves, “How are we enabling a shift in position, if at all?” and, “What competencies for sustainability are we facilitating?” We notice that in all three contexts we begin by attempting to interrupt students’ complacency, particularly for those coming to the faculty from a dominant cultural paradigm. We invite them through problem-posing and enabling community/ecologically-based experiences to critically reflect on their own assumptions and to be open to other ways of knowing. We build on what students already know, inviting them to move beyond rudimentary understandings of environmental and social justice issues to a deeper understanding of complex issues. We recognize that one cannot teach a shift in position but that it is a dialectical process threaded through our course designs. We try to shift positions through enabling meaningful experiences. We then work with students to make sense of their experiences. Finally, we teach students how to integrate community and the natural and built environment into their own future teaching practice. A transformative shift may occur for teacher candidates when they begin to consider their position with respect to the more-than-human world and to experience themselves as participants in collaborative meaning making within ecosystems, within shared places. These transformative perspectives will hopefully be included in their own teaching practice and shared with their students.

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## **Chapter 7**

### **Developing Competencies for Education for Sustainable Development: A Case Study of Canadian Faculties of Education (Manitoba)**

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### Abstract

Education is paramount when trying to enable a change in values and attitudes towards sustainability. Higher education in faculties of education plays an important role in working toward this change because of its impact on future and practicing teachers in the school systems. This study inquires into the current role of education for sustainable development (ESD) in undergraduate and graduate teacher education programs at Canadian universities, with a particular focus on promising practices and initiatives toward a reorientation of teacher education for sustainability. A qualitative case study approach was used identifying promising initiatives as well as challenges and enablers of reorienting teacher education toward sustainability at four Canadian universities. The discussion of results is framed by how identified initiatives relate to the development of core ESD competences for educators as established by the UNECE. The results of the study suggest the following as being important for developing the ESD competencies: experiential, inter-disciplinary, and problem-based learning around real-life issues with community and the natural environment; and building partnerships with colleagues, students, community organizations, and other institutions.

*Keywords:* education for sustainability, faculties of education, teacher competencies

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## Abstrait

L'éducation est essentielle pour rendre possible le changement des valeurs et des attitudes orientées vers la durabilité. L'éducation au niveau supérieur joue un rôle important réalisable vers ce changement, à cause de son impact sur les enseignants présents et futurs dans les conseils scolaires. Cette étude se renseigne dans le rôle actuel de l'éducation pour le développement de la viabilité (ESD) dans l'éducation du premier cycle et d'un programme de formation des enseignants dans les universités canadiennes en mettant plus particulièrement l'accent sur les pratiques prometteuses et les initiatives vers la réorientation de la formation des enseignants pour la viabilité. Une approche d'étude de cas qualificatif utilisé a identifié des initiatives promettantes ainsi que les enjeux et les obstacles de faire la réorientation à la faculté d'éducation vers la viabilité à quatre universités canadiennes. La discussion des résultats est encadrée par la façon dont les initiatives identifiées sont associées au développement du cadre des compétences ESD: expérimental, pluridisciplinaire et l'apprentissage basé sur la résolution de problèmes autour des situations dans un contexte réel avec la communauté et l'environnement naturel; établir des partenariats avec des collègues, des étudiants, dans les organisations communautaires et d'autres institutions.

*Mots clés:* l'éducation de la viabilité, les facultés d'éducation, les compétences des enseignants.

**Developing Competencies for Education for Sustainable Development:  
A Case Study of Canadian Faculties of Education**

Sustainable development is concerned with creating and sustaining the conditions for current and future generations of humans to live well on this planet. The notion of sustainable development was introduced by Brown (1981) and then adopted by the United Nation's World Commission on Environment and Development (UNWCED). According to UNWCED (1987), "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (p. 43). Hence, right from the beginning, a multi-pronged approach to sustainable development was taken that went beyond concerns for the destruction of the natural environment, included concern for meeting the essential needs of all people in a sustainable way, and was in consideration of the needs of future generations. This comprised a concern for equitable access to, and distribution of, resources (Jucker, 2002), a link that is especially brought into focus in a critical pedagogy of place (Greenwood, 2008; Gruenewald, 2003; Stevenson, 2008). Although not all scholars share this multi-pronged approach to sustainable development (Scott & Gough, 2003), many scholars do take a holistic, system-theoretical view of the way in which the elements of sustainable development are interlinked (Capra, 2002; Clayton & Radcliffe, 1996; Senge et al., 2008). In this regard, Summers, Childs, and Corney (2005) "identify in the literature a growing consensus that sustainable development must be conceptualised at the very least in terms of three dimensions: environment, economic [economy] and social [society]" (p. 629).

The UNWCED report in 1987 recognized that "sustainable development requires changes in values and attitudes towards environment and development" (p. 111), and that education has to play a central role in achieving those changes. Furthermore, researchers have identified education as "a critical tool in the transformation towards sustainability" (Firth & Winter, 2007, p. 600) in the K-12 school system (Robertson & Krugly-Smolka, 1997; Summers et al., 2003); the tertiary system (Minguet, Martinez-Agut, Palacios, Piñero, & Ull, 2011; Mochizuki &

Fadeeva, 2010); and in informal/non-formal education settings (Mahruf et al., 2011; Wheeler, 2007). Research has also identified three domains of the educational process relevant for such transformation. The first is the content of what is being taught at both the tertiary and post-secondary level (Blewitt & Cullingford, 2004) and the K-12 school system (Hopkins, Damlamian, & López Ospina, 1996; Paige et al., 2008; Robertson & Krugly-Smolka, 1997). The second is pedagogy, with some scholars suggesting that sustainability education requires a constructivist approach to teaching (Firth & Winter, 2007), an ecopedagogy—a critical pedagogy of environment—that “overcomes the anthropocentrism of traditional pedagogies” (Gadotti, 2010, p. 205), and perhaps a complete new paradigm of teaching to account for a holistic perspective on education for sustainability (Sterling, 2001). The third domain is the education and professional development of those who are responsible for implementing education for sustainable development (ESD), namely teachers. Furthermore, UNECE (2012) proposed a number of core ESD competencies for educators, organized into the following four clusters:

- Learning to Know (refers to understanding the challenges facing society both locally and globally and the potential role of educators and learners);
- Learning to Do (refers to developing practical skills and action competence in relation to ESD for sustainable development);
- Learning to Be (addresses the development of one’s personal attributes and ability to act with greater autonomy, judgement and personal responsibility in relation to sustainable development); and
- Learning to Live Together (contributes to the development of partnerships and an appreciation of interdependence, pluralism, mutual understanding, and peace).

The study presented in this chapter focuses on the latter domain: the education and professional development of teachers in faculties of education.

### **The Problem: Reorienting Teacher Education Toward Sustainability**

In 1998, the United Nations Educational, Scientific and Cultural Organization (UNESCO) initiated work on reorienting teacher education toward sustainability, which led to:

the formation of an International Network of Teacher Education Institutions (McKeown & Hopkins, 2007); a series of monographs on integrating ESD into teacher education programs (Hopkins et al., 2007; Hopkins & McKeown, 2005; McKeown, 2006; Tilbury, 2011); a list of relevant competencies for educators (UNECE, 2012); and, a reoriented teacher education curriculum (UNESCO, 2010). The reorientation of teacher education, often referred to as the “mainstreaming” of education for sustainability in teacher education, means the “incorporation of ESD philosophy, content, and activities within an initial teacher education system to such an extent that ESD becomes embedded within all policies and practices” (Ferreira, Ryan, & Tilbury, 2007, p. 226). Despite the work of UNESCO, the International Network, and others, we are not aware of any studies that report such mainstreaming of a teacher education program in any country. Quite to the contrary, Nolet (2009), for instance, writes that “today, sustainability education is almost nonexistent in the teacher education curriculum in the United States” (p. 430). Ferreira et al. (2007) report a similar situation for Australian teacher education programmes. Despite the lack of mainstreaming, there are studies documenting the integration of ESD into teacher education programs around the world to various degrees (Alsop, Dippro, & Zandvliet, 2007; Down, 2006; Ferreira et al., 2007; Fien & Maclean, 2000; Firth & Winter, 2007; McKeown & Hopkins, 2007).

Based on reports by members of the International Network of Teacher Education Institutions, Hopkins and McKeown (2005) have identified four types of challenges in the reorienting of teacher education toward ESD (see also Down, 2006; Falkenberg & Babiuk, 2014; Firth & Winter, 2007). These four types of challenges are:

- lack of awareness, support, and resources at the teacher education institutional level;
- lack of prioritizing sustainability in the educational community;
- the common approach to reforming education systems and structures (that does not give consideration to education for sustainability and is generally undertaken within the traditional disciplinary curriculum frameworks, which makes the incorporation of the transdisciplinary education for sustainability a challenge); and,

- lack of establishing and sustaining partnerships (lack of partnerships with communities in which education for sustainability is taking place and lack of coordinated efforts between different branches of governments beside ministries of education). (Hopkins & McKeown, 2005, p. 30)

### **Focus of the Study: Reorienting Teaching Education for Sustainability in Canada**

In Canada, education, including post-secondary education, is under provincial jurisdiction. Teacher education programs that prepare students for certification in the K-12 teaching profession are offered as undergraduate or graduate programs. Some graduate programs (some masters and doctoral programs) may be offered to practicing teachers as systematic professional development. The focus of this study is to inquire into the current role of ESD in undergraduate and graduate teacher education programs in Canadian universities.

Currently, there is very little known about this topic in Canada. There are studies on particular initiatives around the teaching of particular courses by individual course instructors (Alsop et al., 2007; Dipbo, 2013), and there are only a few baseline-type studies, including Falkenberg and Babiuk (2014) and Swayze, Creech, Buckler, and Alfaro (2012). The former is a baseline study using in-depth interviews on the status of ESD in the preparation of teachers in faculties of education in Manitoba and the latter uses survey and follow-up interviews on the status of ESD in Canadian faculties of education. The study reported in this chapter builds upon the baseline study by Swayze et al. (2012) by using in-depth interviews with a sample of faculty members from selected Canadian faculties of education to explore promising practices and initiatives aimed toward a reorientation of teacher education for sustainability in undergraduate and graduate programs, in particular, at Canadian faculties of education.

## **Method**

### **Case Study Approach**

The general focus of the study was to inquire into the current role of ESD in

undergraduate and graduate teacher education programs at Canadian universities. The study had two specific research questions: (a) What are the ESD-related course designs, pedagogical approaches, and other initiatives used in Canadian teacher education programs (undergraduate and graduate) to help school teachers develop competencies for ESD? (b) What are the challenges and enablers faced by university instructors who intend to develop those competencies? In order to address these research questions, this study explored multiple cases within a bounded system (Creswell, 2007), where the bounded system included the teacher education programs at Canadian universities. The design of the study was a single-case, multiple-units case study (Yin, 2009) where the Canadian teacher education context was the single case of the world-wide teacher education context and the selected teacher education programs of the selected faculties of education in Canada were the different units of analysis within the single case. Due to the lack of understanding of the status of ESD in Canadian teacher education programs, this study had the character of an exploratory case study (Yin, 2009).

