

Chapter 10

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



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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 Preservice Teacher Education (PTE) programmes can play an even greater role by preparing teachers who are environmentally literate and who can successfully implement sound Environmental Education (EE) programmes 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” (as cited in 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 wait for future generations to solve the mistakes made by those before them. It is critical that current generations are 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 also should think about ways to prepare environmental educators for non-formal education settings, what I would call “environmental educators for the masses”.

Permission to re-publish this manuscript has been granted by the Canadian Association for Teacher Education (CATE)

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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 (PTs) 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 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 PTE programme at Laurentian University can use 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 emphasised 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 (2009) policy on EE; 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 has been provided to support teacher preparation in this area. The contradictions between the policy mandate and implementation of EE in PTE have made it difficult for faculty who have been advocating for the inclusion of EE courses in their programmes. However, some progress has been made and a number of PTE programmes in Ontario are offering EE courses. Inwood and Jagger (2014) highlight examples of the PTE programmes in Ontario that offer EE courses either as elective or required courses.

The PTE programme at Laurentian University did not offer an EE course for students in the Concurrent Education programme until 2014, when I was given the opportunity to develop an EE course for the Environmental Studies programme in the university's new School of the Environment. The idea was to develop an undergraduate elective EE course that not only would meet the needs of Environmental Studies and Environmental Science majors, but that also 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 centres, and museums. Some may question why we should care about developing environmental literacy among PTs. The following section provides a review of literature that shows the relationship between environmental literacy and PT effectiveness in developing environmentally literate students.

10.1 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 and Hopkins 2002; World Commission on Environmental Development 1987). In addition, teachers are influential in environmental leadership development among children and teenagers (Esa 2010). Therefore, teachers who are knowledgeable, have positive attitudes, and show concern for the environment are more likely to produce students who are more environmentally literate (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 et al. 2014). Inadequate incorporation of EE within ITE programmes is one of the obstacles to successful implementation of EE in schools (Cutter and Smith 2001; McKeown and Hopkins 2002; UNESCO 1997; Yavetz et al. 2014).

A lack of the desired environmental knowledge and understanding among PTs has been well documented, including misconceptions regarding issues such as the greenhouse effect, ozone layer depletion, and acid rain (Boyes et al. 1995; Dove 1996; Groves and Pugh 1999; Khalid 2003). Spiropoulou et al. (2007) reported on how limited knowledge about the environment among Greek primary PTs resulted in low rates of implementation of environmental programmes 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 behaviour among PTs (Boubonari et al. 2013; Michail et al. 2007; Pe'er et al. 2007; Stir 2006; Tuncer et al. 2009). Boubonari et al. (2013) and Stir (2006) reported that PTs in Greece and Australia, respectively, 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. Similarly, PTs 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 PTs revealed their positive attitudes towards the environment despite limited knowledge (Pe'er et al. 2007). This can be viewed as a reflection of PTs' 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 PTs 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 PTE programmes 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, PTE programmes need to find creative ways to ensure that teacher candidates are provided with the necessary knowledge and skills required to effectively lead EE programmes in schools.

10.2 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 the 1960s at the International Union for Conservation of Nature and Natural Resources meeting (Disinger 1984); and 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 eighteenth and nineteenth centuries (Hammerman et al. 2001; Woodhouse and Knapp 2000). Dewey (1938), 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 programmes of the 1930s (Inwood and 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) *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* (United Nations 1992), for example, stipulates the promotion of education, training, and public awareness on climate change.

Global attempts to promote inclusion of ESD in the education system were initiated by the United Nations' declaration of 2005–2014 as the *Decade of Education for Sustainable Development* (DESD) (UNESCO 2002). The DESD has been replaced by several ESD agendas, such as the *Aichi-Nagoya Declaration on Education for Sustainable Development* (UNESCO 2014a), the *Roadmap for Implementing the Global Action Programme on Education for Sustainable Development* (UNESCO 2014b), and the *2030 Agenda for Sustainable Development* (United Nations General Assembly 2015). The goal is 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, privatisation, 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 et al. (2015) view neoliberal ideals that promote economic growth and use of markets to solve environmental and economic problems as constraints on how we conceptualise 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 *What Every Environmentalist Needs to 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 amidst ideological contradictions between the rhetoric of public policy, actual programme structure, and practices administered in an economy that primarily serves to reinforce a capitalist mode of production marked by high environmental impact (Stahelin et al. 2015). Such challenges are mostly encountered by institutions or organisations 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 of Canada'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 (Mancini 2013). 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 PTs.

Hursh et al. (2015) argue that educators and researchers need to analyse 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 and 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 enables 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.

10.3 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 PTE programmes 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 PTE programmes 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*, *in*, and *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 programme 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 worked in pairs to observe and identify plant and animal species found in the local environment. The idea was 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 involved 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 centre 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, eight Environmental Studies/Science majors, one Biology major, one Geology major, three Law and Justice majors, one Nursing major, and one Outdoor Education major. It is important to note that this is not a required course for Concurrent Education students, but it is highly recommended. The next section outlines a self-study that was conducted to evaluate the effectiveness of the EE course.

10.3.1 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 programmes, 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 enrol 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 and to ensure that they would be free to provide more honest responses without fear of their views jeopardising performance in the course. The following section provides a description and discussion of the findings.

10.3.2 Findings and Discussion

10.3.2.1 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". Another student 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 be for a diverse student body? I think the answer to this question lies in the eclectic nature of EE itself which has been described by Palmer (1998) using the metaphor "a stream with many tributaries" (p. 22). 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.

10.3.2.2 How the Course Impacted Students' Thinking and Views about Environmental Issues

Environmental Education as Developing a Sense of Place

In order to emphasise 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 emphasised 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 and 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, our 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 centre 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 centre 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 centre. 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 realise [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; as one of them stated: "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 and Nickel (2008) who showed how cognitive and situated teaching strategies place participation at the centre 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 realise 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 education majors and non-majors alike 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 realised that youth participation is a component of civic engagement that enables youths 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 practise 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 realised 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 analyse environmental issues on campus and in their neighbourhoods (Huckle and Wals 2015). Working on the action projects in groups demonstrated that participation should not be seen only as something students do as an extension of their classroom learning; rather, 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 and 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 realise 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 and 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 Twenty-First 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 analyse their own lifestyles and determine what needed to change. In the course, students also realised 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". Another said:

It made me realise 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 twenty-first 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 practised 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 chromite mining and development 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 a 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.

10.3.3 *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 might reaffirm 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 programmes. Perhaps, in the future, we will consider adding another field trip to a non-formal environmental learning centre such as Science North to provide students with yet another experience of teaching about the environment in non-formal settings.

Five of the survey respondents suggested that the course could be improved by focusing more on teaching skills and practising 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 practise in order to feel more confident in their communication skills.

In the course, students learned about programme 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 et al. 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 programmes, 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 field trips 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 practise 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 focused 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.

10.4 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 focuses on developing critical thinking skills among students with regard to local and global environmental issues, and it is designed to enhance their problem-solving and decision-making skills through participation in hands-on and action projects. It also provides 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 environmental educators both for formal education and non-formal environmental education settings. 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 education majors. Considering that almost 50% of the students enrolled in the course were 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 more likely to develop students who are more

environmentally literate (Tuncer et al. 2009). Currently, this course is not mandatory, but highly recommended, for Concurrent Education majors. However, making it a required course will greatly help to ensure that student teachers from the programme 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 programme where it does not compete with the compulsory, Professional Year, teacher certification courses.

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