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Best practices of five Canadian ecological education (ECE), environmental education (EE) and education for sustainable development (ESD) pre-service teacher educators

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BEST PRACTICES OF FIVE CANADIAN ECOLOGICAL EDUCATION (ECE), ENVIRONMENTAL EDUCATION (EE) and EDUCATION FOR SUSTAINABLE DEVELOPMENT (ESD) PRE-SERVICE TEACHER EDUCATORS

By

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Abstract

This study examines the teaching practices of five Canadian pre-service teacher educators in ecological education (ECE), environmental education (EE) and education for sustainable development (ESD) courses. This study builds upon Lin's (2002) and Towler's (1980) studies by investigating the varied practices of Canadian ECE/EE/ESD teacher educators through the use of interviews. This study found that to greater and lesser extents, all of the participants use action projects, creative/critical approaches, experiential approaches, modeling, narrative, social learning, present multiple perspectives and provide students freedom in choosing their assignments. These teaching practices are carried out in order to provide an environment conducive to inner transformation. Inner transformation has been described as of building an understanding of aesthetics, systems, interconnections and personal worldviews; experiencing shifts in emotions, perspectives and values; and gaining action, communication, critical, creative, and social skills. Beyond these broad similarities, many differences were found in the participant's educational practices. These differences are a result of structural and paradigmatic forces. The results of this study can help to build a unified Canadian vision of ECO/EE/ESD and can provide valuable ideas to anyone who wishes to teach ECE/EE/ESD.

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Chapter One: Introduction

The Research Problem

Background

The second half of the 20th century witnessed a rise in the popularity of ecological issues (Guha, 2000). This rise in popularity can be seen in several major events such as the publishing of Silent Spring in 1962, the founding of Environment Canada in 1971, the Convention on International Trade in Endangered Species of Wild Fauna and Flora of 1973 and the Montreal Protocol of 1987 happened during this period. Throughout this time "many environmental problems have increasingly been recognized as transnational in character" (Boardman, 2002, p. 190). However, governments have not always been able to work together towards a common goal. This is especially true of climate change where greenhouse gas emissions have continued to rise dramatically in Canada and many other countries despite increasingly dire predictions about the reality and threat of climate change (Intergovernmental Panel on Climate Change, 2007). Perhaps in response to this lack of progress on the international level, transnational activist groups have become increasingly popular in the late 20th century (Wapner, 2002; Wapner, 1995), and individuals in general have been taking local action to help enact global change (Rootes, 2007; Rootes, 1999).

As Albert Einstein is quoted as having said, the significant problems we face cannot be solved at the same level of thinking we were at when we created them (Des MacHale, 2002). Ecological degradation is certainly a significant problem and it will also require a shift in the way people think. However, ecological education (ECE), environmental education (EE) and education for sustainable development (ESD) are

about more than just changing the way people think. The theory of ECE/EE/ESD generally follows some kind of variation/elaboration on the process whereby students gain knowledge, change their attitudes and build skills in order to help avert future ecological degradation (Canadian Environmental Grantmakers' Network (CEGN), 2006; Hungerford, 1996; Puk, 2009; Stapp, Bennet, Bryan, Fulton, MacGregor & Nowak, 1969; United Nations Educational, Scientific and Cultural Program-United Nations Environmental Program (UNESCO-UNEP), 1976). However, as will be seen later on in this thesis, when it comes down to the details it becomes apparent that there are many different conceptions of what constitutes good ECO/EE/ESD. In any case, one of the central pillars underlying the current study is the idea that ECO/EE/ESD is necessary in order to avert future ecological degradation.

Overview of the Study

The purpose of this study is to examine the teaching practices of Canadian pre-service teacher educators whose main aim is to directly or indirectly prevent ecological degradation. This will necessarily include teachers under the banners of ecological education (ECE), environmental education (EE) and education for sustainable development (ESD). For simplicity's sake, these types of education will be abbreviated as ECE/EE/ESD when they are being referred to as a whole. There are other words used to label this type of education but these specific labels were chosen because they are the most popular and because they reflect the terminology used by the participants of this study.

In this study, a sample of university teachers across Canada were interviewed by telephone in order to uncover a list of best practices in ECE/EE/ESD. Stevens and

Andrews (2006) defined best practice as a "practice that has been clearly defined, refined through repeated delivery, and supported by a substantial body of research" (p. 7). With this definition of best practice in mind, the selection of participants for this study was based upon two criteria. First, participants must have taught pre-service teachers in one of the fields of ECE/EE/ESD in a faculty of education of any Canadian university for at least three full course equivalents (FCE). For the purposes of this study, a full course equivalent consists of a year long course which runs for a number of hours per week for a total of 72 hours class contact, which is normal for some pre-service courses taught at that university. A half course equivalent would be one semester long for a total of 36 hours class contact. Second, participants must have conducted and published research in ECE/EE/ESD. These two criteria will help ensure that the participants have had the time and interest in ECE/EE/ESD to have refined their practices and based it upon a substantial body of research. Also, the data collection process will be thorough enough to ensure that the teaching practices are clearly defined and representative of the way that these educators carry out their work.

This study is comprised of three stages. In the first stage, I planned my research, conducted a literature review and developed a research proposal. In the second stage I conducted the research. The research is composed of interviews (by telephone), email follow ups and readings of publications highlighted by the interviewees as being particularly relevant to their teaching. The email follow up consisted of emailing each interviewee the results section and the transcripts so that they could elaborate on any points that required further exploration to correct any inaccuracies. During the third stage, the data gathered was analyzed to generate codes, and develop patterns and themes as

they emerged from the analysis. These patterns and themes were used to evaluate the similarities and differences between each participants' teaching practice in ECE/EE/ESD and to develop categories to help organize the data.

Research Statement

The purpose of this study is to examine the teaching practices of Canadian pre-service teacher educators whose main aim is to directly or indirectly prevent ecological degradation. The main research problem of this study is: what are best practices in ECE/EE/ESD from the perspective of pre-service teacher educators?

While answering this research problem, a number of other research questions will also be addressed. Namely, this study will address the following questions:

1. What are the participants' backgrounds in teaching ECE/EE/ESD?
2. How do the participants approach the issue of advocacy in the classroom?
3. How do the participants beliefs concerning the nature of knowledge & learning affect the ways in which they teach?
4. How do the participants assess and evaluate student success?
5. How does the participants' activism impact their teaching?
6. Have any personal life experiences impacted the ways in which they teach?
7. Do any other factors affect the ways in which they teach?

Key Terms/Definitions

Ecological Consciousness: "the human condition in which all daily behaviours are viewed through the lens of ecological literacy and responsibility such that these behaviours form an ecologically beneficial lifestyle" (Puk, 2009, p. 119).

Ecological Literacy: "the capacity, based on a comprehensive, gestalt-like understanding of the interconnectedness between natural systems and human systems, required to make informed decisions about the future of life" (Puk, 2009, p. 119).

Environmental Awareness: "to help social groups and individuals acquire an awareness and sensitivity to the local environment and its allied problems" (UNESCO-UNEP, 1978, p. 26)

Environmental Knowledge: "to help social groups and individuals gain a variety of experience in, and acquire a basic understanding of, the environment and its associate problems" (UNESCO-UNEP, 1978, p. 26).

Environmental Attitudes: "to help social groups and individuals acquire a set of values and feelings of concern for the environment, and the motivation for actively participating in environmental improvement and protection" (UNESCO-UNEP, 1978, p. 27).

Environmental Skills: "to help social groups and individuals acquire the skills for identifying and solving environmental problems" (UNESCO-UNEP, 1978, p. 27).

Environmental Participation: "to provide social groups and individuals with an opportunity to be actively involved at all levels in working toward resolution of environmental problems" (UNESCO-UNEP, 1978, p. 27).

Sustainability: "of, relating to, or being a method of harvesting or using a resource so that the resource is not depleted or permanently damaged" (Merriam-Webster, n.d.).

The Research Study

The Research Context

The two major published studies conducted to investigate ECE/EE/ESD in the Education Departments of Canada's universities suggest that the quantity and quality of

Canadian pre-service teacher training in ECE/EE/ESD has not substantially improved over the last three decades, if indeed it has improved at all (Towler, 1980-81; Lin, 2002). Both of these studies are essentially based upon the same survey instrument and used the same methodology, therefore "standardization between the two studies was achieved" (Lin, 2002, p. 200). The first study found that only 18 out of the 42 (43%) institutions that responded offered a course in the methodology of ECE/EE/ESD in the 1977-78 academic year (Towler, 1980-81, p. 13). The second study found that only 18 out of the 35 (51%) institutions that responded to the survey offered ECE/EE/ESD methodology courses in 1996 (Lin, 2002, p. 203). It is important to note that these results are inflated since some of the courses described as ECE/EE/ESD would more properly be classified as outdoor, science, or social science education. These results clearly demonstrate that the number of Canadian teacher methodology courses in ECE/EE/ESD are low and have not increased significantly between 1980 and 2002.

By examining the backgrounds of those who teach ECE/EE/ESD methodology courses, these two studies also shed some light on the quality of these courses. For example, Lin (2002) stated in her article that:

> "overall, pre-service teachers continue to receive much of their environmental education training from faculty members who (a) possess degrees in education and biology and (b) have low levels of participation in environmental education projects and research" (p. 211).

The fact that ECE/EE/ESD methodology courses in Canada are mainly taught by people with a science background suggests that prospective teachers are mainly being taught the science of ecology, to the detriment of other aspects of ECE/EE/ESD such as going into

the outdoors, economics and community action. This is reinforced by the fact that ecology was ranked as being the most emphasized aspect of ECE/EE/ESD in both Lin's (2002) and Towler's (1980-81) studies, while biology was ranked as third in Towler's study and fourth in Lin's (Lin, 2003, p. 204; Towler, 1980-81, p. 13). It seems that there is a lack of teacher educators who specialize in ECE/EE/ESD.

In Canada, education falls under provincial jurisdiction, therefore the quality and goals of instruction in ECE/EE/ESD varies from province to province. When comparing studies from 1990-1997 in Quebec (Sauvé & Robitaille, 1990; Sauvé & Boutard, 1991; Sauvé, Boutard, Begin & Orellana, 1997), it seems that ECE/EE/ESD in Quebec high schools has improved quantitatively as well as qualitatively. Amongst other improvements, Sauvé et al (1997) mention that "more actors inside the schools can be identified, more partners are involved... more educational agents are expressing a global conception of environment, where biophysical and socio-cultural agents are seen as interconnected" (p. 4).