### **Site Selection, Data Collection, and Analysis**

The following purposive sampling procedure was used to identify interviewees for the study. Based on initial findings from the study by Swayze et al. (2012), four faculties of education (the units of the case study) were identified as particularly noteworthy in their attempts to integrate ESD into different aspects of their undergraduate and/or graduate programs. Key faculty members in each of the four institutions were identified, who, in turn, identified other members of their faculty who had contributed to the integration of ESD. In total, twenty faculty members across all four faculties of education were interviewed using semi-structured, in-depth interviews in face-to-face meetings or by phone by Sims between April and September 2012. The guiding interview questions were designed to explore interviewees' response to the two research questions of the study. The interviews were transcribed verbatim for analysis, which consisted of coding and interpretation processes (Coffey & Atkinson, 1996; Creswell, 2007; Maxwell, 1996) using the two research questions as guides. Nvivo (Muhr, 1997) was used to select and code data segments, create memos, and build families of codes based on themes that



emerged from the data. Member checking was used for feedback on the accuracy of data presentation. Relevant documents (referenced below) were also reviewed.

### **The Case Study Sites**

In the presentation of the study results, real names of participants are used unless otherwise stated, a practice approved by the research ethics board and the respective participants. Participants were from faculties of education from four different universities (the units of this case study). Two of them are located in Toronto, the largest city in Canada in the province of Ontario: the Ontario Institute for Studies in Education /University of Toronto (OISE/UT), and York University. The other two universities were located in Vancouver in the province of British Columbia: the University of British Columbia (UBC) and Simon Fraser University. (SFU). The results are organized and reported by university.

## **Results**

### **Case 1: OISE/UT**

OISE/UT has a long-standing focus on social justice and equity issues as well as a more recent one on environmental education. Particularly under the leadership of Dr. Hilary Inwood, initiatives to integrate sustainability and environmental education at OISE/UT started in 2007. Over the years, she, in close collaboration with other individuals and university groups, worked to realize their goals through what has become the Environmental & Sustainability Education (ESE) Infusion Initiative (n. d.). This initiative :

Aims . . . to support one of the tenets, Social and Ecological Responsibility, of OISE's new institutional vision. It provides a nexus for ESE-related groups at OISE . . . to share information, co-develop events and programs, and work towards a greater level of sustainability in all that OISE does. (Environmental & Sustainability Education Infusion Initiative, n. d., p. 1)

**Awareness-raising initiatives.** OISE/UT implements a variety of creative initiatives that aim to reduce their impact on the environment, and raise awareness amongst students and staff

who frequent the institute. Examples of their activities included, promoting awareness through their Fatal Light Awareness Program to prevent migrating birds from hitting their campus high-rise building, or motivating people to walk the stairs by installing art in the stairwells. In 2012-2013, they installed four eco-art projects showcasing a variety of student-created pieces of art related to ESE environmental and sustainability education (for more details: [http://www.oise.utoronto.ca/ese/ESE\\_in\\_Practice/Eco-Art\\_Projects.html](http://www.oise.utoronto.ca/ese/ESE_in_Practice/Eco-Art_Projects.html)). In 2012-2013, OISE/UT created a community learning garden to:

Support integrated learning about ESE in our graduate and teacher education program. . . . The garden is found in six large concrete planters at the front of the OISE/UT building, each with its own theme related to the foundational concepts of OISE/UT's programs: Aboriginal Education, Equity and Inclusive Education, Holistic Education, Creativity in Education and Environmental and Sustainability Education. Our hope is that these gardens will become a symbolic and physical manifestation of collaborative learning around social and ecological learning across all of OISE/UT's programs, and act as demonstration sites to inspire our students to integrate nature-based learning into their own personal and professional lives.  
([http://www.oise.utoronto.ca/ese/OISE\\_Learning\\_Garden/index.html](http://www.oise.utoronto.ca/ese/OISE_Learning_Garden/index.html))

OISE/UT also created a website with resources for pre- and in-service teachers (<http://www.oise.utoronto.ca/ese/>).

**Undergraduate teaching.** The integration of sustainability and environmental perspectives into OISE/UT's undergraduate program was manifested in a number of ways including:

- Environmental and sustainability learning goals, which are listed explicitly in the vision for the qualities with which students graduate from OISE/UT's programs (OISE/UT, 2011).
- The cohort system used in teacher education programs, which allows for theme-based learning groups. Within the courses offered in each particular cohort program, that theme

was woven into all of the courses. OISE/UT offers a Global Citizenship and Sustainable Development secondary cohort and an elementary Social and Eco-Justice cohort. At the highest level, cohort instructors took a team approach, regularly discussing student progress and how best to integrate the theme across the disciplines. Ideally, students' practica complemented the desired thematic focus, allowing students to see best practices in action. However, in less-than-ideal conditions, there was little to no time for instructors to meet, and high instructor turn-over makes consistent integration challenging.

- The offering of an elective course linked to sustainability/environmental education. Dr. Inwood made an effort to provide some theory in her ESD elective, but also built bridges with the community by taking students on field trips, and by having local, non-governmental organizations come to give seminars. For the 2013-2014 academic year, this elective, along with 17 others, was, unfortunately, cut as a cost-saving measure.
- The hiring of a doctoral student with expertise in ESD to infuse environmental and sustainability education themes across the broader curriculum offered to B.Ed. students, through, for instance, presentations on environmental and sustainability education in many methods courses. In 2010-2011, this doctoral student spoke to 750 students. Funding for this position was provided through the Teacher Education Program Assistant (TEPA) program. In 2013, funding for this doctoral student was cut by half as a cost-saving measure.
- The integration of ESD into some of the curriculum and instruction courses. Jane Forbes, an elementary science educator in the program, argued that instructors must look to infuse sustainability education concepts into their courses, not just have a one-day intervention. Forbes explained how "in science, we want a critical question that could guide what we look at throughout our six classes with students like: 'How can we promote sustainability and environmental responsibility amongst diverse learners?'"
- The opportunity for interested teacher education students to have their experience and knowledge in ESE environmental and sustainability education to be formally recognized through a certificate in environmental leadership. There is no financial cost associated with

pursuing this certificate. To earn the certificate, students must complete the following three components: (a) a formal learning component (which includes course work, mentorship, or intern learning opportunities); (b) a co-curricular learning component (which includes attending ESE environmental and sustainability education talks, workshops, or field trips); and (c) a service learning component (which includes volunteering or participating in an ESE environmental and sustainability education initiative at OISE/UT). In 2012-2013, the pilot year for this initiative, 60 students earned the Environmental Leadership Certificate. The hope is to be able to open this certificate program to graduate students as well (for more details see [http://www.oise.utoronto.ca/ease/EE\\_Leadership\\_Certificate.html](http://www.oise.utoronto.ca/ease/EE_Leadership_Certificate.html)).

**Graduate teaching.** In terms of ESD opportunities for graduate students:

- OISE/UT offered an Adult Education for Sustainability Certificate Program. This program is also open to the general public.
- Graduate students in the Master of Teaching Program attended a one-day conference on ESD as part of their program.
- A variety of graduate courses related to ESD have been offered, including: Adult Education for Sustainability; The Pedagogy of Food; Environmental Studies in Science, Math and Technology; and Environmental Health, Education and Policy Change.

Furthermore, OISE/UT offered a mini-research grants program, “Inquiry into Practice,” which has been used to investigate ESD-related topics. David Montemurro, lecturer and coordinator of the Critical Global Citizenship and Environmental Sustainability teacher education cohort at OISE/UT, explained:

For the past decade we've had an “inquiry into practice.” . . . They're mini-research grants to support school-university partnerships that are thematic so recently it was teaching global matter in local classrooms. Profs and teachers put in an idea around a question, and this time it was “How are students making sense of global content into local context in the greater-Toronto-area classroom?” That research money provides instructors the opportunity to do

things other than just teaching—an inquiry project to think deeply about something and to work with schools.

### **Case 2: York University**

York's Faculty of Education ESD work was built on a very strong focus on equity and social justice issues in teacher education (Dippo, in Hopkins & McKeown, 2005). According to Dr. Dippo, over the past 15 years, in order to better integrate a focus on the environment, elective courses have been offered in both the undergraduate and graduate programs. An effort has been made to integrate the three components of ESD into the overall teacher education program through a specific core course in the preservice program. He suggested that one of York's particular strengths in the area of ESD lies in providing a joint graduate diploma with the faculty of environmental studies and close collaboration with Learning for a Sustainable Future (see <http://www.lsf-lst.ca>) and the UNESCO Chair on Reorienting Teacher Education to Address Sustainability.

**Undergraduate teaching.** The integration of ESD into the undergraduate program in the Faculty of Education at York University was manifested in a number of ways, including:

- Offering two electives related to ESD. Dr. Dippo taught his ESD elective course on campus, but outside the conventional classroom (i.e., in the outdoors), actively making the link between the environment where students learn, and the students' future teaching practice. Examples include finding authentic places which would act as appropriate learning environments and teaching mock lessons from there. For instance, on a dull November day, to commemorate Remembrance Day, a future teacher recited a poem by Wilfred Owen and then had his classmates "write letters from the trenches," in the drizzle, with dull pencils, crouching against a concrete wall.
- Infusing ESD across courses in the undergraduate program by, for example, replacing a mandatory course in general teaching methods by a course called "Teaching and Learning for Inclusive Classrooms," Dr. Dippo described the course as follows:

That course was ostensibly about general teaching methods—just focussing on

lesson and long-range planning, curriculum documents. . . . About five years ago there was an effort to come up with a broad vision of a more coherent, compelling course. Those teaching it worked on revisions for a year or two. . . . Now, this course has an explicit social justice agenda and it's where climate change and environmental education are taken up. That was a pretty remarkable achievement where the course had to be redesigned and approved at all levels. . . . However, in practice, that course is sometimes team taught but more often it's taught by an individual and the extent to which that person has knowledge in those areas, that's the extent to which EE/ESD gets taken up. But it's there, and that's significant.

**Graduate teaching.** At York University, a joint graduate diploma in ESE Environmental/Sustainability Education has been offered through the Faculties of Education and Environmental Studies. In this program, students must take courses from both faculties, with a few courses being mandatory and the rest elective. Dr. Diplo explained:

We've a fairly good mix of interested people some of whose lives are grounded in schools and others whose lives are grounded in the NGO community. . . . For those who want to learn about environmental sustainability, I think the collaboration between the two faculties serves them well. . . . I think that this jointly-offered graduate diploma enables the faculty of education students to work more closely with community activists and that has been a good thing.

### **Case 3: UBC**

According to Dr. Mark Edwards of UBC, with respect to the broader university context, UBC has a long history of being a “sustainability mecca.” UBC's strategic plan, called Place and Promise, led to the creation of the UBC Sustainability Initiative, which further developed dedicated resources for support faculty, staff, and students in their ESD work. More specifically, within UBC's Faculty of Education, Indigenous scholarship is a strong area of expertise. These experts, in collaboration with other faculty members, help define what ESD means at UBC's

Faculty of Education. Additionally, UBC's Faculty of Education includes a diverse group of individual faculty members whose areas of expertise closely and innovatively link the environment with pedagogy and social justice. ESD work is highlighted in research, graduate courses, and in their teacher education program. Much work has been done through the creation of a common vision for the faculty, particularly through groups like the Environmental Education Caucus (Environmental Education Caucus, 2011), and the creation of sustainability-focused graduate programs in the Faculty of Education. According to Dr. Edwards, some part of this work has been university-driven and other parts have been grassroots-driven, particularly through student initiatives.

**Undergraduate teaching.** The integration of ESD into the undergraduate program in the Faculty of Education at UBC has been manifested in a number of ways, including:

- Having had a thematic cohort that integrated sustainable education and social justice in the two-year program for elementary teachers. However, this cohort is not offered anymore.
- Offering electives related to education for sustainability, including a long-standing outdoor education course.
- Several initiatives for infusing ESD into different courses of the program. For instance, Dr. Susan Gerofsky, in collaboration with graduate students and colleagues from Land and Food Systems, has created a learning garden on the UBC campus. She recognized that if learning through gardens in schools was to be supported, future teachers would need to learn to teach their subject areas (e.g., history, music, science, and mathematics) in a garden through their university course-work. A learning garden can take many forms depending on the specific context: at UBC, after years of advocacy, Dr. Gerofsky and her team built the Orchard Garden, which includes a small-scale version of a traditional Chinese market garden and reflects the historical relationship of Chinese-Canadian and Musqueam First Nation cultures. In 2011-12, over 500 preservice teachers from various disciplines engaged with the garden through outdoor learning experiences. Dr. Gerofsky said that to maintain a learning garden one needs to get a broad spectrum of people involved in the planning, construction, and use

of the garden (e.g., students, faculty, administration, planning and operations, and community members). Accessing available grants is also important. The challenges that she has encountered in sustaining a learning garden have been: setting up an online commons (to share ideas) that is actually meaningful to users; engaging a broad and diverse community in garden activities; learning from, and valuing, different cultural approaches, and gardening methods; and overcoming logistical challenges, like organizing volunteers.

- Various initiatives to integrate ESD into undergraduate courses. Dr. Gerofsky has conducted research linking math concepts with the natural environment, including using the learning garden to provide opportunities for students to do math in a living environment. She explained:

In the winter we did workshops with student teachers on math and body measurements in the garden. . . . We researched different ways that people have measured spaces and objects with our bodies, using a pace, or a hand-span, or the width of a thumb to measure distances like a foot or an inch. We'd think about seed packets and how far apart particular seeds have to be planted. . . calculate how many packages of seeds were needed to seed a given garden bed. We used trigonometry to figure out how tall a certain tree was, and noticed where the shadow falls at different times of day. . . . We thought about ideas like embedding shapes in the walls and pathways of the garden that embody mathematical ideas and puzzles like, for example, the 17th-century Königsberg Bridge problem.

Furthermore, other instructors have done workshops on teaching history, drama, science, and classroom management in the garden. In the summer, they offered courses for in-service teachers on how to meaningfully integrate a learning garden into their teaching.

Dr. Charlene Morton, an instructor at UBC, discussed how creating music relates to the concepts of sustainability and how these might be used in a classroom. Through



activities like the “sound walk,”<sup>1</sup> she has taken students outside so that they can become more aware of sounds present in the environment through active listening and a contemplative practice, reflecting upon how we judge these sounds and how these relate to underlying social and environmental issues in the community. Dr. Morton elaborated:

What does integrating sustainability across the curriculum mean in the context of music education? To help teacher candidates understand . . . we begin by considering the commercial and true costs of the musical instruments in well-equipped university music classrooms. Following initial discussion . . . teacher candidates learn about the instruments' maintenance and replacement costs. . . . For example, we find out how many new plastic recorders are purchased yearly and what this means in assessing how many are disposed of. This . . . usually leads to a discussion about the wide discrepancy among schools in what programming they can afford and the assumption that, for some, band and string programs are a right even though [they] may or may not be environmentally, culturally, or economically sustainable. The most salient question is “What’s the most sustainable musical practice?” It doesn’t take long . . . to surmise that singing is the best option. . . . Nonetheless, more time is needed to accept singing as a sustainable alternative to playing with a variety of musical toys (acoustic/electronic) and surrender to the musical temptations of consumer marketing. I also explore sustainability through a PlayList assignment: students share personally-selected recorded music by posting it to an online forum. They comment about each others’ reviews incorporating musical, social, and cultural aspects of their choices. . . . However, it’s too difficult for one assignment to foster a critical awareness about the economic, social, or environmental impact of our musical appetites.

### **Graduate teaching.**

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<sup>1</sup> See the National Film Board of Canada’s documentary *Listen* by Murray Schafer for more details.

- Robert Vanwynsberghe explained recent planning initiatives focussed on sustainability:  
[UBC recently examined] the principles and some of the possibilities of advancing sustainability programming in a way that brought together all of the departments. We met for a year. . . . we have a Master's of Arts in sustainability and a Ph.D. program coming forward, a Master's of Education program,<sup>1</sup> all in the faculty of education, all focussed on sustainability. We also have certificates, one in urban farming, another in teaching using gardens, and another in outdoor and environmental education. . . . The other piece is a seminar series which argues for education for sustainability as a kind of field. It provides these kinds of rock-star people as resources who can come in and talk to others in the community and to university classes.
- Through the Peru Summer Institute called Ecology, Technologies and Ecoliteracies (see <http://www.students.ubc.ca/global/learning-abroad/group-study-programs/current-programs/peru/>), indigeneity and sustainability are brought together. Two elective courses have provided an international service-learning experience with Kichwa-Lamista communities in the High Amazon. These 4-week courses took place at the Sachamama Center for Biocultural Diversity in Lamas, Peru.
- Dr. Vanwynsberghe described an inter-institutional graduate-level course using a transdisciplinary approach as follows:  
We had four institutions, UBC, Simon Fraser University (SFU), Emily Carr, and British Columbia Institute for Technology (BCIT); we had students and instructors from all four places. We also had government employees who sat in the course. We ran it out of Science World one summer and out of another building downtown on another occasion. The focus was stakeholders' issues on the building of the Urban Trail. We brought together stakeholders and asked them what they saw as issues; they may raise an issue of riparian zones,

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<sup>1</sup> See link <http://pdce.educ.ubc.ca/med-in-curriculum-studies-ejs1-2/> for details.

or women's safety. Then a group of students would work together to address these issues and then brought them back to the stakeholders and in some cases implemented the solutions with them. Each summer we would pick up where we left off, we did that for three summers. Again this was all towards creating the possibility for inter-institutional courses for moving forward. At Emily Carr they're all artists and designers. They bring an aspect to your course that, until you experience it, you can't believe how valuable it is. For example, they would say, here's the stream, if we built this bridge, and they would build it with designer software, this is how it would protect the environment. SFU students are extremely strong and very community-oriented and BCIT are purely technical-oriented, we had this nice complement.

#### **Case 4: SFU**

SFU's Faculty of Education has provided leadership in innovative pedagogies for teaching for and about ESD at both the undergraduate and graduate levels. It has, arguably, offered the longest-standing environmental education summer institute in North America, now in its 44th year of continuous course offerings. According to Dr. David Zandvliet, SFU's non-departmentalised structure at the Faculty of Education allows certain innovative collaborations in both teaching and research.

**Undergraduate teaching.** The integration of ESD into the undergraduate program in the Faculty of Education at SFU manifests in a number of ways, including:

- A Sustainability Education and Environment of Diversity (SEEDs) cohort in the Faculty of Education's undergraduate teacher education program.
- Elective courses with a focus on environmental education. Dr. Zandvliet has offered two environmental education courses which share a common process, approach, and broad focus, yet with unique contexts and content. One has taken place with the Haida Gwaii First Nations community, and another in metro-Vancouver. The latter was created 12 years ago to be more logistically accessible for students. To realize these courses, a "strategic

partnership” was created with the communities involved. Establishing courses like these involves a multi-year commitment as building these strong, long-standing, respectful relationships with communities takes time. Community members act as resource people and have input into the course, including teaching and assignments. The focus is on how the community works: students learn about the aspects that sustain a community (e.g., social programs, and waste management systems). The course outline reflects a process of inquiry, experiential learning, and community engagement than a specific content. Zandvliet and Brown (2006) describe how these courses directly link what the students are experiencing in the communities with their future teaching. By living a place-based pedagogy, pre- and in-service teachers interpret curriculum in a way that focusses learning within the context of a physical community. For students in the sustainability cohort, an “alternative” academic year—one that runs January to December—has provided a unique opportunity to take courses in the summer, thus enabling student-teachers the possibility to integrate and experiment with their new ideas and understandings into their final practicum in the fall term. The theme of the metro-Vancouver course is “city as a living organism,” and has been open to preservice and in-service teachers.

At SFU, these unique courses have included twice the credit hours of a “normal course” (eight credit hours) usually lasting three weeks in the intensive residential format or over six weeks in the intersession format. Also, these courses are not graded. Zandvliet argues that they need to be this long, otherwise they would not be logistically possible, and would be less meaningful. Also, these courses are not graded courses. According to Dr. Zandvliet, being ungraded seems important as the courses become “more about what students want to experiment with . . . , more inquiry and open-ended” (Zandvliet, personal communication). Though subject to some critique, these courses’ long history and faculty advocacy helps maintain their longevity (see Zandvliet & Brown, 2006).

**Graduate teaching.** The Faculty of Education at SFU offers a two-year master’s program focusing on environmental education. According to Dr. Zandvliet, in the two-year

master's program, students stay together in a cohort and take different courses, part-time, on alternate weekends, and they do intensive summer-school courses. A summer course could include an international experience (e.g., a three-week field course in Australia). This program has also included an action research component in which students study their own practice to become more critically reflective) and in which they propose teaching projects for their own milieu. Advisors support students through this process. This program has also included a project-based comprehensive exam.

### **Discussion**

#### **Promising Practices Developing Competencies in ESD**

As mentioned in this chapter's introduction, UNECE (2012) identified a number of core competencies for ESD for educators. The promising initiatives described in this chapter reflect many of UNECE's (2012) recommendations to integrate ESD approaches across the curriculum in innovative ways, and to provide ongoing professional development opportunities for teachers, such as through critically reflective practice. The various initiatives support UNECE's (2012) recommendation that establishing partnerships between education and other sectors ensures that the wider systems embrace ESD. Furthermore, these initiatives reflect a process of engaging people in the university and the community in meaningful ways in the planning and implementation of learning projects. These processes of inclusive collaboration within and outside of institutions to problem-solve around locally-relevant, real-world issues, have potential for creating interdisciplinary opportunities that reflect ESD goals and strategies.