The picture in Ontario is quite different from Quebec. From 1988-2000, Environmental Science was available as an elective high school course in Ontario. When the course was eliminated from the curriculum in 1998, the Ontario Ministry of Education decided it would integrate Environmental Science into science and geography courses. To examine the effect of this policy change, Puk and Behm (2003) conducted a survey designed to measure the extent to which environmental science concepts were being taught in geography and science courses. The results show that less time was being spent teaching environmental science concepts, while sometimes they were not being taught at all. A similar study was conducted at the elementary level which found that 34%

of survey respondents taught zero hours of ecological education per week, while 88% taught less than 2 hours per week (Puk & Makin, 2006, p. 271). This same survey found that 91% of the respondents want more professional development to teach ecological literacy (p. 272). The poor performance of ECE/EE/ESD in Ontario's schools highlights the importance of pre-service teacher training in ECE/EE/ESD.

Significance of the Study

Teacher educators have been instrumental in introducing ECE/EE/ESD into Canada's educational system (Hart, 1990). Unfortunately, only two studies have been conducted to examine Canadian ECE/EE/ESD teacher educators (Lin, 2002; Towler, 1980-81). The current study has built upon these studies by conducting semi-structured interviews with five ECE/EE/ESD teacher educators across Canada. Conducting interviews is particularly relevant as no studies have yet been conducted to examine the practices of Canadian ECE/EE/ESD pre-service teacher educators through the use of interviews. Through these interviews, the variability of teaching methods and a list of best practices emerged. It is hoped that by sharing the varied practices of ECE/EE/ESD teacher educators, information will emerge that will help to enrich Canadian ECE/EE/ESD. This study will also briefly examine various justifications underlying the practices uncovered in ECE/EE/ESD.

Limitations

The limitations of the study are as follows:

1. This study will not evaluate whether certain practices are better than others in ECE/EE/ESD. Rather, this study will present how the participants practice ECE/EE/ESD.

2. The researcher's opinions, prejudices, biases, background knowledge, comfort level and other biases may influence the questions and answers that come forth during an interview.

Delimitations

The following items delimit the study:

1. Participant selection delimits the study. Only Canadian ECE/EE/ESD teacher educators who have published a paper(s) in the area of ECE/EE/ESD and who have taught this subject for the equivalent of three full years were interviewed in this study. For example, professors who teach ecological or environmental topics in other teacher methodology courses such as outdoor education, science and social science methodology courses were not included in this study.

2. Given time and resource constraints, it may not be possible to build an open and trusting relationship with each of the research participants. This may affect the depth to which topics are explored in interviews and email follow ups. Therefore, the data uncovered will not necessarily reflect the full scope of the participants' teaching practices and philosophies.

Assumptions

1. It will be assumed that the practices presented by the participants are in fact best practices.

2. It will be assumed that the participants will be honest in their answers to interview questions and email follow ups.

The Organization of the Thesis

Chapter one includes the overview, some background information, the research statement, key terms/definitions, the significance of the study, limitations, delimitations and assumptions. Chapter two includes a literature review of ECE/EE/ESD and educational research relating to ECE/EE/ESD. Chapter three includes the research design and methodology, the research questions and the research population. Chapter four presents an analysis of the data in the form of lists of similarities and differences between the participants. Chapter five provides a discussion on the data, recommendations and a conclusion.

Chapter Two- A Review of the Literature

Introduction

There are many different conceptual, paradigmatic and ethical stances concerning ecological and educational realities underlying peoples' ideas of what ECE/EE/ESD should be. For example, Stevenson (2007) offers a typology to help explore different approaches to how environmental problems might be tackled. Two types of reform are presented, conservative and radical. Conservative reform works within the existing social-political-economic order, while radical reform aims to substantially alter the current order. Within this typology, Stevenson (2007) writes of technical, political, socially critical and alternative approaches to environmental reform. The technical approach sees technological advances as the most important focus, the political approach focuses on political advances, the socially critical approach focuses on changing the existing social/political/economic order, and the alternative approach focuses on having people turn to traditional and simpler ways of living.

The field of ECE/EE/ESD may also be split according to different paradigmatic and ethical stances that people take. For example, Robottom & Hart (1993) refer to positivist, interpretivist and critical paradigms in ECE/EE/ESD research and O'Riordan (1988) writes of environmental/ecological value systems ranging from gaianistic to technocentric. Gainism values the co-evolution of human and natural ethics while technocentrism values the application of science, market forces, and managerial ingenuity (O'Riordian, 1988). All of this diversity leads to a bewildering array of conceptions of what ECE/EE/ESD should be. In order to try to make some sense of this array of ideas,

this literature review will present a limited history of ECE/EE/ESD, as well as some major ideas and issues in educational theory.

Part One – History of ECE/EE/ESD

Ecological Education (ECE)

Ecological education differs from environmental education in that it has a single, clear framework for its objective, and it differs from education for sustainable development in that it holds ecological concerns as its prime focus (Klaus, 1989; Puk, 2009). Ecological education flows from the concept that "without clean air, water and soil, without controls on population, without protection for biodiversity and without ecologically renewable forms of clean energy, there will be no future of life (Puk, 2009, p.8)". This can only be achieved by placing ecological integrity as the prime consideration and by placing social, eco-nomic and health concerns as secondary. In educational settings, this would require the creation of a "meta-perspective, composed of an enriched subject matter including sciences (geography, physics chemistry), history, arts, mathematics, language, economics, health, philosophy, aesthetics and ethics" (Puk, 2009, p. 98).

Also, using the term 'ecological' rather than 'environmental' is a purposeful change. People often speak of 'the environment' as if it is a particular place separate from the whole (Puk, 2009; Smyth, 2006). A comical definition of the word environment from the urban dictionary defines the environment as "a place all people say we must look after and yet they don't look after it themselves" (Urban Dictionary, n.d.). In opposition to this concept of the environment as a separate physical place away from humans, "human beings are part of the natural order, sharing the same elements as all things on

earth" (Puk, 2009, p. 98). Furthermore, environmental education often does not focus on teaching students about complex ecological relationships (Van Matre, 2004). Particularly, environmental education has often come to mean anything which takes place in the outdoors.

The term ecological education also fits well with the term ecological literacy, which is frequently used in ECE/EE/ESD literature. Most definitions of ecological literacy include the development of some variation on the components knowledge, skills, affect and behavior (Cole, 2007; Moody, Alkaff, Garrison & Golley, 2005; Puk, 2009). Orr (1992) describes ecological literacy as the ability to ask "what then?" (Orr, 1992). This question is a succinct criticism of education which solely focuses on teaching people how to use the earth's resources. Following the question of "what then" are a whole series of other questions. For example, what will humans do when they have taken to the point that there is nothing left to take? Is the destruction of a species or of an ecological system a fair price to pay for human consumption? Will humans ever have enough material goods? Is it economically desirable to destroy natural systems? Can a particular natural system ever heal itself if it is destroyed? Can humans reproduce the services offered by nature such as clean water, clean air and a good climate? Being able to explore these types of questions effectively requires a broad understanding of ecological systems and an ability to synthesize all of this diverse, interdisciplinary information into a solid and clear picture.

While ecological literacy consists of acquiring the necessary prerequisites for taking effective action to help preserve ecological health, ecological consciousness is "a world view and a lifestyle (Puk, 2009, p. 4)". It represents a state of being that is in

harmony with human and ecological health. Gough (1992) speaks of how an Indigenous people called the Kesh identify strongly with the environments in which they live (Gough, 1992). This "ecological consciousness is so profound that... they have no word for 'nature' but, rather, see themselves and nature as part of 'being' (Gough, 1992, p. 50). In such a state of being, the only actions that can conceivably be taken are necessarily in harmony with the local environments.

Environmental Education (EE)

Environmental education is the term most frequently used in reference to ECE/EE/ESD. It is often used as an umbrella term which encompasses many (if not all) types of ECE/EE/ESD. Sauvé (2005) has identified 15 different currents in environmental education with diverse names such as the conservationist/resourcist current and the feminist current. The metaphor of a current represents the fact that environmental education practitioners may draw upon a number of different currents much like a river draws upon its tributaries. According to the metaphor of environmental education as a river, the diversity in environmental education is a strength and thus there need not be one single conception of environmental education.

The view that there need not be one conception of ECE/EE/ESD is held by people other than Sauvé (McKeown, & Hopkins, 2003; Scott & Oulton, 1999; Wals & van der Leij, 1997). McKeown and Hopkins (2003) suggest that "collaborative, locally appropriate action in both EE and ESD is more useful than an either-or debate over whose terminology should be adopted (p. 117)." Scott and Oulton (1999) believe that socially critical theory is exerting a dominating influence on the field and that schools should collaboratively create their own types of ECE/EE/ESD with the communities in

which they dwell. The form that this education would take would depend on the traditions and ideological persuasions of the people involved. Wals and van der Leih (1997) argue that creating content and outcome based national standards for ECE/EE/ESD would impose an undesirable constraint on what happens in the classroom. They suggest that ECE/EE/ESD should be locally shaped by the knowledge, ideas and concerns of teachers, students and the school community. In each of these cases, the authors argue that some type of force is constraining ECE/EE/ESD and that schools should work outside of these constraints to create the form of education that they deem appropriate. In any case, the global story of ECE/EE/ESD begins with the term environmental education.

The words 'environment' and 'education' began being used together in the mid-1960s, although the roots of environmental education go much deeper to great eighteenth and nineteenth century thinkers, writers and educators such as Goethe, Rousseau, Humboldt, Haeckel, Froebel, Dewey and Montessori (Palmer, 2008, p. 7). In 1977, governments across the world (including Canada) began to formally adopt environmental education at the first Intergovernmental Conference on Environmental Education in Tbilisi. The final report from this conference stated that the training of qualified personnel in environmental education is a "priority activity" (UNESCO-UNEP, 1978, p. 20). UNESCO-UNEP (1990) later suggested in a newsletter that training teachers in environmental education is "the priority of priorities" (p. 1). Thirty years after the first conference in Tbilisi, the dedication to teacher training has remained strong in international rhetoric, as was made evident at the fourth international conference on environmental education (UNESCO-UNEP, 2007).