For instance, Dr. Zandvliet's environmental education courses at SFU and Dr. Vanwynsberghe's inter-institutional graduate course at UBC are clear examples of inquiry-based, integrated, and locally-relevant learning opportunities in which students may take action on real world problems directly with stakeholders or in their field placements (practica). UBC's and York's joint master's programs are examples of programs that try to increase integration by breaking down the traditional disciplinary "silos" still very common in post-secondary education today. These examples enable, to a greater or lesser extent, the development of competencies in

systems thinking, problem-setting, critical reflection, visioning, and creative thinking (UNECE, 2012). The programs in these the cases, discussed in this chapter, provide opportunities for learners to develop competencies through active engagement with different groups across generations, cultures, places, and disciplines. They also help learners clarify their own (and others') worldviews through dialogue and the recognition of the existence of alternative frameworks (UNECE, 2012). In terms of the UNECE (2012) "Learning to Do" competencies, these university experiences might enable future educators to better create opportunities for sharing ideas and experiences without prejudice and preconceptions; to work with different perspectives on issues; and to connect learners with their local and global spheres of influence. In regards to the "Learning to Be" competencies, these promising practices may help educators be more inclusive of different disciplines, cultures, and perspectives, including Indigenous knowledge.

The promising practices shared in this chapter may vary in scale, but they are clearly connected to their communities. For example, OISE/UT's work with local non-government organizations (NGOs); UBC's speaker' series, or the "sound walk" activity, are inherently community-based. Furthermore, UBC's learning garden, Peru's summer institute and inter-institutional graduate course, and SFU's environmental education courses, are larger-scale initiatives, but also very much embedded in the local and natural environment. In regards to UNECE's (2012) "Learning to Do" competencies, these examples, as well as Dr. Dippo's teaching outdoors program at York University, make use of the natural, social, and built environment, including their own institutions, as a context and source of learning. To a greater or lesser extent, they all facilitate the assessment of potential consequences of different decisions and actions. With respect to competencies related to "Learning to Be," these activities, are, in general, inclusive of different disciplines, cultures, and perspectives. These, and other examples, like OISE/UT's mini-research grants or SFU's master's action research project, provide opportunities for practitioners to be critically reflective, creative, and innovative.

### **Challenges and Enablers of Reorienting Teacher Education toward Sustainability**

**Challenges.** This study suggests that there are challenges in reorienting faculty of education programming toward sustainability. The first challenge is programmatic. The undergraduate programs of the four cases of this study were all one-year programs at the time, which limited the amount of time available for introducing stand-alone ESD courses to the roster of elective courses. Only where ESD was integrated into already existing courses has ESD found its way into courses that reached all students (e.g., OISE/UT and York). However, the new two-year teacher education programs in Ontario (including those at York and OISE/UT) might open up opportunities for new courses with a stronger, more direct focus on ESD. Further, the current elective courses integrating ESD are vulnerable as they can fall prey to changing institutional priorities. At the moment, ESD seems to be a priority area in the four case universities; however, priority areas can, and often do, change over time. For instance, in spite of the strong focus on sustainability at OISE/UT, its ESD undergraduate elective was cancelled in the 2013-14 academic year. This potential challenge is further exacerbated by a turnover of deans and others in leadership positions.

The second type of challenge concerns logistical matters. Some of the innovative approaches to ESD in teacher education programs require particular logistical accommodations in terms of time and place, which was, for instance, been the case for SFU's environmental education courses. Logistical challenges also play a role in cross-disciplinary programming, which can be complex and time consuming. This challenge was articulated by many interviewees, but particularly with respect to the community-based courses (e.g., SFU's environmental education course) and programs which attempt to meaningfully integrate ESD throughout a theme-based cohort's course work. These challenges align well with the larger challenges inherent in efforts to integrate ESD into universities—challenges identified by, for example, Lidgren, Rodhe, and Huisinigh (2006), and Stephens et al. (2008).

**Enablers.** Although challenges exist in implementing ESD initiatives in teacher education programs (Hopkins & McKeown, 2005), the initiatives discussed in this chapter show

how some of these barriers can be overcome by, for example, enabling interdisciplinary learning opportunities; collaborating with a community of experts to tap into local knowledge; and by providing direction with a clear university-wide mandate to integrate ESD into university activities.

In the cases discussed in this chapter, there were many factors that provided a fertile context, both at institutional and broader levels, for the various practices to occur. At an institutional level, which, depending on the context, could mean the faculty or university level, the champions of ESD programming built upon their institutions' strengths. A successful approach was to begin program development by coming to a better understanding of their colleagues' views and perspectives, and what resources already existed at that particular institution or part of the institution. The evolution of OISE/UT's Environmental and Sustainability Education Infusion Initiative provides a glimpse of how this was done. Swayze et al. (2012) found, as confirmed by some participants in the current study, that the UN's "Decade on ESD" contributed significantly in helping early adopters to create a legitimate space for ESD debate and action across their faculties. However, while faculty and university integration of ESD initiatives is increasing, the study reported here affirms Swayze et al.'s (2012) findings that ESD adoption is still primarily based on individual faculty members' commitment than on a faculty-wide response.

As with most Canadian universities (Swayze et al., 2012), these cases all have some sort of policy related to sustainable development. With respect to a vision or clear mandate for ESD, in all case contexts, some kind of inclusive process was facilitated to create a guiding vision or document for the work they were doing at a faculty and/or university level. At OISE/UT, for example, these included: the creation of a vision statement for the Environmental and Sustainability Education Infusion Initiative, its *Learner Document*, which outlines capacities, including ones directly related to environmental and sustainability education that they are trying to embed through various faculty of education programs; and the *DEEPER* guide, *Deepening Environmental Education in Pre-Service Teacher Education Resource* (Inwood & Jagger, 2014),



which was created collaboratively, via a provincial roundtable on EE. At UBC, guiding documents have included: *Transforming Sustainability Education at UBC: Desired Student Attributes and Pathways for Implementation*, led by the University Sustainability Initiative Teaching and Learning Office; the *Environmental Education Caucus Green Paper*, created by the Environmental Education Caucus/Sustainability Working Group; and a *Faculty of Education Plan*. This process of planning together has provided significant opportunities for people to get to know each other and to build community. As mentioned previously, participatory decision-making is an important characteristic of ESD (McKeown, 2006; UNECE, 2012). Sinclair, Diduck, and Fitzpatrick (2008) stress the importance of inclusive planning processes since meaningful participation can result in participant empowerment and learning. Directly addressing challenges identified by Hopkins and McKeown (2005), such as having a clear mandate, helps raise awareness and prioritize sustainability in the education community. Moreover, when there is a clear mandate, it gives legitimacy to ESD work and provides space where individuals can pressure institutions and expect them to provide resources for these initiatives.

A challenge identified by participants in this study, when collaborating on ESD, has been the search for appropriate language (especially when creating guiding documents like those discussed above). This challenge was also identified by Stephens, Hernandez, Román, Graham, and Scholz (2008) in their findings. Most interviewees articulated the need to look critically at the language being used and the concepts represented. Depending on the context, a language should be used that will enable collaboration and understanding, and one that will not create barriers. For example, at OISE/UT, they chose the expression “environmental and sustainability education,” and at York, the acronym “ESD” was commonly used.

Logistical supports at an institutional level are also important. These could include support for the overall coordination of ESD initiatives or enabling collaboration with national and international organizations. OISE/UT provided release time for an “infusion lead” in its Faculty of Education. Release time and funding support are two particularly important enablers

identified by Hopkins and McKeown (2005). UBC created a University Sustainability Initiative Office to coordinate a fully-integrated, university-wide approach to ESD. York University supported broader national and international ESD work by providing office space to house the Learning for a Sustainable Future Program and Dr. Chuck Hopkins' UNESCO Chair on Reorienting Teacher Education to Address Sustainability. Supportive institutional leadership, as a central enabler for reorientation in faculties of education, has also been identified in other studies, including Falkenberg and Babiuk (2014).

Faculties of education are grounded within a broader educational context. Interviewees identified outside enablers that have helped create a fertile environment for ESD initiatives at universities. Across Canada, much work has been done by provincial and territorial ministries of education, as well as other organizations, to build awareness, and to support programming and policy change consistent with ESD (Buckler & MacDiarmid, 2013; Swayze et al., 2012). Findings showed that recent Ontario and BC provincial EE policies (i.e. *Acting Today, Shaping Tomorrow* in Ontario and *Environmental Learning and Experience* in BC) served as enablers for ESD initiatives in faculties of education—affirming Hopkins' and McKeown's (2005) recommendation that ministries of education and faculties can mutually support each others' work. For example, Dr. Inwood (OISE/UT) noted how in 2007, the forthcoming Ontario environmental education policy helped create a legitimate entry-point to discuss the integration of ESD into their B.Ed. program. Many interviewees from UBC and SFU mentioned how helpful BC's Ministry of Education curriculum document, coupled with a general appreciation for sustainability in Vancouver, have been in terms of enabling the integration of ESD into their undergraduate and graduate programs.

### **Conclusions**

Overall, as this study illustrates, preparing for competencies in ESD involves meaningful and experiential learning in nature and communities, and connecting with place and people. The importance of building partnerships was seen in the close collaborations with colleagues,

students, and community organizations. Moreover, the initiatives studied highlight the importance of “thinking outside the box” to provide inter-disciplinary and inter-institutional learning opportunities that problem-solve around real-life issues within communities and the environment. Indigenous perspectives were suggested to greatly enrich our understanding and practice of ESD. Inclusive and participatory decision-making processes were important with respect to engaging people meaningfully, building a broader support base, and raising awareness. These various initiatives highlight possibilities for integrating, into higher education, discussions that explore values and attitudes towards sustainability and social justice. Further, strong administrative support has helped to support individual and collective work on reorienting teacher education toward sustainability.

The study discussed in this chapter elucidates how faculties of education in four Canadian universities successfully integrated ESD into their teacher education programs through curriculum, pedagogical approaches, and ESD-related initiatives, and what challenges and enablers created the particular contexts for these initiatives. Others might consider adopting, adapting, and/or building upon these initiatives according to their specific contexts. The initiatives reported in this study align well with Hopkins and McKeown’s (2005) *Guidelines and Recommendations for Reorienting Teacher Education to Address Sustainability*. Future research should involve assessing the impact of these promising practices on the awareness and ESD competencies of university students in faculties of education.

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## **Chapter 8**

### **Learning to Teach Environmental Education by Gardening the Margins of the Academy (British Columbia)**

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### Abstract

Through research findings and autobiographical narratives, three teacher educators working in Environmental Education (EE) and Garden-based Learning (GBL) at the University of British Columbia (UBC) explored the ways that EE remains marginal in the process of teacher candidates learning to become teachers, in spite of the university's high-level commitments to goals of sustainability. The challenges and generative potential of "gardening the margins" becomes both a metaphor and an example of pedagogical places and practices in the landscape of teacher education, both in the placement of EE within UBC's teacher education program, and in specific narratives from The UBC Orchard Garden, a campus teaching and learning garden and outdoor classroom.

*Keywords:* teacher education, environmental education, sustainability, marginalization, garden-based learning.

### Abstrait

À travers les résultats des études et les récits autobiographiques, trois enseignants travaillant pour l'éducation de l'environnement (EE) et l'enseignement agricole (GBL) à l'Université de Colombie Britannique (UBC) ont exploré les moyens que EE demeure faible dans la méthode que les apprenants deviennent des enseignants, malgré des engagements particulièrement élevés en ce qui a trait aux buts de durabilité. Les défis et les potentiels créateurs du 'jardinage en marges' deviennent une métaphore et un exemple des places pédagogiques dans le paysage de la formation des enseignants, les deux dans les emplacements de EE dans le programme d'éducation UBC et les événements spécifiques du jardin Orchard Garden UBC, un jardin qui vise à l'apprentissage et l'enseignement dans une classe en plein air.