Although environmental education has gone through changes since the Tbilisi Conference, this conference still provides a good explanation of what environmental education is. Broadly, this conference stated that the goals of EE should be to help students increase their environmental awareness, environmental knowledge, environmental attitudes, environmental skills and environmental participation. The Tbilisi Conference has a lot more to say about environmental education though, describing it as:

> is a life-long process; is inter-disciplinary and holistic in nature and application; is an approach to education as a whole, rather than a subject; concerns the inter-relationship and interconnectedness between human and natural systems; views the environment in its entirety including social, political, economic, technological, moral, aesthetic and spiritual aspects; recognizes that energy and material resources both present and limit possibilities; encourages participation in the learning experience; emphasizes active responsibility; uses a broad range of teaching and learning techniques, with stress on practical activities and first hand experience; is concerned with local to global dimensions, and past/present/future dimensions; encourages the development of sensitivity, awareness, understanding, critical thinking and problem-solving skills; and encourages the clarification of values and the development of values sensitive to the environment (UNESCO-UNEP, 1978).

Of particular interest is the statement that environmental education is a new approach to education, rather than just new subject matter to be taught and learned. This reinforces the importance of teacher training because simply making changes to subject matter in

curriculum documents does not tell teachers much with regard to how they should approach the matter that they are teaching.

Education for Sustainable Development (ESD)

The World Conservation Strategy (International Union for the Conservation of Nature (IUCN), 1980), the Brundtland Commission Report (World Commission on Environment and Development (WCED), 1987) and the Rio Earth Summit (United Nations Department of Public Information (UNDPI), 1992) mark a shift in international rhetoric concerning ECE/EE/ESD. At this time, international rhetoric turned away from environmental education and towards education for sustainable development. The major difference between Tbilisi and Rio is that the words 'environment and development' replaced the word 'environment' in the documents (McKeown & Hopkins, 2003, p. 120). Adding the term "development" is meant to counter the view that ECE/EE/ESD ignores human needs in favour of environmental/ecological needs. Regardless of this shift in focus, education for sustainable development still fits fairly well under the description of environmental education created in Tbilisi.

Education for sustainable development concerns itself equally with the human built environment, social strife and environmental protection. The sustainability triad is a concise framework to help explain what education for sustainable development is all about (Herremans & Reid, 2002). The triad is made up of economic, social and environmental considerations. Sustainability is the middle area where economic, social and environmental concerns are all being met in a balanced way. Thus, education for sustainable development aims to teach students what they need to help bring about this balance between these three considerations.

Part Two – Educational Paradigms in ECE/EE/ESD

The concept of ECE/EE/ESD means different things to different people. These differing conceptions are closely tied to various fundamental assumptions concerning education. Therefore, it would be helpful to investigate various paradigmatic visions of education to later compare these concepts to the educational practices uncovered in the study. Approaches to education in general may vary according to a number of factors, such as one's beliefs concerning the nature of knowledge, concerning how students learn best and concerning power relationships. Nevertheless, these various beliefs can be categorized into three research paradigms, namely empirical/analytical, interpretivist and critical (Robottom & Hart, 1993, p. 26). As will be seen in this section, these different educational paradigms offer very different visions of ECE/EE/ESD. There will also be a brief examination of two issues in ECE/EE/ESD: advocacy and process vs. outcome.

Empirical/Analytical

Empirical/analytical research has traditionally been the most popular approach to research in the field of ECE/EE/ESD (Robottom & Hart, 1995). This approach works as an applied science where teachers, students and educational settings are objects to be manipulated to create generalizable findings; [it is instrumentalist in that the goals of education are presupposed; and it is behaviourist in that its main aim is the shaping of human behaviour.] In the classroom, this means that information flows from teachers to students. This perspective on knowledge is the dominant form in Canada as "twenty years of conservative and neo-liberal education reform in... Canadian schools have led [to]... universal standardized norm-referenced achievement testing... growing expenditure on

behavioural management programs; and voluminous print-based documentation (Alsop, Dippo & Zandvliet, 2007, p. 209)."

Empirical/analytical approaches to education are also often labeled as positivistic. Positivism is predicated on the notion of "science as a continuous, ever-expanding, increasingly certain understanding of the world" (Owens & Valesky, 2007, p. 10). As such, positivism may be seen as reflective of the modernistic paradigm whereby "credible ways of knowing must base their claims to knowledge only on behavior or other phenomena that could be observed directly, measured, and quantified" (Owens & Valesky, 2007, p. 6). This research often aims to quantify the extent to which certain educational practices elicit some preconceived notion of pro-environmental behavior in students. By examining how external influences affect the pro-environmental behaviors of students, researchers hope to find how students can best be influenced to adopt pro-environmental behavior.

Hungerford and Volk's (1991) study is a classic example of this approach. In this particular study, these researchers presented psychology research which helps to explain how ECE/EE/ESD could best meet the outcome goals of EE set out at the UNESCO-UNEP meeting held in Tbilisi, Georgia in 1977 (environmental awareness, knowledge, attitudes, skills and participation). Hungerford and Volk (1991) identified that educational programs must do the following to meet the outcome goals set out in Tbilisi:

> "Teach environmentally significant ecological concepts and the environmental interrelationships that exist within and between these concepts; provide carefully designed and in-depth opportunities for learners to achieve some level of environmental sensitivity that will promote a desire to behave in appropriate

ways; provide a curriculum that will teach learners the skills of issue analysis and investigation as well as provide the time needed for the application of these skills; provide a curriculum that will teach learners the citizenship skills needed for issue remediation as well as the time needed for the application of these skills; and provide an instructional setting that increases learners' expectancy of reinforcement for acting in responsible ways, i.e., attempt to develop an internal focus of control in learners" (p. 14).

Critics of this approach, such as Jickling (1997) argue that there is no generally accepted definition of ECE/EE/ESD, and that neither should there be. In fact, there is a diversity of opinion surrounding almost everything related to environmental/ecological issues. Therefore, how do researchers know that their conceptions of desirable educational outcomes are in fact desirable to the people who are being educated? Rather, the purpose and goals of ECE/EE/ESD might vary according to the context within which the educational process takes place. Orr (2004) argues that many of the world's current environmental problems were created through positivist education and that "more of the same kind of education will only compound our problems" (p. 8). However, it might be unfair to label all quantitative, empirical/analytical research as positivist.

Meyers (2006) made the point that even the most socially critical educators might benefit from some of the findings of empirical/analytical research. For example, a meta-analysis of 128 empirical-analytical research projects was conducted. This meta-analysis can help any educator see that the linear model of knowledge inducing pro-environmental behavior does not accurately reflect environmental decision-making in people (Bamberg and Moser, 2007). Rather, behavior is influenced directly and indirectly by a number of

factors such as attitude, behavioral control and personal norms. It seems that this type of research can be used as a tool to help guide any type of education. As such, it seems more accurate to label this research paradigm as empirical/analytical rather than positivist.

Interpretivist

Intepretivism is based upon the idea that "without our interpretations of events in terms made sensible by shared experiences, all human action... is inconceivable" (Brundrett & Silcock, 2002, p. 53). As an educational paradigm, this means that teachers must allow students to build up a strong base of experiences alone and with one another in order to create their own interpretations and understandings. In other words, the role of the educator is to "utilize the surroundings, physical and social, that contribute to building up experiences that are worthwhile" (Dewey, 1963, p. 40). This might include educational practices such as going on hikes or playing educational games in the outdoors. This form of education is often called experiential education. By learning through experience, it is hoped that the educational process will become more relevant to students and therefore students will be more likely to hold a positive attitude towards education.

Constructivism is also an important dimension of interpretivism. Constructivism is a term used in the social sciences that tends to emphasize how students actively acquire knowledge, particularly through social interaction. Research in this area has found that students learn better by giving help to others (Terwel, 1999, p. 195). This constructivist proposition repudiates the traditional notion that education should flow mainly from teacher to student. Instead, this view proposes that there should be a higher level of student-student interaction in educational settings. Critics of this approach argue that an

overemphasis on student-student interaction might allow students to reproduce and construct "prejudices, naïve concepts, misconceptions, subjectivism, solipsism and uncommitted relativism" (Terwel, 1999, p. 198). In other words, Terwel believes that teachers need to be involved in education to the extent that they can move students away from the qualities presented as negative in the previous quote.

Interpretivism is also tied to post-modernism in its proposition that knowledge should be individually constructed in specific contexts. This is tied to post-modernism because "post-modernism... is predicated not on positivistic certainty but on pragmatic doubt, the doubt that comes from any decision based not on metanarrative themas but on human experience and local history" (Doll, 1993, p. 63). In sharp contrast to positivism, post-modernism is quite wary of placing faith in knowledge.

Critical

A critical approach to education is also reflective of post-modernism in its opposition to positivistic certainty, although it takes a more active role in confronting power relationships than does interpretivism. Sauvé (2005) holds that the critical current in EE "promotes analysis of the social dynamics underpinning environmental realities and problems" (Sauvé, 2005, p. 23). Inherent in this concept of education is the idea that "the knowledge we have to work with depends on the ways we approach the world and the kinds of questions we ask" (Jickling, 2005, p. 39). As such, there is no such thing as 'neutral' knowledge. Furthermore, a critical approach to education emphasizes the probabilistic nature of science to counter the absolute faith that some people hold in science. According to the critical approach, because the reliability of knowledge is

limited, an analysis of the power relationships and underlying values that help shape and guide knowledge is required.

Critical analysis can take place in a variety of ways, such as through the deconstruction of hidden messages in commercials or through an exploration of the people and organizations that conduct and fund specific research. For example, companies have often hidden or distorted their own research to hide or downplay the negative ecological and human health impacts that they cause (Michaels, 2008). Similarly, an analyses of 141 English-language environmentally skeptical books published between 1972 and 2005 found that 92% of these books were linked to conservative think tanks (Jacques, Dunlap & Freeman, 2008). These types of examples help to show that the interests of big business introduce bias in the types and quantity of information that is available. By exposing the hidden values and interests underlying such research, a critical approach can help students gain skills in evaluating information.

As with the previous two approaches to education, there are a number of criticisms that could be leveled against the critical approach. For example, it could be argued that the critical approach places too much emphasis on rational analysis, and thus too much emphasis on rational ways of knowing. Perhaps more emphasis should be placed on developing people's values towards the environment. Another argument is that critical pedagogy does a good job at deconstructing, but often fails to reconstruct a perspective on which action can be based. Some people may blame post-modern approaches such as this for the apathy and relativism that seems to be so prevalent in Canadian society.