*Mots clés:* la formation des enseignants, l'éducation de l'environnement, la durabilité, marginalisation le programme d'apprentissage basé par le jardinage.

## Learning to Teach Environmental Education by Gardening the Margins of the Academy



Figure 1. Core thematic strands in UBC's teacher education program launched in 2012 (Teacher Education Office, 2013, p. 3).

As one of Canada's and North America's leaders in campus sustainability, the University of British Columbia (UBC) has positioned itself as an innovator in sustainability for its green buildings, energy systems, campus operations, research, and teaching, and as an employer (Baxter, 2015; Public Affairs, 2011). Faculty, staff, and students within the Faculty of Education at UBC have been actively involved in campus-wide sustainability initiatives, sustainability education, and Environmental Education (EE) within and beyond the Faculty. Consistent with this UBC-wide commitment to sustainability, the recently "re-visioned" teacher education program emphasizes "social and ecological justice and diversity" (see Figure 1) as a central thematic strand of the program. These commitments have occurred alongside provincial attempts to integrate EE within the British Columbia (BC) curriculum, which currently includes EE in the Science curriculum.<sup>1</sup> After the BC Ministry of Education's recently proposed (draft) Kindergarten-Grade 7 Science curriculum for 2015-2016 received extensive criticism for its lack of EE content, a team of experts developed EE content along with concepts of environmental stewardship and responsibility to be integrated at each grade level.<sup>2</sup>

Notwithstanding these shifts to apparently integrate EE at UBC and within the BC curriculum, in this chapter we offer our perspectives as three teacher educators working in EE at

<sup>1</sup> For BC curriculum resources, see *Environmental Concepts in the Classroom: A guide for teachers* (1995) and *Environmental Learning and Experience: An Interdisciplinary Guide for Teachers* (ELE) (2009).

<sup>2</sup> The current draft of the BC Science curriculum (British Columbia Ministry of Education, 2015) includes place-based learning, First Peoples' principles of learning, key ecological concepts, and principles and themes of human-society-nature relationships.

UBC and the ways in which EE remains marginal—and at times, marginalized—in the ways in which teacher candidates learn to become teachers. The challenges and generative potential of “gardening the margins” becomes both a metaphor and an example of pedagogical places and practices in the landscape of teacher education as we move from a general description of EE within UBC’s teacher education program to specific narratives from The UBC Orchard Garden,<sup>3</sup> a campus teaching and learning garden and outdoor classroom.

Julia Ostertag (hereafter, Julia) recently completed her Masters and Ph.D. degrees in Curriculum Studies at UBC (focusing on environmental and garden-based education). She is co-founder of The UBC Orchard Garden Education projects. Julia has conducted research and led courses, workshops, seminars, and teacher candidate practica in The Orchard Garden. Her doctoral thesis (Ostertag, 2015) is based on her site-specific installation and arts-based research with student teachers in the garden. Susan Gerofsky (hereafter, Susan) is an Assistant Professor in the Department of Curriculum and Pedagogy at UBC, specializing in Mathematics Education and EE. She is co-founder and long-time Education Faculty Advisor to The UBC Orchard Garden, and active in The Orchard Garden projects in teacher education. Sandra Scott (hereafter, Sandra) is a Senior Instructor in the Teaching Professor stream in the Department of Curriculum and Pedagogy at UBC, specializing in Science Education, EE, and Teacher Education. She is the Education Academic Advisor to the Intergenerational Landed Learning for the Environment project at the UBC Farm,<sup>4</sup> and has worked as an environmental educator, marine educator, and naturalist both within and outside the academy. Throughout this co-written chapter, at times we will be speaking individually from our distinct experiences and positions. These parts of the text will be flagged with our first names and will be formatted as indented paragraphs. At other times, we will be speaking together from shared experiences and interpretations, and these sections of the text will remain unmarked.

The chapter begins with an introduction to EE curriculum at UBC’s teacher education program through Sandra’s autobiographical experiences teaching EE in the Faculty of Education. We then move to an example of an informal and marginal educational space: The UBC Orchard Garden. In this section, we draw on our extensive, hands-on experience developing The UBC

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<sup>3</sup> For more about The Orchard Garden, visit the project’s blog at <http://theorchardgarden.blogspot.ca/>

<sup>4</sup> For more about the Intergenerational Landed Learning on the Farm for the Environment Project, visit: <http://landedlearning.edcp.educ.ubc.ca/>

Orchard Garden as a student-driven, outdoor classroom project. Through Julia's tour of the Garden and other campus landscapes, and Susan's ecopoetry walk with student teachers, we explore how, despite the fact that ecological justice is positioned as a central strand to be infused throughout the teacher education program, its presence nevertheless remains marginalized and fragmented.

### **EE in UBC's Teacher Education Program**

While ecological justice is a strand within the UBC's 2012 revisioning of the teacher education program (Figure 1) and UBC promotes sustainability education pathways across the various disciplines of the university,<sup>5</sup> student teachers' access to EE is often piecemeal. Currently, there are no environmental cohorts in the Bachelor of Education (B.Ed.) Program. In the past, the Living and Teaching Green cohort (2006-2010) was a very successful elementary cohort that featured themes of Social Responsibility and Environmental Sustainability. As with many cohorts in the UBC B.Ed. program, Living and Teaching Green had a limited tenure to allow for the implementation of a new "themed" cohort.

As indicated in Figure 1, coursework in the B.Ed. program is guided by the following strands: Inquiry and Dialogical Understanding; Curriculum, Pedagogy, and Assessment; Social and Ecological Justice and Diversity; Language, Literacies, and Cultures; and Field Experience: School and Community. Many instructors infuse EE into existing courses, particularly in science education (Scott & Adler, 2014) and interweave bioregional and land-based experiences through field trips to the UBC Farm, The UBC Orchard Garden, local beaches, and forest walks. Teacher candidates at UBC can also access EE through electives offered to secondary teacher candidates during the summer (Outdoor Environmental Education: Curriculum and Pedagogy; Advanced Methodology in Outdoor Environmental Education; Environmental Education), through inquiry classes, and during a three-week Community Field Experience (CFE) practicum where students learn to teach in a broad range of educational settings in addition to their regular 10-week school-based practicum. Teacher candidates can choose outdoor EE projects for their CFE such as The UBC Orchard Garden and the Intergenerational Landed Learning on the Farm for the Environment Project at the UBC Farm.

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<sup>5</sup> UBC intends to embed Sustainability Learning Pathways across all teaching programs (<https://sustain.ubc.ca/courses-teaching/sustainability-learning-pathways>).

Many environmentally conscious UBC Education faculty, staff, and students have laid the groundwork for EE in the UBC Faculty of Education. The EE Caucus, co-chaired by a faculty member and a graduate student, was formed in 2005, and has been key to developing EE courses and programs, and implementing “green” initiatives within the Faculty of Education. Although the activity level of the EE Caucus fluctuates, depending on need and student/faculty engagement, it has remained an important grassroots force in advancing work in EE in the Faculty.

Due to these efforts, the UBC teacher education program has begun to acknowledge and incorporate EE initiatives. Sandra has taught in the UBC teacher education program for more than 20 years. From her earliest experiences in this program, her work has consistently promoted EE as a foundational, integral approach to be woven into every course and program. She has witnessed what has changed and what has remained the same in the teacher education program at UBC since the early 1990s, and writes about her personal journey navigating change and constancy below.

### **Autobiographical inquiry into EE at UBC: Sandra’s story**

Through autobiographical introspection, Sandra highlights a combination of encouraging EE initiatives and a frustrating lack of uptake on some of these initiatives. As well, she documents new teachers’ struggles stepping into professional responsibilities:

**Sandra:** During a recent conversation with education colleagues, we discussed the presence, or really the lack of presence, of Environmental Education in the UBC teacher education program. We came from a variety of educational backgrounds that included teaching in elementary, middle, secondary, and postsecondary classrooms as well as in parks, museums, and science centres. To explain the dearth of EE at UBC, a colleague offered this observation: “I will tell you what the problem is. EE tends to take over, to the exclusion of everything else.” During the prevailing silence, I thought, “Isn’t that a good thing?” I was reminded of David Orr’s words, “All education is Environmental Education” (Orr, 1994, p. 12). I also thought of a conversation with my colleague and friend, Mathabo Tsepa, a Mosotho of the Bafokeng (Hare) clan of the Basotho people, from Lesotho in southern Africa. She explained that in her Sesotho language, there was no word for EE. Environment, the Land, was “simply part of the story;” a story about rootedness, connection, and deep care for the land (M. Tsepa, personal communication). Why then



could we as environmentally conscious educators not understand and teach about the land, and by *Land* I mean all worlds of the earth, skies, and waters, in a similarly integrated way?

This idea of EE “taking over” has not been my experience during 20 years working with teacher candidates and practising teachers at the University of British Columbia. When I first taught in the teacher education program as a graduate student in 1994, there was no EE component in the required coursework for the Bachelor of Education degree. The secondary B.Ed. students were offered an EE elective in the summer, but the elementary B.Ed. program did not have a similar course. And so, as a newly appointed instructor of a 13-week elementary science methods course, it was my idea, and therefore up to me, to interweave EE into my curriculum. To start, I drew upon my lived experiences and my lifelong knowing of and being in the more-than-human world (Abram, 1996). My vision was informed by my experiences as a marine educator, park naturalist, and elementary and secondary classroom teacher. Ignited by my caring, connection, and concern for the Earth, I infused those 13 weeks with a sense of wonder inspired by the writings of Rachel Carson (Carson, 1965) and Eleanor Duckworth (Duckworth, 2006, 2008). This reimagining and re-enlivening of the students’ inborn sense of wonder was framed within an inquiry approach to teaching and learning as conceived by Schwab (1962) and furthered by the work of White and Gunstone (1992).

One area I emphasize in my curriculum is the importance of infusing what Canadian environmental researcher and educator Lucie Sauvé (Sauvé, 2005) refers to as a bioregional focus. When we honour where we live and who we are, then we come to know, connect, care, and ultimately strive to ensure the health and well-being of ourselves, our families, our culture, and all the Earth’s living and non-living communities. This focus also reflects my own research and what I call “environmental knowing” (Scott, 2007) conceived through my doctoral work on children’s EE experiences. I continue to draw upon and add to this understanding of knowing and being in all of my pedagogical and research pursuits.

The current elementary science methods course that I teach is a work in progress as I attempt to instil a sense of wonder, love, commitment, and an ethic of care for the land within the confines of a five- to six-week course. This brief time frame does not provide a favourable context for Payne and Wattchow’s (2009) “slow pedagogy.” I have also been

disheartened to note in my research that student teachers did not explore and articulate their environmental knowing as fully in their final assignments (a unit plan) as they did when engaging in class discussions, conversations, course experiences, and writing and drawing in their course notebook. These results suggest that, just as with many practising beginning teachers, when confronted with a challenge, teacher candidates tend to teach the way they were taught (Adler, 2012; Blanton, 2003; Lortie, 1975; Nashon, 2006). Pushing the boundaries beyond the seemingly “easy” and “comfortable” textbook derived activities of a conventional unit is not yet part of many a beginning teacher’s pedagogy.