Other Perspectives

Stables (2006) presents a similar classification of ECE/EE/ESD research to that of Robottom and Hart (1993). Of special interest though is the class of researchers called "postfoundationalist". These people deny any claims of understanding reality in any pure sense, although they do not deny that there is in fact a reality out there. In other words, they believe that humans may never know how well their interpretation of reality matches reality. The position that one takes with regard to ECE/EE/ESD is thus in largely dependent on the confidence that one has in knowledge.

Robottom and Hart's (1993) three educational approaches may be associated to the concept of education about, in and for the environment (Scott & Oulton, 1999). In an attack against the popular conceptions of ECE/EE/ESD as education about, in, and for the environment, Gough (1992) argues that ECE/EE/ESD should focus on education with the environment (Gough, 1992). This signifies that people should focus on the interactions that they have with social and ecological systems. This emphasis on connections can counter the disconnection that people feel towards people and natural environments. Also, ecological systems are so complex that it may be impossible to fully understand them. Therefore, it may be more productive to concentrate on understanding and managing our interactions. In any case, it is clear that ECE/EE/ESD is a young field, that there are many different conceptions of what it should be, that ECE/EE/ESD is sometimes seen as an education created in specific, changing contexts and thus its seems likely ECE/EE/ESD will continue to change through time.

Part Three – Educational Issues in ECE/EE/ESD

Advocacy

With all of the disagreement present in the field of ECE/EE/ESD, it is no wonder that the topic of advocacy is so hotly disputed (Tripp, 2005; Jickling, 2005; Johnson & Mappin, 2005). The American Heritage Dictionary (n.d.) defines advocacy as "the act of pleading or arguing in favor of something, such as a cause, idea, or policy" (The American Heritage Dictionary, n.d.). Seeing as any ECE/EE/ESD program argues implicitly or explicitly in favor of warding off ecological degradation, ECE/EE/ESD is necessarily intertwined with advocacy. Everything that people do can be seen as advocacy in a sense, even doing nothing. As Howard Zinn (2002) argues, one cannot remain neutral on a moving train. If there is a possibility that a train may crash if it advances further, not doing anything about it is still a decision. It is a decision to do nothing.

While advocacy is necessarily present in ECE/EE/ESD, indoctrination is not. Johnson & Mappin (2005) propose that "advocacy moves toward indoctrination when content is taken to be self-evident or true… and teaching uses methods of unquestioned authority or coercion" (p. 2). Educators can do certain things to keep from indoctrinating their students. Jickling (2005) proposes that "we should teach students about the probabilistic nature of science" (p. 42). For example the Intergovernmental Panel on Climate Change (IPCC) states that "there is *very high confidence* that the global average net effect of human activities since 1750 has been one of warming" (IPCC, 2007, p. 37). This spotlight on the probabilistic nature of science helps to introduce the limitations of

science, possibly keeping people from making rash decisions out of an absolute fear of ecological disaster.

In keeping with the critical approach to ECE/EE/ESD, Tripp (2005) proposes that educators should maintain a strong objectivity when teaching scientific concepts. "Objectivity is considered 'strong' when there is a commitment to examining all the values and politics impinging on a scientific research project" (p. 68). For example, when examining the arguments presented by the scientific leaders of the climate change deniers, it could be mentioned that many of these individuals are the exact same individuals who worked to foster the belief that cigarette smoking does not cause cancer, and most of the organizations who support this research were also behind the research produced to put into question the harmful nature of asbestos, lead, pesticides, and benzine to name only a few (Michaels, 2008).

Process vs. Outcome

There are different opinions concerning whether this field should focus on achieving desirable educational outcomes or whether it should focus on providing quality educational processes (McClaren, 1997; Roth, 1997; Wals & van der Leij, 1997). Wals and van der Leij (1997) contend "that environmental education should be a learning process with four dimensions in that it seeks to enable participants to construct, transform, critique and emancipate their world in an existential way" (p. 7). If ECE/EE/ESD focuses on achieving specific outcomes, then teachers and students are presumably not being given the chance to utilize their own knowledge to suit their unique circumstances.

In response to this, McClaren (1997) points out that setting standards for learning outcomes is not necessarily incompatible with setting standards for learning processes. As an example of this, Roth (1997) demonstrates that the goal of achieving an "improved quality of life" (p. 29) could in fact help to guide the processes carried out in ECE/EE/ESD. Instead of having a debate over whether ECE/EE/ESD should be focused on processes or outcomes, perhaps it would be better to look for common threads between everyone involved in ECE/EE/ESD and proceed from there. Better teacher education about these common beliefs concerning "best practices" may go a long ways towards resolving the belief that ECE/EE/ESD is about indoctrination or is based on bad science. Perhaps teachers just need more help understanding how to best practice ECE/EE/ESD. As McClaren (1997) states, "it may well be that it is not that we do not know what to do as much as we do not do what we know" (p. 44).

Conclusion

This literature review has shown that the concepts of ecological education, environmental education and education for sustainable development represent very different viewpoints concerning ECE/EE/ESD. Furthermore, educational paradigms have a large impact on the way that teachers go about teaching ECE/EE/ESD. Conceptions of ECE/EE/ESD are also tied to educators' beliefs concerning ecological degradation and their value system. For example, someone who does not believe that humanity is currently going through an ecological crisis would likely adopt an empirical/analytical approach to education, seeing as they do not believe that people need to challenge power relations or build their own conceptions of ecological issues and solutions. On the other hand, those who believe that an ecological crisis is looming upon us may adopt an

interpretivist or critical approach to help people work together as groups and challenge the power structures that are causing this crisis. When it comes to value systems, someone with a technocentric value system would more likely adopt the approach of education for sustainable development, whereas someone with a gaianistic value system would more likely adopt the approach of ecological education.

Chapter Three – Design of the Study

Overview

This study utilized a grounded theory methodology. Straus and Corbin (1990) simply define grounded theory as "one [theory] that is inductively derived from the study of the phenomenon it represents" (p. 23). In the case of this study, the phenomenon explored is ECE/EE/ESD. The participants in this study shared their practices in ECE/EE/ESD and shared their own personal perspectives and background in ECE/EE/ESD. From this data, the researcher developed a list of best practices, and also examined various factors underlying the practices that were uncovered in ECE/EE/ESD.

Research Design and Methodology

Straus and Corbin (1990) explain that "the grounded theory approach is a qualitative method that uses a systematic set of procedures to develop an inductively derived grounded theory about a phenomenon" (p. 24). By using a qualitative approach, this study will be able to provide intricate details about the practice of ECE/EE/ESD that would not be possible by using quantitative methods. Also, grounded theory research often connects to similar research in a cumulative fashion and also often provides information that is useful to other practitioners in the field under investigation (Straus & Corbin, 1990).

Grounded theory should adhere to four central criteria: fit, understanding, generality and control (Straus & Corbin, 1990, p. 23). This study meets the criterion of "fit" because it is "faithful to the reality (p. 23)" of ECE/EE/ESD and "carefully induced from diverse data" (p. 23). The criterion of "understanding" has been met because the results of this study are understandable to both the participants of this study and others in

the field of ECE/EE/ESD. The criterion of "generality" was met because the results of this study can be applied in a variety of different contexts. Finally, the criterion of "control" was met because the results are based on data related to ECE/EE/ESD and the paradigmatic/personal conditions that would induce someone to practice ECE/EE/ESD a certain way rather than another.

Rather than merely providing a description or summary of data, grounded theory research aims to relate the themes which emerge during data analysis to create an overarching conceptual scheme (Straus & Corbin, 1990). This necessarily includes using personal interpretation during the data analysis phase in order to create overarching themes which connect the diverse themes uncovered during data analysis. Also, in grounded theory the researcher uses interpretation to describe the relationships between the concepts uncovered (Straus & Corbin, 1990).

This study is primarily based upon semi-structured interviews. Semi-structured interviews retain the open quality of unstructured interviews, but are controlled by a list of questions and topics to be covered (Powney & Watts, 1987). See Appendix A for the interview guide. Simple information pertaining to the teaching experiences and programs taught by the teacher educators were discussed at the start of each interview and the second stage of the interview was open so that the research participants would be able to tell their own unique stories. Interviews were chosen as the method to be used because Canadian ECE/EE/ESD teacher educators have not yet been investigated through the use of interviews. Data was also gathered from emails and documents that the participants highlighted as being particularly important.

Research Questions

The main research problem of this study is: what are best practices in ECE/EE/ESD from the perspective of university teacher educators? While answering this research problem, a number of different research questions were also addressed. Namely, this study addressed seven other questions:

1. What are the participants' backgrounds in teaching ECE/EE/ESD?
2. How do the participants approach the issue of advocacy in the classroom?
3. How do the participants beliefs concerning the nature of knowledge & learning affect the ways in which they teach?
4. How do the participants assess and evaluate student success?
5. How does the participants' activism impact their teaching?
6. Have any personal life experiences impacted the ways in which they teach?
7. Do any other factors affect the ways in which they teach?

Research Population

The selection of participants for this study was based upon two criteria. First, participants must have taught pre-service ECE/EE/ESD in the education department of any Canadian university for at least three full course equivalents. For the purposes of this study, a full course equivalent will be a year long course which runs for a number of hours per week which is fairly average for pre-service courses taught at that university. A half course equivalent would be one semester long. A preliminary survey of Canadian Faculties of Education over the internet helped identify potential participants. Through snowball sampling (i.e. getting these educators to identify other potential participants), it

was hoped that a significant percentage of the educators who fit these criteria would be interviewed.

Ethical Considerations

This study will follow the ethics procedures and guidelines developed by the research ethics board at Lakehead University. Before any data was collected, the purpose of the study was explained verbally to the participants. They were also informed verbally, and in writing, of their rights as participants prior to involvement in the interview session. See Appendix B for the letter of informed consent. The following information was explained to the participants.

1. Risks/Benefits. This research study will pose no risks and will cause no harm to the participants. Benefits may include opportunities for the participants to further develop their understanding of ECE/EE/ESD. Also, the list of best practices in ECE/EE/ESD may be beneficial to anyone interested in ECE/EE/ESD.

2. Anonymity and Confidentiality. The names of all individuals will be changed on all transcripts and in this thesis. All data is considered to be confidential and information that may personally identify the participant will be excluded from the report. This right may be waived if the participants choose to (see Appendix B).

3. Right to Withdraw. Participants will have the right to withdraw from the study at any time.

4. Data Storage. In accordance with Lakehead University Research Guidelines, all data will be safely stored at the university for five years.

5. Results. Results from the research will be available once the thesis is produced. Research participants will be invited to contact the researcher and will be given an email

address in the letter of informed consent in order to do so for the purpose of obtaining a copy of the thesis once it is produced. The research may be published in a peer-reviewed academic journal.