In working with my graduate students who decide to further their studies in EE after their B.Ed., I can see, as Tsepa (2008) suggests, that the environment becomes part of their story. Within initial teacher EE, however, we are far from the situation that my colleagues described as EE taking over the entire curriculum. However, ever so slowly, changes are taking place. Today in my academic home, the Department of Curriculum and Pedagogy, as well as across the UBC Faculty of Education, there is a growing community of educators who care deeply about the Land, who live an ethic of care not only in their teaching and learning but in all that they do. I truly believe that it is not the program and curricula that make EE *live*. Rather, it is those individuals who live within it as the land becomes their story. As Carson (1965) writes, these individuals are the companions who share and relive the “excitement and the mystery of the world” and “keep alive” our inborn sense of wonder.

### **The UBC Orchard Garden and its Role in the UBC Teacher Education Program**

The UBC Orchard Garden is a place and a project designed to further the efforts of UBC teacher educators, graduate students, and teacher candidates to learn how to teach across the curriculum through a garden as an outdoor classroom. The Orchard Garden has afforded many opportunities for teachers and learners to infuse EE, ecological awareness, integration of the arts, a sense of wonder, and the importance of complicated, unsettling conversations and actions in the process of learning to teach in and with a living place like a school garden. We will introduce The Orchard Garden and its projects here, and then explore some of the implications of *gardening the margins* through Julia Ostertag’s autobiographical narrative of her experiences leading teacher education classes based in the garden.

Initiated as a partnership project between the Faculty of Land and Food Systems and the Faculty of Education, with the participation of the School of Architecture and Landscape Architecture, The UBC Orchard Garden is a project of the University of British Columbia, grounded in a physical garden on central campus. The garden is a collaborative, student-directed research and university teaching project that creates an outdoor teaching and learning space where students and educators (who are often other students) come together as a community to teach, learn, and grow organic produce for the UBC community. The garden is also a point of contact for community engagement, both within the UBC community and externally, notably with the Vancouver School Board, the Chinese-Canadian Historical Society, local artists (e.g., Sharon Kallis and the Urban Weaver Project) (Kallis, 2014), local food systems projects (Fresh Roots, the Vancouver Food Policy Council, the Vancouver School Food Network), and the Musqueam community via the First Nations House of Learning at UBC. Finally, The UBC Orchard Garden is recognized as fulfilling the goals of UBC's strategic planning document, *Place and Promise*.

Graduate and undergraduate students are central to all aspects of the garden's operation. Mentored by faculty from Education and Land and Food Systems, students: write grants to fund the garden; design the garden; maintain the garden; sell garden produce through direct sales to the student-run Agora Cafe and a Community-Supported Agriculture garden share model; promote the garden as an outdoor classroom for teacher education; host classes; lead and teach student teacher practica; host celebrations, conferences, and workshops in the garden; conduct research; design curriculum resources; collaborate with community partners and international garden-based educators; and maintain an active blog of garden-based initiatives. Students from the Faculty of Land and Food Systems largely focus on urban, organic gardening practices, frequently sharing their knowledge and skills with students from the Faculty of Education. Student leaders from the Faculty of Education explore the garden as a co-teacher and outdoor classroom. Since 2010, over 1,500 teacher candidates have engaged with the garden as learners, educators, researchers, and volunteers. Courses that have held classes in the garden span the B.Ed. program, including Aboriginal Education, Math and Science, Philosophy, Art Education, Language and Literacy Education. The UBC Orchard Garden offers an intensive, eight-part, student-led Saturday workshop series, and a three-week community field experience placement for student teachers interested in garden-based EE.

We will explore gardening the margins through co-author Julia Ostertag's autobiographical contribution, a creative non-fiction description about guest-teaching a class in the UBC teacher education program, written in an ironic, third-person voice. She brings us into the story of The UBC Orchard Garden as a fraught and contested place in the academy.

**Julia:** Imagine that you are a UBC teacher candidate sitting in a mandatory teacher education class on Aboriginal Education in Canada (EDUC 440), and your instructor has invited Julia, an educator at The UBC Orchard Garden, to bring your class to the garden. You are not entirely sure what a garden has to do with teacher education or Indigenous Education but you are looking forward to getting outside. However, just as you leave the front door of the teacher education building, Julia has already stopped the group. You gather around and notice that Julia is standing beside a young apple tree that you have never noticed growing out of the concrete planter box on the front sidewalk.

“This little apple tree was planted by our campus landscapers,” Julia starts saying. “It is a cutting from the original apple orchard that used to grow from behind this building to the agriculture building where the garden used to be that gave us our name, The UBC Orchard Garden.”

An orchard, here? And what does she mean when she says “where the garden used to be”? But the group moves on, down the steps, and out onto the expansive Main Mall Boulevard. Immediately, however, Julia stops again in the middle of the kilometre-long stretch of green lawn that reaches north-south on Main Mall, from the Canadian flag at the Rose Garden to the flag of the Province of British Columbia by the Forest Sciences Building on the opposite end of the lawn.

“I want you to start looking at this campus landscape as a garden, or particular kinds of gardens, and consider how these gardens narrate stories about human relations and human-land relations,” she says. Your eyes are drawn down the long line of immense red oak trees that grow parallel to the grassy boulevard and recently completed stone walkways. “In which ways might this be a colonial campus design? Why are there oak trees ‘native’ to eastern Canada and the US northeast growing here when the forests around us are coastal temperate rainforests? What does this suggest about whose knowledge and ways of organizing space are most important? What is being erased?” The flood of

questions and Julia's passion are unsettling and unnerving, since the large green boulevard is a central attraction at the heart of the campus.

"When we first started looking for an outdoor classroom garden space on campus," Julia continues, "we naively asked the campus planners if we could garden here on Main Mall, right in front of our building, since, after all, it was zoned "green academic." We were told, in no uncertain terms, by the planners that, 'This is a sacred green lawn, stretching from one flagpole to the other.' Sacred? What do they mean by sacred?" Julia leaves the question hanging, but you sense that she still struggles with what seems like a colonial appropriation of the notion of sacred land for grass monocultures on linear campus boulevards.

The group continues walking down the boulevard toward the BC flag, where you turn right and head down a small slope. Immediately, the noise of yet another construction site on campus assaults your ears and eyes. Cranes stretch into the sky, looming above the grey skeletons of concrete high-rises. Shouting above the din, Julia's hand sweeps over the construction site where, with a wry laugh, she says, "Welcome to The UBC Orchard Garden!"

Puzzled, you frown. This is the garden? "This is where, in 2005, students in Land and Food Systems started The UBC Orchard Garden, after a series of old portables were demolished behind the agriculture building," Julia explains. "In 2010, after our failed attempt over several years to find garden space close to teacher education classes, an expanded garden was cultivated as a collaborative initiative with the Faculties of Education and Land and Food Systems, and the School of Architecture and Landscape Architecture. In 2014, however, we were relocated to a new site. The University cut down the remaining original apple trees and began construction of the Orchard Commons to house Vantage College's international student program that will charge \$45,000 for one year of tuition and housing at UBC."

Since the noise of the construction site makes it too loud to keep talking, the class continues walking down the sidewalk, turning left and heading toward Totem Park residences, the undergraduate student residences adjacent to Totem Field, where the new garden is located. Pausing in front of the residence buildings, Julia notes that in the past, they have visited this location with Sarah Ling from UBC's Aboriginal Initiatives, and

Sarah has shared with students the story of how two of the Totem Park residences, *həm'ləsəm'* and *q'ələxən* Houses, received their *hən'q'əmin'əm'* names drawn from Musqueam First Nations history, oral traditions, and significant places.<sup>6</sup>

When you finally enter the large rectangular plot allocated to The UBC Orchard Garden, you notice how the clean lines of the Totem Field agricultural experiments quickly give way to a barely contained profusion of plant life that threatens to spill beyond its borders. “Here we are,” Julia announces. “Whenever we host visiting classes or events in the garden, we acknowledge that we are gardening, teaching, and learning on the traditional, ancestral, and unceded territory of the Musqueam First Nations. This history, and these ongoing relations, are particularly important for land-based projects such as this one, and require that we constantly work toward repairing and renewing our relations, examining colonial and oppressive assumptions in our historical and contemporary gardening and teaching practices, and experimenting with ways to engage ethically with this land and the First Nations peoples that have lived here since time immemorial. Layered onto these stories are also the ever-changing dynamics of the land, of glaciation, of isostatic rebound, of deforestation and urbanization, and now, of climate change.” Julia pauses, looks around the garden, and gazes up into the sky.

You ponder Julia’s words and the webs they have spun on this walk to the garden, struggling to juxtapose these unsettling stories with the beauty, abundance, and possibilities presented to you today as you gather together in the garden.

Although it takes longer to tell these pedagogical place stories of The UBC Orchard Garden than to simply walk briskly from the classroom straight to the garden itself (or to describe the garden briefly in a few cursory sentences in this chapter), sharing these narratives is central to what it means to be an environmental educator and to understand, challenge, and reinvent our relationships within human and more-than-human communities. As the story of the garden suggests, garden-based education is itself a complex and complicated pedagogical practice. Add to this complexity the challenging financial, spatial, temporal, and discursive marginalization of garden-based educational initiatives and initial teacher EE more generally, it becomes apparent that even at a university that foregrounds sustainability throughout its

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<sup>6</sup> For more information about the house names, visit:  
<http://vancouver.housing.ubc.ca/h%C9%99ml%C9%99s%C9%99m-and-q%C9%99l%C9%99CF%87%C9%99n-houses-at-totem-park/>

operations, teaching, and research, integrating EE programs and projects (such as the garden) within UBC's teacher education program and the campus landscape exposes layer upon layer of obstacles.

Engaging with these obstacles through arts-based practices has been one approach that we have used extensively at The UBC Orchard Garden in our research and teaching. As such, we turn now to the poetic voices of student teachers and their responses to some of these barriers during a poetry walk as part of The UBC Orchard Garden's student teacher workshop series. Susan Gerofsky's autobiographical narrative about the experience of leading these ecopoetry workshops frames and contextualizes the students' poetry. All student poems have been included with the consent of their authors.

### **Poems from the Invisible Gardens Ecopoetry Walk**

**Susan:** From the unofficial margins of the teacher education program, The UBC Orchard Garden offers all student teachers the opportunity to voluntarily attend a workshop series on garden-based learning. The workshops are designed and led by students on The UBC Orchard Garden team and, occasionally, even by student teachers on their CFE practicum. In addition to their busy academic schedules and practica, these remarkably dedicated student teachers spend six Saturday mornings in the garden, and, at the end of the workshop series, they receive an informal certificate for their teaching portfolios.

Although students lead the majority of the workshops, most sessions also include invited guests from the community (i.e., high school students from an exemplary school gardening project, local artists, soil scientists, landscape architects, etc.). On a cold, damp day in January of 2015, I facilitated a Garden Poetry session as part of the workshop series. My own history as an English language and literature teacher and poet, as well as a teacher of mathematics, physics, music, drama, film, and modern languages, has meant that I have some facility in moving among and across disciplines, and sometimes finding unexpected resonances betwixt and between them.