Data Collection

In qualitative research, data collection and data analysis occur simultaneously. This occurs as "emerging insights, hunches, and tentative hypotheses direct the next phase of data collection, which in turn leads to refinement or reformulation of one's questions, and so on" (Merriam, 1988, p. 119). In this vein, educators in faculties of education who might not qualify for this study were first interviewed in order to refine and develop the questions that will be asked during the following interviews. Also, themes uncovered during the interviews informed the researcher as to what follow up questions to ask and as to what to look for in the publications highlighted as being particularly important by the participants. For these reasons, it may be somewhat misleading to have separate data collection and data analysis sections.

Data collection consisted of interviews, readings of publications and email follow ups. The interviews were recorded through the use of a digital voice recorder. The emails consisted of sending each participant a copy of the interview transcript, the results section, and a list of questions to help further clarify and/or elaborate on key issues that require further exploration. At this stage of the research process, the participants were given a chance to alter what has been written if they believed that the material did not completely and/or accurately reflect their views.

Interviews were conducted by using open-ended, non-judgmental questions. This way, the interviewer encourages unanticipated questions and unforeseen statements and

stories to emerge (Charmaz, 2006). The use of open-ended questions to explore the practices of educators has been conducted by others in the field of ECE/EE/ESD (Powers, 2004; Sauvé et al, 1997). By conducting most of the interview in an open manner, the study used an emerging design, which "stresses the importance of letting a theory emerge from the data rather than using specific, preset categories" (Creswell, J., 2008, p.438). Letting data naturally emerge during the interview rather than coming in with fixed, predetermined topics fits the description of grounded theory methodology. Occasionally, it is also helpful to "rephrase and reflect back to the informant what he [or she] seems to be expressing and to summarize the remarks as a check on understanding" (Whyte, 1982, p. 112).

Data Analysis

The analysis of this data took place by first creating themes from each interview's transcript. This involved identifying themes as they emerged from focused readings of the transcripts. During this initial phase of analysis "the goal is to remain open to all possible theoretical directions indicated by [the]....readings of the data" (Charmaz, 2006, p. 46). The second phase used the most significant or frequent themes that previously emerged to sort and organize the data. This included creating a table containing all of the diverse themes which came out during the first phases of analysis and using this to create overarching themes. Through this process, themes were created to represent common areas between the participants wherever possible.

During the analysis process, if anything was unclear or warranted further exploration, questions were sent to the interviewees through e-mail. By the end of this

study, the distinct educational practices of each participant were revealed. The practices of each educator were compared to one another and to the academic literature.

Chapter Four – Results of the Study

Introduction

This study examined the educational practices (and reasons for these practices) of ECE/EE/ESD pre-service teacher educators. To qualify for this study, an educator must have taught three full course equivalents of ECE/EE/ESD to pre-service teachers and must have published something in the field. The participants interviewed in this study ranged from approximately 5 years to approximately 25 years of experience teaching ECE/EE/ESD to pre-service teachers. One participant indicated having experience teaching at an Outward Bound school. Similarly, another participant indicated having helped develop and having taught an outdoors program for hardcore juvenile delinquents in an outdoor setting. Three participants also spoke of teaching ecological/environmental content in courses not specifically labeled as ECE/EE/ESD for pre-service teachers such as science and social science methodology courses. These courses not specifically labeled as ECE/EE/ESD are in addition to the three FCEs required to participate in this study. All of the participants have published several articles on the topic of ECE/EE/ESD.

Thirty-five potential participants were contacted at 13 different universities and 26 of them responded, which is a response rate of 74%. Only five of those who agreed to participate in the study met all of the criteria. Out of the 21 respondents who did not participate in this study, 16 (76%) stated that they did not qualify for this study and 5 (24%) stated that they were not interested or too busy to participate. A number of the people contacted stated that ECE/EE/ESD courses are expanding in their university and a number of people nearly had enough teaching experience to qualify for this study. This

may suggest that the number of people who would qualify for this type of study in the future would be higher.

In this study, five participants were interviewed from three different universities. This study has uncovered many different educational practices, some of which are shared by the participants to varying extents and some of which are entirely unique among the participants. These will be explored in the common generalities and unique specifics sections respectively. It is important to note that the practices uncovered in this study do not represent the full scope of the participants' teaching practices, but rather a snapshot of the practices uncovered during the interviews.

Common Generalities

Teaching Approaches/Processes

Action Projects

Every single participant includes action projects as a course requirement. Usually these actions are carried out in groups (or a group) and usually students have freedom in choosing what action(s) to carry out. The students' actions must contain some sort of element to help foster healthy ecological systems. One participant explained that these actions provide students with a chance to gain new ways to know the world that could never be learned in the abstract and to see their community from the perspective of someone who is actively involved in it.

Creative/Critical Approaches

Throughout the interviews it became clear that all the participants are very careful not to indoctrinate their students. On the contrary, they all work to give their students the skills to critically evaluate information. This is done by uncovering assumptions that

underlie claims and by deconstructing claims. This helps to empower students to think for themselves and to create their own understandings of issues. As an example of this, one participant likes to have his students critically evaluate hidden messages that underlie advertisements.

Experiential Education

All of the research participants include experiential education in their classes through action projects. The participants all explained their role as a teacher in way similar to one participant, who stated that his role as a teacher is to set up a rich context in which students can encounter different influences, such as the natural world, colleagues, text and the professor. In this vein, most of the participants ensure that a large part of their course takes place in the outdoors and includes some field trips. Similarly, participants spoke of their course as being skill, process, action and/or inquiry based rather than knowledge based. Holding a group discussion after having experiences is also a common practice among the participants. These group discussions look at both how people felt and what they thought during their experiences.

One participant uses a cyclical framework for experiential education which he helped develop where students gain direct experiences, critically reflect about them, conceptualize then negotiate with others. Students then go on to have other direct experiences and restart the cycle. During the conceptualization phase, students are encouraged to investigate the complexity of systems, aesthetics, responsibility (responsible action and consequences of action) and the practice of an environmental ethic. This framework encapsulates fairly accurately how experience is used by the different participants in their courses.

Inner Transformation

By being critical, by looking at things from multiple perspectives and by setting up unique experiences, all of the participants provide students an environment in which they have opportunities for inner transformation. For example, changes could happen in values, attitudes, emotions and/or behaviours. One participant described that he provides situations/opportunities for students to "see things differently, to re-examine their assumptions and when you re-examine your assumptions, you're really re-examining your cognitive framework." As an example of this approach, one participant explains that when discussing course readings, "it's not so much about what you think about the reading as what the reading may do to your preconceived thought."

Modeling

The research participants model teaching methods and ways of being to their students rather than just talking about them. The participants model all of the themes present in the common generalities section. They all say that they try to "walk the talk". Some of the participants also stated that they model a feeling of caring. As an extension of this, students are encouraged to think about what kind of role models they will be to their future students.

Narrative

Storytelling is present in all of the participants' teaching to varying extents. Particularly noteworthy is that all of the participants indicated that they tell stories of their own environmental activism to their students. All of the participants also used stories to describe their teaching practice during the interviews. One participant was particularly vocal on the topic of narrative, supporting the use of narrative by stating that

people "remember stories well… [and] narrative isn't always about a given truth", but stories do enable people "to do work" in trying to understand their world.

Social Learning

Having students share what is being done and learned in the course with one another is an important part of all the participants' courses. One participant calls this negotiation, where students actively seek out differences of opinion and look for common ideas or themes. One participant encapsulated the importance of social learning by stating that "learning is as much social and relational as how that impacts what goes on inside the head."

Course Content

Multiple Perspectives

It is telling that the only common thread between the participants with regard to the topics explored in class is that multiple perspectives are presented. The perspective of a tree, a government, a business, a community or an individual could be presented. Similarly, the perspectives of different academic disciplines could be presented. All of these different lenses help to create a richer picture.

Assessment and Evaluation

All of the participants constantly give feedback and assess student learning through one on one and group discussion. Beyond this, there are other similarities.

Freedom of Assignment

In various ways and to various extents, all of the participants give their students freedom in choosing what assignments they do in the course. This freedom recognizes

that everyone is different and provides students the freedom to play to their strengths or to work on improving their weaknesses.

Unique Specifics

Courses/Programs

The five participants in this study have taught ECO/EE/ESD to pre-service teachers at three different universities. At one university, "Environmental Education" is now a core course that nearly everyone in the education program must take. Everyone in the elementary and middle years programs must take the course, as do secondary science students. Also, many health, outdoor, and physical education students take the environmental education course. This course grew out of an environmental education course for pre-service science teachers. The course is taught during regular class hours.

At another university, teacher candidates have the option of becoming involved in the Outdoor Ecological and Experiential (OE3) program. Students who take this program are awarded the Environmental Science teachable at the intermediate senior level. The program consists of a full year course entitled "Curriculum and Instruction in Environmental Science", a semester long course entitled "Ecological Community Service" and another semester long course entitled "Ecological Authentic Group Project". Three weekend immersion field trips occur as part of this program.

Another university's education program offers a minor in environmental education to pre-service teachers. To earn this minor, students must have completed a selection of pre-requisite courses out of the disciplines of biology, education, geography, kinesiology, philosophy, psychology and sociology. Once in the program, students must take a number of courses in various departments other than education. In the education

department, students must take the courses "Environmental Education", "Directed Study in Environmental Education" and "Quantitative Approaches in Environmental Education". These courses are either taught in an intensive seven week long summer institute or from Friday evening to Sunday night during the academic year. Also noteworthy is the fact that in-service teachers and people from various non-governmental organizations (NGO) take these courses.

Participants

The participants in this study have unique (albeit similar) backgrounds. One participant said that his background conforms to the background that Hungerford and Volk (1991) describe as being common among people who become environmental activists. Namely, in their early years many of these people spent time in the outdoors, had a role model and were inspired by stories. This participant described how his parents and grandfather would take him out camping, hiking, touring downtown and hunting. He also described how his family always engaged in discussion surrounding pertinent issues of the time. Three other participants also spoke of important life experiences. All of them described that they had many experiences in the outdoors growing up, and two of them spoke of important parental figures influencing them to be involved in the outdoors.

Teaching Approaches/Processes

Action

All of the participants exert varying degrees of influence over student action projects. Participants can influence action projects in a number of ways. For example, teachers can influence the action project by inviting members of the community to pitch an action project of theirs to the students, by suggesting action projects to the students, by

speaking of the type of activism they perform(ed) or by directing the action projects. Participants argued in favour of having more influence over an action project in order to provide some scaffolding, modeling, mentoring to their students regarding action and to ensure that the student projects are effective and thus help to dispel the sense of hopelessness that is prevalent surrounding ecological issues. Other participants argued in favour of having less influence on a project by stating this will help students take ownership of the project and help students to develop their own ideas about what types of action should be done. Also noteworthy is that some of the research participants insist that the group must decide on one project that they will do together. This is so that students learn how to work together with a diverse group.

Experiential Education

Many different educational practices could be described as experiential. What follows is a selection of unique experiential practices that could be useful to ECE/EE/ESD practitioners.

One participant has his students go on three day solo adventures in a wild or urban setting. The students camp with all the necessary items (food, tent, etc.) in pre-determined spaces that are well spaced out from one another. He unobtrusively checks on the students to make sure they are safe. Following the solos, people get together in small groups and discuss their experiences with one another.

One participant's students also stage ceremonies. There are closing (and sometimes opening) ceremonies that might include a special way people are brought into the room, dinner, decorations, candlelight or whatever the students decide should be done. These ceremonies provide students some time to pause and think, to freely interact

with one another and a powerful punctuation mark to end the course and sometimes start the course.

One participant is constantly developing what he calls "ecological macro models". These are cooperative activities performed in the outdoors in which the learner plays the role as if they were a component of some type of system, such as a tree, bacteria, soil or economy. These macro models are used as a main way of introducing ideas in his classes.

One participant is also currently working on developing ecological dioramas for his classes which are made up of spaces where people can see ecological systems they normally cannot see. For example, students could walk along a big movie screen floor showing the earth evolving underneath their feet, as they explore a manufactured tree with tubes showing water and nutrients being pumped, and windows showing carbon dioxide entering and oxygen exiting.

Narrative

While all of the participants tell stories to their students about their own environmental activism, these stories differ from one another. Particularly noteworthy is that all of the participants tell students stories of how they actively worked to incorporate ECE/EE/ESD into curriculum in some way.

One participant has developed a storyline that he presents to his students concerning his advising of Ontario's Ministers of Education as to the need to make ecological literacy a discreet, distinct subject area from kindergarten to grade 12. He talks about how he has met with Ministers of Education and Ministry personnel, conducted

surveys, filled freedom of information requests and tried to get the Ministry of Education subject to Ontario's Environmental Bill of Rights (EBR).

Amongst other stories, one participant tells his students about how an environmental study center needed to replace its pit toilets/outhouses with facilities that would meet current health standards, especially for residential centers. The center wished to create an exemplary composting toilet facility with solar power supplementing generator power. It was the participant's good fortune to be able to provide the funding to support the construction of this facility. This participant has also had the opportunity to build one house designed to be off the grid, and another with his daughter, son-in law and other family members that made extensive use of locally sourced materials, water conserving fixtures, and relatively high energy efficiency for heating and lighting. The off the grid house was built with the assistance and advice of the participant's graduate students and they all learned a lot about construction and design through that process, to say nothing of the power and social network in rural communities.

Similar to the previous participant, another participant relates to his students the experience of being the general contractor in the building of his own green home. He brings his students out there to check it out and to use the classroom that he built in the basement. This participant also tells his students the story of how he spearheaded the creation of the BC Framework on Environmental Learning and Experience. Also, this participant always tells his students the story of how as a teacher he was told that he couldn't do field trips. Not accepting no as an answer, this professor got a blanket permission form done for the whole school year and got a bus driver's license in order to finally get the go ahead to do field trips.

Another participant tells his students the story of how he wrote the background papers for the Saskatchewan curriculum in which he introduced a strong focus on environmental content. This includes the E in STSE (Science-Technology-Society-Environment). STSE is one of the seven major components of scientific literacy used in several provinces and it places nearly equal emphasis on each of the STSE components. This participant also talks to his students about how he has met several times with provincial government environment ministers to lobby for an environmental education position within the Ministry of Education. He also presents many different stories to his students from different perspectives, such as the government, aboriginal people or systems.

One participant uses narrative as an overarching approach to how he introduces ideas in his courses. He strategically matches personal stories to raise questions that will help students to build their critical analysis skills. This participant, in cooperation with the last participant, lobbied the Canada's Minister of the Environment and met with the Prime Minister of Canada to try to implement a document they developed entitled "A Framework for Environmental Learning and Sustainability in Canada." To avoid real or perceived indoctrination, this participant uses the strategy that the hotter the temperature is on an issue he is involved in, the more he separates it from his teaching. For example, in the heat of the controversy over a government sponsored wolf kill program, this participant did not tell his students the story of how he actively opposed that program in his community unless specifically asked. Most students would have some idea about his position on this issue as it was well represented in the media.

Place Based

One participant explains that "we have a very place based focus. We bring local people in, we have local partnerships, we deal with local issues, and we go to local places, and those places become our textbook." As such, course content changes substantially depending on the location of the program. This course has been taught in many different locations, such as Vancouver, Haida Gwaii and Indonesia. When holding the course in and around a city, one participant likes to use the metaphor of the city as a living organism, highlighting the fact that people can never be outside of nature.

After having place based experiences, students and the teacher conduct research to answer questions that arose from the experiences. One participant described a story of being on a hike with students and running into a beached whale. This experience prompted a lot of questions and searches for answers. When this occurs, course content is not pre planned but rather flows from the students' experiences and questions that arose in a particular location. This approach includes using online resources to support and compliment the courses, although there is a firm commitment to maintaining a strong experiential focus in the courses.

Two participants' courses are also place based in the sense that they explore local systems, natural and human systems. The class talks about these systems as they explore them one way or another. One participant calls this "location based system learning". Another participant has a class he calls the three smellies where students go to a garbage transfer station, a waste water treatment plant and an incinerator. This shows the students that everything we use goes back into the environment in one way or another and has a strong emotional learning component.

Social Learning

The research participants help their students to learn through social interaction in a variety of ways. Many of the participants have their students sit in circles when discussing issues to put everyone on an equal level. One participant also uses role based viewpoints as a framework for group discussion. This works by having a speaker identify who they are speaking as (eg. student, professor, the natural environment, etc.) before adding to the discussion. He explains that the idea in these group discussions is that "it's not about a back and forth debate, it's about hearing all the perspectives, and hearing the complexity of the issue."

One participant uses the concept of "ambiguity" as a method of bringing the class together, by creating activities that place everyone at a similar level of knowledge and experience. For example, on the very first class he has his students learn to tie complex knots, something that few of the students usually know how to do. This helps to develop a sense of community within the class as groups of learners help each other figure out the knots. As another example of developing a sense of community, this participant uses "group sketching" of outdoor scenery as a teaching/learning strategy during the course. This past year his class collaboratively drew a mural of the natural landscape as viewed through a "window" on one of their weekend immersion trips. Ambiguity is also used so that people stop feeling the need to control what is happening, but rather just enjoy the moment and have fun.

Two participants like to bring people who are actively engaged with the environment into their classes to act as mentors. For example, one participant once had the opportunity to bring some of the world's leading climate scientists to his class. The

mentors provide information that is especially relevant to the students since the students have a chance to interact with these mentors and ask them relevant questions.

Debate can also be a productive way of learning. Sometimes one participant will introduce a controversial issue into the class by debating with a colleague. This is done because his colleague is on an equal playing field with him, whereas a student might shy away from disagreeing with what the professor is saying since the professor has certain powers (at least perceived powers) over students.

One participant has his students engage in small group conversations about how they came to construct their understandings about particular topics. These stories are then shared with the class. This can help people to understand their own subjectivites (ie. why they think the way they do) as well as help people understand a particular topic.

Topics Covered

Activism

One participant makes the distinction to his students that people should learn about, through, and from action rather than just learning about exemplary actions that other people have taken. This framework highlights the importance of taking action in your local community and debriefing afterwards to see what you learned from it.

Another participant likes to explore the notions of concepts such as critical activism with his students, asking questions such as: what do we mean by activism, why it is important to actually take action, how does that relate to forms of democracy, how does that kind of activity relate to coming to know things relationally and what kind of activism could you see yourself involved in?

Ecological/Environmental Literacy (E-Literacy)

One participant defines ecological literacy as a comprehensive understanding, where "comprehensive means you can't just look at X and say the solution is Y. You have to look at abcdeg, you have to look at the whole gamut to have enough comprehensive understanding before you can make determinations." This comprehensive understanding could be described as inter/multidisciplinary.

Another participant provides his students with five foci designed to help them transfer ecological knowledge that they learn in his course into a teachable form: i) the big picture (which investigates the boundaries of life on earth), ii) the critical picture (which is concerned with the difficult ecological issues of our time) iii) the what (which consists of earth's grand systems such as air, water, soil, biodiversity, population and interconnections), iv) the reciprocal impact between humans and the natural world and v) the changes required by humans.

Many participants also noted that the investigation of systems and aesthetics is an important component of their course. In relation to systems, one participant highlighted that he likes students to investigate how people think about systems, cause and effect, inputs, output and flows. Another participant likes to highlight that systems are complex. In relation to aesthetics, one participant likes to ask his students questions such as is this beautiful, why is it beautiful or not and what are our indices of quality.

Philosophy

One participant likes to focus on what his students think they need to do in the classroom as a kind of practical philosophy. After the 'doing' aspect has been established

and more trusting two-way conversations have been established in his courses, he finds that it is much easier to engage philosophical questions.

For another participant, the most fundamental question explored in his class is what kind of assumptions are at play. Other important questions follow this question such as what legitimately counts as knowledge and how do we see ourselves in relation to the rest of the world. For example, students in his course investigate the implications of holding a Cartesian perspective. This perspective holds that all knowledge that is influenced by the senses or feelings is illegitimate and what counts most is what can be reduced to measurable amounts and measured. One participant also likes to examine the term "sustainable development", asking question such as why do we privilege this term and whether or not it is a productive metaphor.

Psychology

One participant presents research to his students on people's worldviews related to environmental themes. Amongst other things, this research looks into people's paradigms concerning human relations to nature, into people's motivations to engage themselves on an environmental level and into the social and personal values that underlie human action. By building a better understanding of where people are and why, it is easier for people to challenge their thinking and reconsider their positioning if they so desire.

Society/Culture

Society and culture represent an important dimension of lived experience. The following excerpts provide examples of how the participants incorporate society and culture in their courses.