These sketch poems, written by workshop participants at 5-minute intervals during an ecopoetry walk around campus, express thoughts and impressions, real, remembered, and imaginary: about the invisible and visible gardens of this place. These poetry walks draw on the practices of ecopoetry (Bryson, 2002; Skinner, 2009), grounded in acknowledging and valuing the ecological interdependence of human and more-than-

human entities, a decentring of the human, and an attitude of humility, respect, and listening.

**Ode to the Lawn, Sara Peerless**

A mono-culture

Green is the colour

Order is the agenda

At all costs

Mow, spray, deter all pests

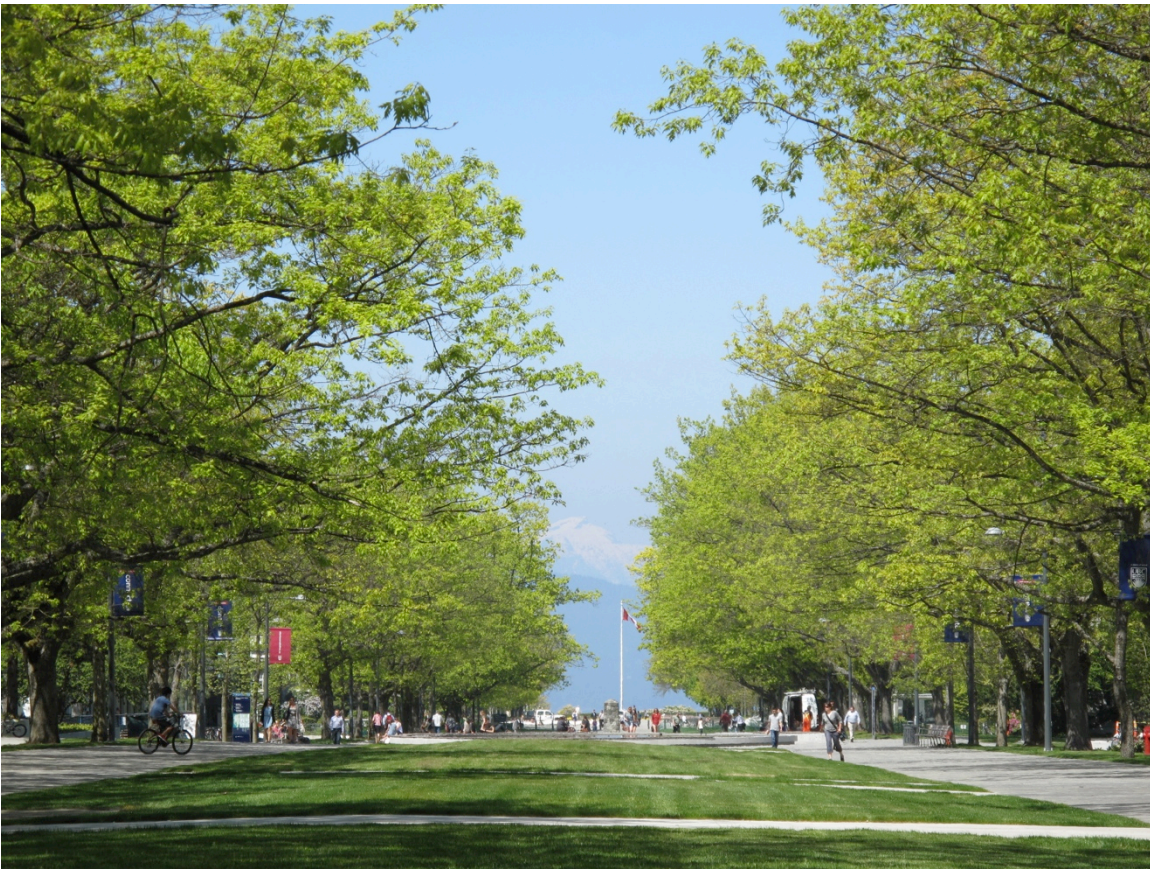
A mono-culture

Primp, preen, green is best

Look on, don't touch

Nature's perfect green

Or mankind's perfect mess





*Figure 2. Sacred green lawn, Main Mall, UBC Campus (Photo Credit: Julia Ostertag).*

**Sacred, Elisha Gill**

Sacred they say,  
But what is so sacred when you are stepped on,  
Easily maintained,  
Green as ever you stay,  
Your silence keeps the garden away,  
What is messy needs to be tucked away,  
Us humans always want our neat and tidy ways,  
Plucked, picked, pruned,  
Always groomed...  
That is not the natural way.

**Stolen, Elisha Gill**

They take away the land that brought people together,  
They take away trees,  
They take away apples,  
They take away community,  
They take away the feasts,  
They take away a place of refuge,  
They take away the food on my plate,  
I ask you to take away your greed.

**Poem about the original Orchard Garden, Suke Padam**

No more garden, it's rebar  
No more garden, it's cranes  
No more garden, it's hammers  
No more garden, it's cement  
No more garden, it's steel  
No more garden, it's workers cussing

No more garden, it's mass development  
 No more garden.  
 I am sad now.



Figure 3. The original UBC Orchard Garden, 2012 (Photo Credit: Julia Ostertag).

### Challenges of Implementing Initial Teacher EE at UBC

Institutions of teacher education fulfil vital roles in the global education community; they have the potential to bring changes within educational systems that will shape the knowledge and skills of future generations. Often, education is described as the great hope for creating a more sustainable future; teacher-education institutions serve as key change agents in transforming education and society, so such a future is possible. (UNESCO, 2005)

As expressed in the UNESCO (2005) report, *Guidelines and Recommendations for Reorienting Teacher Education to Address Sustainability*, a great deal of hope and possibility lies in the role of teacher education for transforming education and society more generally. However, a central challenge that makes it difficult to bring about EE programming within initial teacher education is that teacher education programs—like schools themselves—are remarkably resistant to change. Furthermore, after years of observing other teachers teach, it is difficult, as Sandra

illustrated above, to unsettle the identity of the teacher that student teachers have formed over years of their own schooling (Britzman, 2003) and stereotypical representations of teachers and classrooms in the media. Teacher education, Hargreaves and Jacka (1995) write, is all too often “a stressful but ineffective interlude in the shift from being a moderately successful and generally conformist student, to being an institutionally compliant and pedagogically conservative teacher” (p. 42). Hargreaves and Jacka (1995) go on to suggest that even when students are seduced by new teaching ideas during their short induction period, they then encounter the relatively unchanging realities of schooling when they begin their first appointments. If EE and unique pedagogical places such as The UBC Orchard Garden are to become integral to initial teacher education, it will require that these pedagogical practices and places are not simply seductive new teaching ideas. Instead, it is important to prepare and support student teachers to engage with these ideas, practices, and places within the context of the relatively unchanging reality of schools (and schools of education). For instance, through our work with The UBC Orchard Garden, gardening the margins has not been about seducing students with new pedagogical innovations. Rather, the collaborative, student-led initiative has allowed for unique pedagogical relations to emerge wherein students and the garden “become teachers together” (Ostertag, 2015), a notion we discuss in greater detail below that may offer an alternative response to both seductive utopias and the isolation and individualism that contribute to the challenges for changing teaching practices within, beyond, and “beside” (Sedgwick, 2003) the physical and metaphoric walls of the traditional, anthropocentric school classroom.

Despite the fact that UBC’s teacher education program offers courses in outdoor EE, and ecological justice is visually presented as a central thematic strand within the program, efforts to integrate EE throughout the curriculum and develop EE specializations within the teacher education program as well as the graduate programs have consistently failed to gain support and traction.<sup>7</sup> For instance, congruent with Lin’s (2002) findings is the lack of specific individual faculty members employed as EE specialists who can oversee the development of courses, programs, and special projects such as The UBC Orchard Garden. Rather, science educators (such as Sandra Scott) and mathematics educators (such as Susan Gerofsky) have played an active role in teaching EE and developing EE programming from the side of their already

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<sup>7</sup> It is worth noting that even the reference to “Social & Ecological Justice and Diversity” as a strand in the teacher education program has an odd propensity to disappear in official documents such as the UBC Faculty of Education Community Report (2012).

overflowing desks. In addition, untenured adjunct and sessional instructors continue to offer many of the summer outdoor EE courses, and, while these instructors may be specialists with extensive experience and qualifications in EE, they are marginalized within the neoliberal academy from many of the institutional decision-making processes required to implement and sustain EE programming within the Faculty of Education. This has all contributed to a fragmented approach to EE within teacher education that has undermined numerous passionate attempts to develop programs, certificates, diplomas, courses, and special projects (e.g., The UBC Orchard Garden) over the last decade. Without institutional support, EE has remained poorly infused within the teacher education program.

Notwithstanding this fragmentation, initiatives such as The UBC Orchard Garden reflect yet another common factor in the implementation of initial teacher EE, namely, the central role of motivated and engaged individuals. As Van Petergem, Blieck, Imbrecht, and Van Hout (2005) report, “Education professionals—teachers, department heads, as well as non-teaching staff—and students are the key players in EE” (p. 162). As we suggest below, students have driven numerous EE initiatives in teacher education; nevertheless, in order for these programs to be well integrated within teacher education, these programs require financing, space, and faculty support embedded in teacher education programs rather than treated as occasional novelties. The integration of such inherently interdisciplinary programs, however, necessitates a collaborative school culture, strong institutional leadership, and faculty professional development and support (Van Petergem et al., 2005). This collaborative culture is difficult to achieve. According to Van Petergem et al. (2005), “the most difficult constraint seemed to be the motivation of all the teachers as a team. Most of them did not feel committed to action since they were trained to work autonomously” (p. 168). The ability for faculty, staff, and students to collaborate as human and more-than-human collectives within the highly individualistic, anthropocentric, and increasingly neoliberal culture of the academy is clearly a barrier to implementing initial teacher EE. Unfortunately, this also replicates the isolation experienced by many educators within the school system.

A further barrier to faculty collaboration is the continued emphasis of disciplinary silos, a particular challenge for EE, a field that is highly interdisciplinary. As Van Petergem et al.’s (2005) research suggests, many “teachers regarded EE as a supplement in addition to the overabundance of topics in the syllabus. In particular, the non-science teachers, with little EE

experience, did not feel responsible as EE was understood to be a task of science teachers” (p. 168). While many EE proponents recognize the inherently interdisciplinary nature of the field, EE programming is still often housed within the disciplinary silo of science education, which continues to be perceived as its most “natural home.” For instance, McDonald and Dominguez (2010) suggest that:

although the basic premise of EE calls for an interdisciplinary approach, the reality of resource availability for preservice preparation may mandate a single subject approach. Therefore, the most reasonable alternative would be the use of science methods courses for EE preparation delivery. (p. 26)

While the two formal EE courses in UBC’s Faculty of Education program are housed within science education in the Department of Curriculum and Pedagogy, the creation of inquiry courses and the Community Field Experience practicum offer the potential to overcome these boundaries and create spaces for the collaborative and transdisciplinary infusion of EE.