Two participants talk to their students about how schools are currently based on an industrial approach to education. One participant highlighted the fact that "we confuse content coverage with the development of knowledge." He provided the example of Olympic athletes, stating that if athletes were to learn their skills the way students learn in school (with six different bosses and six different jobs in one day), they would have never reached their high level of skill. On the same note, this participant described that spending more time learning a particular topic allows a person to move from learning data or information, to creating knowledge, finally to attain wisdom. In response to these considerations, students should be provided with longer stretches of time to focus on particular skills/topics of inquiry.

Two participants talk to their students about aboriginal perspectives. Through this, students may come to understand that aboriginal perspectives are often more focused on processes rather than the outcomes, much like ECE/EE/ESD.

One participant utilizes Monbiot's (2006) perspective that approximately 40% of the answer to climate change is at the individual level, and 60% is business, industry and government. This highlights the importance of people working together. One way this participant reminds his students that people can work together is the use of what he calls the three primary R's – rethink, refuse, reconceptualize. This means people should rethink the things they do, consider refusing to buy certain products and reconceptualize how things are designed and created.

One participant likes to investigate the interplays between culture and environment with his students. To do this, he uses the framework of a sociosphere and technosphere nested within the ecosphere. He points out that modern cultures are usually

quite responsive to changes in technology (technosphere), but not so responsive to changes in society (sociosphere) or the environment (ecosphere). To help change this, educators should place new knowledge "within the context of the existing knowledge and past experience of the individual or community" (McBean & Hengerveld, 2000).

Other topics

Participants certainly also introduce a number of other topics in their courses that did not come out during the interviews. These topics likely change depending on how the course unfolds and depending on what is going on in the world at a particular time. During the interviews, the participants indicated that they introduce the following topics into their courses: the history of EE, greenwashing, propaganda, the word "environmentally friendly" and hydrogen.

Assessment and Evaluation

Methods

Most of the participants include some kind of pass/fail element in the way they evaluate student learning. One participant gives a high expectations speech at the start of the year explaining that pass/fail doesn't mean easy, it means you need an A to pass the course. Those who use pass/fail all identify 80% and over as the passing mark. One participant aptly explained that if everything students do has to be measurable, then certain things are always going to be underrepresented, undervalued or left out. For example, feelings are not amenable to measurement yet "they are at the heart of our capacity to be ethical beings." Those who use a pass/fail system will often give students chances to improve their work should they fail. As an example of this approach, one

participant has his students do an ecological knowledge review which is a series of questions about ecological literacy which students must get 80% or over to pass.

Two participants have their students make contracts regarding what students will do in their courses. With one participant, the contract usually contains a reading component, a writing component, a thinking component and an action component. This contract is flexible and can be renegotiated throughout the year to emphasize one component more than another as students explore the various avenues of the contract. Grading involves self assessment and he and his students work from broad grade categories on student assignments (eg. A, B, C...), then translate these grades into numbers.

One participant evaluates his students by assuming that students will achieve a level of mastery if they have completed all of their assigned work and that a base grade of 80% will reflect this mastery. Following this, his students' grades are adjusted up or down depending on how articulate they are in what they do. Specifically, he looks for clarity, coherence and creativity.

One participant grades at intervals of 10% based on which projects students have done in his class. He provides his students with a list of potential projects on the first day of class. If students want to get a certain mark, they have to do the necessary projects to earn that mark. When it comes to their "authentic group project", students all get the same mark.

One participant uses portfolio assessment, where students develop a number of projects then present what they learned to each other. In their portfolios, the students have to demonstrate what he calls the three Ps, personal, professional and philosophical

growth. To pass, students need to display mastery over what they have learned. During their public presentations, the students need to express where they were in the beginning of the course, where they are at the end and what it was in their experiences that prompted that kind of learning.

Assignments

One participant encourages his students to write autobiographies. This type of investigation can help students to understand "how they internalize their belief system and how they can... begin to articulate that through deeper thinking about... what kind of things are important to them and what aren't." This participant has his students do unit plans so that they familiarize themselves with the curriculum, learn how to teach a unit in their own unique style and string themes together so that units aren't just made up of isolated activities and ideas. This participant's students also investigate how they could engage students to work through an environmental issue.

One participant likes to give his students practical assignments. For example, students can choose to develop what he calls "lost life skills", such as preserving foods, sowing clothing and bread making. As another component of his courses, after participating in the "ecological macro models" this participant's students must do a follow up describing how they might change their behaviours based on what they learned.

One participant has his students do nature journaling, readings, presentations, an evaluation of educational resources, a field trip lesson plan and a write up about a controversial issue. His students also facilitate conversations around readings they do in the class.

Learning Outcomes

All of the participants provide opportunities for "inner transformation" to their students. Two participants specifically talked about "transformation" as a potential learning outcome. One participant pointed out the fact that experiences that are transformative for one person will not necessarily be transformative for another. This at least in part explains the diversity of practices and freedom that the participants provide their students. The following learning outcomes are part of this transformation and were explicitly stated or implied through the practices that participants carry out.

Knowledge

While none of the participants introduce knowledge using a teacher centered approach, teaching necessarily includes the introduction of specific information in specific ways. What follows is a broad look at the learning outcomes that the participants aim for with regards to knowledge. Two participants spoke of teaching students about "systems", while a third shows his students systems but never explicitly stated it as a desired learning outcome. Systems are necessarily interconnected, as one component of a system relies on the proper functioning of another component. On this topic, two participants explicitly stated that they teach students about interconnections. Other participants talked about "relationships". One participant stated that he helps students to develop their worldview, while another spoke of helping students develop their comprehensive understanding. All of the participants indicated that they introduce information from various disciplines into their classes. One participants also spoke of introducing the topic of aesthetics in class, while four of the participants introduce natural aesthetics into their courses by holding classes in the outdoors.

Shifts

The participants do not force their students to change themselves, but rather provide them opportunities to do so. Some participants spoke of shifts in values, emotions and perspectives. Without explicitly stating it, other participants tacitly indicated that they set up opportunities for shifts in values, emotions and perspectives through various activities performed in class, such as critically evaluating assumptions and encouraging students to talk about how they felt during specific experiences. One participant talked about shifts in behaviour.

Skills

By examining the teaching practices uncovered in this interview, it seems that all of the participants aim for their students to develop action skills, social skills, communication skills, creative skills and critical thinking skills. This can be seen through the heavy use of dialogue and community action in the participants' courses. Four of the participants specifically spoke of critical thinking and two spoke of action skills. One participant spoke of creative skills and one participant spoke of social skills.

Chapter Five – Discussion

Introduction

This chapter's main purpose is to discuss best practices of Canadian ECE/EE/ESD pre-service teacher educators, to examine these practices through the lenses provided by academic literature and to present recommendations for future research on this topic. The participants share common practices at the general level, but when it comes to specifics there are many differences. Part of these differences stem from the fact that different program/course structures offer different opportunities to teachers. For example, one of the participants teaches two three hour courses per week; while another participant often teaches all day for seven weeks straight. These two different course structures offer very different teaching opportunities. Having students focus on ECE/EE/ESD for seven weeks may allow for much more learning to take place compared to teaching six hours a week while a student has to also please many other instructors. However, these different program/course structures certainly cannot explain all of the variations in educational practices.

Participants

The participants in this study were not reflective of the Lin (2002) and Towler (1980-81) studies because the participants are all highly active in ECE/EE/ESD projects and research. Many of the participants indicated that they spent a lot of time in the outdoors growing up, and three of the participants spoke of important role models having influenced them at an early age. These experiences acted as motivators for the activism that they carried out later in life. However, three out of five of the participants do come from a science background, which is reflective of Lin's (2002) and Towler's (1980-81)

studies. Also, the low number of participants in this study supports the idea that there is a lack of people in Canada who specialize in ECE/EE/ESD teacher education. This finding is tentative however considering that this study was not designed as a quantitative study.

All of the participants in this study were active in influencing government policy in the area of ECE/EE/ESD. Particularly noteworthy is that all five participants were active in writing government education documents, while one participant was active in lobbying the government to introduce ecological education as a discreet, distinct subject area from K-12.

Best Practices in Canadian ECE/EE/ESD Pre-Service Teacher Education

Figure 1 summarizes the findings of this study. The roots of the tree contain a list of the teaching practices that are common amongst all of the participants of this study. These practices are organized, from left to right, into the categories of topics covered, teaching approaches/processes and assessment & evaluation. The trunk of the tree lists the unique specifics. These are also organized from left to right just like the common generalities section. Finally, the top of the tree is made up of learning outcomes that were uncovered during this study.