The UBC Orchard Garden is one such space that resists disciplinary enclosure, and follows an emergent, arts-based, responsive curriculum dependent on complex factors. These factors emerge from the interests of the student team at the garden, the season, the weather, the visiting classes’ curricular or pedagogical foci, contributions from community partners (guest speakers, artists, agriculturalists, etc.), scholarly readings, and unplanned conversations and activities that emerge at the garden.

### **Becoming Teachers Together**

Through practices of becoming teachers together, perhaps EE initiatives such as The UBC Orchard Garden can contribute to fundamentally changing the culture and context of teacher education and education (particularly schooling) more generally. As Hargreaves and Jacka (1995) note, the experience of beginning teaching continues to be shaped by “physical isolation, teacher cultures of non-interference and individualism, absence of administrative or collegial support, and school staffs who are unreceptive to the new methods that beginning teachers can bring” (p. 60). What we have explored and encountered through The UBC Orchard Garden is that entanglements of land, student teachers, and ever-changing constellations of highly interdisciplinary undergraduate and graduate student gardeners/student educators with faculty mentorship can create unique intergenerational and inter-species conditions for “becoming teachers together” (Ostertag, 2015) that are unlike those found in most teacher

education programs or schools (Brennan & Clarke, 2011). As gardeners on the margins of the campus landscape and educators on the margins of the teacher education program, becoming teachers together has allowed students to teach students in close relation with the land. The student educators working with the garden have included doctoral and master's students in Education, graduate students in Landscape Architecture, undergraduate students in Land and Food Systems, and other student teachers through the Community Field Experience (CFE). While these students are mentored through close collaboration with Faculty Advisors associated with the garden, they have a great deal of freedom to develop, experiment with, and respond to unique curricular and pedagogical encounters. Strengths of this approach include creating conditions for teacher education that are highly collaborative, creative, relevant to students' interest, supportive, inter- and transdisciplinary, inspiring, flexible, responsive, locally-relevant, and allow for risk-taking and experimentation. As such, becoming teachers together in close relation with the land- or garden-as-teacher can create a community of human and more-than-human teachers and offer an alternative to the isolation and fragmentation of the four-walled classroom that materially and discursively creates barriers to implementing initial teacher EE.

As with any ongoing, student-driven project at schools and universities, The UBC Orchard Garden has also had to cope with the fact that students are at the university for a limited time, and that even faculty members may move on to other jobs, life stages, and projects. Despite the difficulties around having key members of the team graduate and move away, it has been very heartening to find that, as one incredible, dynamic, and irreplaceable student must leave, several more have shown up wanting to do research, teaching, and volunteer work because of a deep love for gardens as living places of teaching, learning, and sustenance. In the ten years of Orchard Garden projects, there has been constant support and engagement with the project from Land and Food Systems undergraduates, teacher candidates, Masters and Ph.D. students along with faculty and staff. Alumni of the Garden have continued to work in EE and frequently support the Garden through collaborations from their new positions as teachers, researchers or gardeners in the Vancouver area or from their new homes around the world (Louw & Gerofsky, 2013).

For better or worse, becoming teachers together in these rich margins of the university is also relatively inexpensive. While the fluidity and transience of student leaders at The UBC Orchard Garden has been a surmountable challenge for the project, the lack of permanent

funding for the project remains a continuous challenge. The UBC Orchard Garden continues to survive, month-to-month and year-to-year, on a series of small and medium-sized, short-term grants from a variety of sources, including internal university funding for innovative teaching and learning projects, sustainability grants, student society and work-study grants, and small grants from local NGOs and government youth employment projects.

Deans and department heads, while offering moral support and featuring The UBC Orchard Garden as a “poster child” for sustainability initiatives in promotional publications for the Faculty (UBC, 2012), have been able to offer little in the way of legitimation or core funding, through, for example, the status as a centre or institute, and hiring instructors. This past decade has been a time of deep and repeated budget cuts to all academic units at UBC, while, at the same time, university faculties have been given the responsibility of raising millions of dollars to fund the University’s massive building projects, and fundraising for these high-rises has taken anxious precedence over all other initiatives, large and small. Increasingly, huge concrete and glass towers take priority on the neoliberal campus, whether or not they actually end up being fully inhabited or making money for the university. In these days, when academics and students do their work from home, a café, beach or out-of-town conference with WIFI on portable devices, more and more university offices and laboratories sit eerily empty much of the time, especially during the summer months, while construction of ever more offices and labs continues all over campus.





*Figure 4. The Orchard Commons, De/Construction 2015 (Photo Credit: Sandra Scott).*

Gardens, on the other hand, are treated as temporary, movable, and disposable frills, particularly when viewed by the development arm of the university. To those in charge of building ever more money-spinning office towers, residences, condos, shopping malls, golf courses, and even resorts on university campuses, teaching and learning gardens are not taken seriously as academic classrooms and research sites. In this (conventionally gendered) view, big high-rise towers made of hard materials are powerful and valuable, while small, fertile gardens of living, tender, seasonal plants and trees are seen as weak, marginal, merely decorative, and appropriate only to the fringes of a high-powered, moneyed, world-class research institution (Figure 4). These discourses are highly gendered, since gardening (and teaching) are marginalized in the “pink ghetto” of women’s activities, which, as Gough (2013) recognizes, frequently echoes the gendered nature of EE discourses:

The foundational discourses of EE are “man-made” discourses [sic] at least two levels—because of the absence of women in their formulation and because of the modernist science that separates “man” and “nature” and associates “woman” with “nature.” The genderedness of the discourses also permeates their epistemology—not only are non-male perspectives not valued, but the epistemology, being consistent with modernist science, views knowledge as universal, consistent, and coherent and the subject of



knowledge as culturally and historically disembodied or invisible and homogeneous and unitary. (p. 16)

As a team of mostly female students and faculty advisors at The UBC Orchard Garden, we have responded to this oftentimes-imposed marginalization as a challenge and a source of activist energy that continues to drive our collaborative work as teachers, gardeners, and researchers.

Constantly confronting unstable funding and space, however, has been a powerful pedagogical experience for the students, community members, and faculty who teach, learn, and grow together at The UBC Orchard Garden. In fact, it has become one of the central EE stories we tell with the garden, and one of the ways in which the failures of the garden are pedagogical, unruly, and potentially transformative. As Halberstam (2011) writes, “*The Queer Art of Failure* dismantles the logic of success and failure with which we currently live. Under certain circumstances, failing, losing, forgetting, unmaking, undoing, unbecoming, not knowing may in fact offer more creative, more cooperative, more surprising ways of being in the world” (pp. 2-3). At The UBC Orchard Garden, failures to secure funding and space—or, in the words of Sandra’s colleague, to “take over” education—have created surprisingly creative and collaborative ways of being and teaching together in the world.

### **Conclusions: Gardening the Margins of the Academy**

In UBC’s strategic plan, the tagline *Place and Promise* is used to encapsulate the mission and vision of the University and is highly visible on all of the University’s branding, advertisement, and signage. In a discussion document describing the meaning of the tagline, the University explains how “the University is informed by the physical majesty of this place. It is easier here to feel a *profound connection to the land* [emphasis added]. It is also understandable to feel a particular responsibility to protect this place, and this planet” (UBC, n.d.). While the sentiment in this statement might suggest a “green light” for place-based EE programs and initiatives, our experiences in teacher education and with The UBC Orchard Garden suggest that the realities of life “on the ground” are incongruent with UBC’s branding. Perhaps we need to continue reading what else is contained within the University’s notion of *Place and Promise* to help us understand where some of these disconnections may originate:

Open vistas and boundless skies evoke a *frontier* [emphasis added] spirit, metaphors for the opportunities UBC presents to learn, *to explore* [emphasis added], to question, *to*

*grow* [emphasis added]. The University *explodes its limits* [emphasis added] whenever students, staff, faculty, and alumni set their *collective gaze on a common horizon* [emphasis added], and we are doing that now. (UBC, n.d.)

It is here that the universalizing, colonial, and neoliberal underpinnings of *Place and Promise* become more apparent, since the settler fascination with frontiers and capitalist ideologies of endless, limitless growth are central to the University's connections between land and learning. As Tuck, McKenzie, and McCoy (2014) suggest in a recent publication on land education, the University's interest in feeling a "profound connection to the land" is an example of "the seduction of claiming Indigenous land as 'our' [settlers'] 'special places' where feeling connected to the natural world is possible" (p. 14). Tuck et al. (2014) also question who are the educators (including the environmental educators) and researchers at UBC that set their "collective gaze on a common horizon" by reminding us to critically consider ways in which "gifted/enlightened non-Indigenous environmental or outdoor educators are the chosen ones to learn and pass on Indigenous knowledge and traditions" (Korteweg & Russell [2012], cited in Tuck et al., 2014, p. 14). Land education offers a necessary turn for environmental educators engaging with initial teacher education, since it recognizes the importance of decolonization "in environmental education toward reconstituting a shared future, or perhaps parallel futures, for settlers and Indigenous peoples" (Tuck et al., 2014, p. 14). Through our work with The UBC Orchard Garden, we have just started to become engaged with colonial, patriarchal, and neoliberal discourses and material realities that continue to shape our campus landscape, gardening practices, pedagogies, and curricula.

What we have learned throughout our experiences of gardening and learning to teach together on the margins of the academy, however, has been to engage with these messy and uncomfortable realities rather than escape them into a utopic garden paradise or refuge. We have learned to constantly ask questions, since scientific management and rationality work with, and sometimes clash with, more spiritual and holistic traditions and the unsettling possibilities of land education: What is a weed? What is a garden? Why plant in straight rows? Do you really mean to say the plants talk to you? Can we learn from gardens? Do we need to make the plots tidy before the winter? What can we learn by engaging ethically with "invasive species" or "native" plants? Is a garden a "natural" place? What are the stories that give support to certain practices? Are there other stories we should be attentive to, and do they support very different

practices? By attending to these and a multitude of other questions, by attending to students and gardeners as teachers, by collaborating across and beyond the university, by becoming teachers together, and by gardening the margins of the academy, we are challenging and contesting “What is education for?” We are also, in a slow and erratic way, contesting and challenging the structures that reinforce an anthropocentric individualism that is at the heart of the increasingly neoliberal academy, teaching practices, and identities. As Berg, Gahman, and Nunn (2014) write, this fragmentation of relations is a central part of the increasingly neoliberal climate of the academy:

Universities in the space now known as Canada are situated on land stolen from indigenous peoples. . . . These universities are the embodiment in both practices and actual bricks and mortar of the materialities of gendered social relations as they interlock with, for example, colonialism, racism, ableism and neoliberal capitalism. (p. 68)

Becoming teachers together in the marginal spaces of The UBC Orchard Garden has created conditions for human and more-than-human collaboration that unsettle—than “take over”—the bricks and mortar of the academy. Sustaining the garden, however, as an integral (and, hence, no longer marginal) space and program at UBC that contributes to broader efforts for initial teacher EE will continue to offer exciting challenges as the seedy weeds of our teaching and gardening together proliferate in unruly and unpredictable places and pedagogies.

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