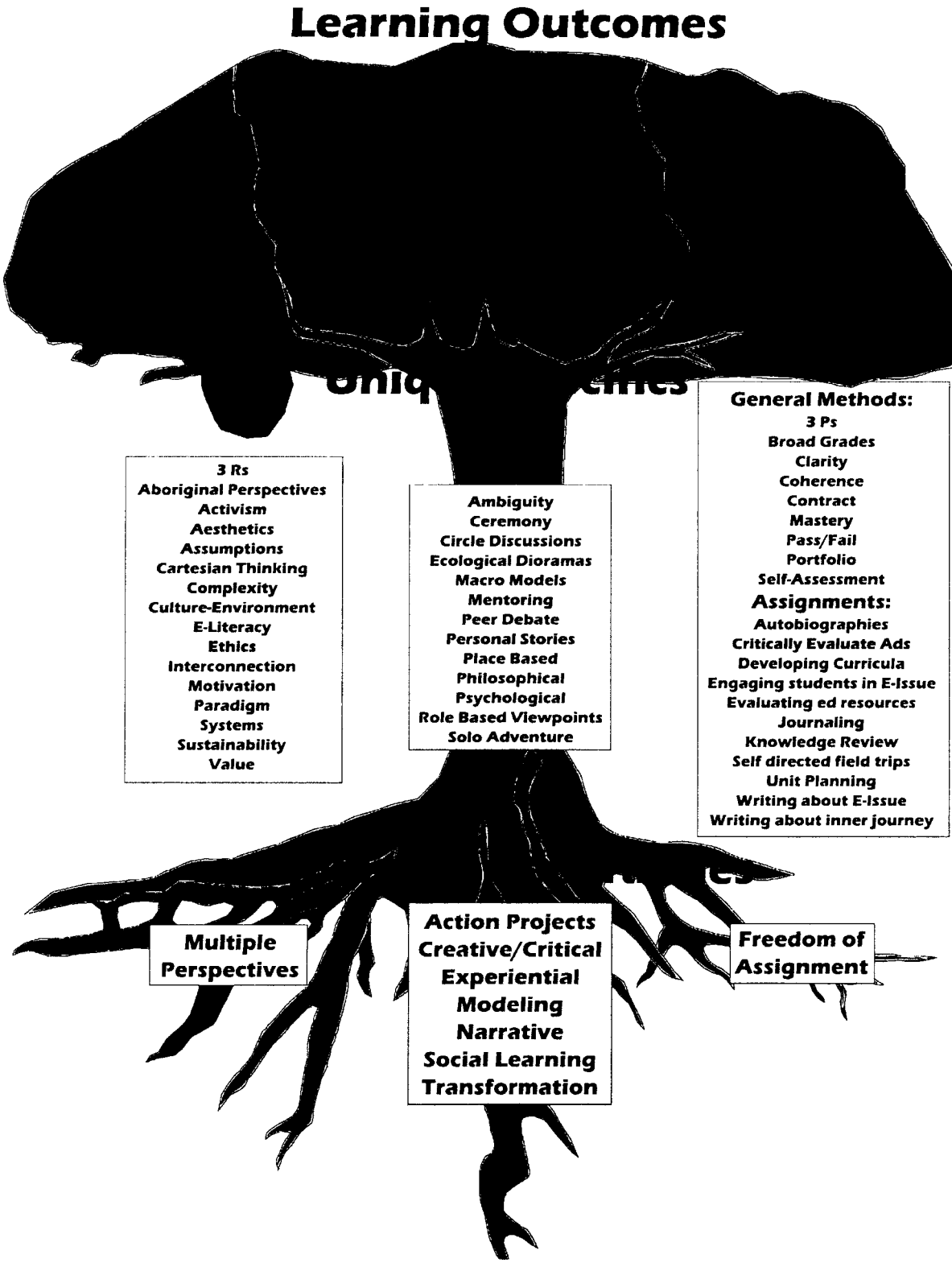

Figure 1 – Summary of Best Practices of Canadian ECE / EE / ESD

Pre-Service Teacher Educators

Teaching Practices & Outcomes

This study found that to greater and lesser extents, all of the participants use action projects, creative/critical approaches, experiential approaches, modeling, narrative and social learning, they all present multiple perspectives and provide students freedom in choosing their assignments. These teaching practices are carried out in order to provide an environment conducive to inner transformation. By broadly compiling together the participants' ideas surrounding inner transformation, it appears that inner transformation consists of building an understanding of aesthetics, systems, interconnections and personal worldviews; experiencing shifts in emotions, perspectives and values; and gaining action, communication, critical, creative, and social skills.

When comparing the participants in this study to Stevenson's (2007) typology, the socially critical approach is certainly the most strongly supported type of environmental reform for the participants. This can be seen through all the time the participants put into their classes for group discussion, action projects, experiential education, freedom in choosing their assignments and looking at things from multiple perspectives. These types of activities are designed to provide students with opportunities for inner transformation, transformation that is necessary if the socially critical approach to environmental reform is to be effective.

Technical, political and alternative approaches to averting future ecological degradation could also be seen in different participants' practices to varying extents. For example, one participant highlight's the political nature of curriculum documents (political), another participant encourages students to restore degraded habitats (technical) and another participant encourages students to learn life skills that were lost

following the specialization of job duties that occurred during the industrial revolution (alternative). These different practices make it clear that instructors' beliefs surrounding environmental reform do have an impact on how a course is taught.

Looking at the results of this study through the lens of Robotom and Hart's (1993) typology, the critical approach is the dominant form of educational practice amongst the participants. All of the participants work quite diligently to ensure that ECE/EE/ESD doesn't fit the stereotype of being about glib slogans and indoctrination. However, if observational data was collected in this study, it would undoubtedly uncover that some professor's emphasize the critical approach more than others.

When it comes to the empirical/analytical and interpretivist approaches, there is a certain tension between the participants' practices. Particularly, one participant spoke of being interested in asking questions rather than imparting knowledge to students and another participant stated that much of the topics covered in class are brought forth through research that students perform in class in response to questions that came forth. On the other hand, other participants have predetermined readings for their courses; some also spoke of the importance of bringing experts into the class to impart their knowledge or of the importance of laying a solid foundation of ecological knowledge for students to later build upon.

Another point of tension between the practices in this study is that some participants offer more direction to students regarding action projects. This is also tied to the tension between students constructing their own knowledge (interpretivism) and learning from previously established knowledge (empirical/analytical). In the area of assessment and evaluation, some use purely pass/fail methods and other provide broad

grades which are translated into specific numbers later on depending on a number of different factors. These differences are also reflective of the tension between interpretivist and empirical/analytical approaches, in this case regarding grading.

In any case, while looking at these educational practices through the lenses of Stevenson (2007) and Robottom and Hart (1993), it is quite clear that none of the participants purely conform to one classification or another but rather fit into these different categories to various extents and in various ways.

Recommendations

Because no observational data was gathered, it was not possible to accurately identify a number of important factors. Further studies might attempt to discover how much time the participants spend doing different things in class, how the participants respond to student actions in class and what kind of emotions the participants display during courses. Perhaps one participant spends considerable time critically evaluating with students, while another spends more time providing students with experiences from which to build knowledge. If a student challenges what a participant sees as a core component of ECE/EE/ESD, how does the participant respond? Maybe one participant displays strong emotions during group discussions that dissuade students from participating. Alternatively, perhaps a teacher is emotionally flat and does not model a passion for what is happening in class.

While all of the practices uncovered in this study are valid and important, it is impossible for an instructor to use all of these teaching practices in one class. As a result, instructors need to decide for themselves which practices are most important to them and to their students. The intent of this study was never to compare the effectiveness of

different unique practices between the participants. However, this study has uncovered many educational practices that could be adopted by different ECE/EE/ESD practitioners. To strengthen ECE/EE/ESD, researchers could investigate the comparative effectiveness of the particular educational practices in meeting the particular educational goals that were uncovered in this study. Furthermore, researchers could look into what types of life experiences tend to produce people who fit into one particular view of environmental reform or education. The broad processes and outcomes uncovered in this study can also help to inform program assessment tools that future researchers may develop.

Many interesting stories also came forward during these interviews. Future research might focus on these stories. Stories concerning action projects could be investigated. Stories concerning transformative experiences could be explored. Stories concerning unexpected, place based educational opportunities could be explored. From the interviews performed, it seemed that the participants have a deep well of experiences in ECE/EE/ESD that could form the basis of some very interesting stories.

Considering the differences between participants regarding how they practice ECE/EE/ESD, it could prove beneficial for the participants to have more dialogue amongst themselves to share their successes and failures and to build a unified position on Canadian ECE/EE/ESD. Perhaps a grassroots Pan-Canadian policy guide surrounding best practices in Canadian ECE/EE/ESD pre-service teacher education could emerge out of this dialogue. Doing this would require bringing more people into the fold than occurred with this study, such as people who teach outdoor, science and social science methodology courses. However, this study could serve as a good starting point. This policy guide could help to shape the future direction of Canadian ECE/EE/ESD teacher

education, something I suspect is especially important to do at this time considering that I received several indications during my research that Canadian ECE/EE/ESD teacher education is expanding.

Conclusion

In this study, the researcher has examined the teaching practices of 5 Canadian ECE/EE/ESD pre-service teacher educators. A grounded theory approach was used so that the participants' teaching practices would emerge out of the interviews and email follow ups with the least amount of influence as possible from the interviewer. This resulted in a list of best practices that accurately reflect the participants' practices.

Analysis of the data revealed a rich array of educational practices that anyone involved in teaching ECE/EE/ESD can draw upon. The differences between the participants' practices merit future exploration. Similarities existed between the participants' practices in the areas of: action projects, creative/critical approaches, experiential approaches, freedom of assignment, modeling, multiple perspectives, narrative, social learning and transformation. These similarities can help lay a foundation for unified Canadian position on ECE/EE/ESD.

Now more than ever the Canadian public is showing interest in environmental/ecological topics. Will this interest come and go without any significant learning taking place, or will this interest help to fuel a substantial growth in the ecological consciousness of Canadians everywhere? To a large extent, this will depend on the success with which teachers are educated to be effective ECE/EE/ESD teachers. This will, at least in part, be influenced by the communication between ECE/EE/ESD teacher educators. Furthermore, to a large extent the successes in developing more

Canadian ECE/EE/ESD teacher education programs will depend on the unified pressure that ECE/EE/ESD teacher educators are able to exert on the various barriers working against them. Achieving this type of unity will require a thorough examination of the similarities and differences between the educational practices of these different teacher educators. This study may provide some guidance in achieving these goals.

Appendix A – Interview Questions

Interview with _____, at _____,

on the day of _____.

Personal Background

What ecologically/environmentally/sustainability related programs/courses do you teach? When did you start teaching them? Have you taught any other related programs/courses? How long are these different courses/programs? What grades levels are your students learning to teach?

Have you conducted research in ECE/EE/ESD? If so, has any of your research been particularly important towards informing your teaching.

Open Ended Discussion

How do you practice ECE/EE/ESD?
How do your beliefs concerning ecological degradation & solutions to ecological problems affect your teaching?
How do your beliefs concerning the nature of learning & knowledge affect your teaching?
Has any research in the field of ECE/EE/ESD been particularly important toward informing your teaching?
Have any personal life experiences been particularly important towards informing your teaching?
How do you go about assessing students in your courses?
How does your own activism (if you conduct any) impact your teaching?
Do any other factors affect the ways you teach?
Is there anything else you would like to say about the ways you teach?
Do you know of anyone else who would be interested in being a participant for this study?

Potential Topics: Best practices, activism, definitions, goals, using research, teaching methodologies, pedagogy, justifications, timing of instruction, age appropriateness, technology, the outdoors, assessment and evaluation, ecological degradation, solutions, epistemology, educational theory, sense of community, politics, economics, society, culture, technology, ecology, ecological literacy, ecological consciousness, war, experiential learning, attitude, awareness, skills, behaviour, participation, sustainability, environment, engagement, values, motivation, projects, ownership, crisis, health, harmony, policy, activism, advocacy, government, interconnections, complexity, entropy, interdisciplinarity…

Appendix B – Cover Letter

Dear Potential Participant,

I am a graduate student currently enrolled in the Masters of Education Program at Lakehead University. Professor Dr. Tom Puk is my thesis supervisor. In order to complete the requirements of my program, I am conducting a research study. I have decided to examine the teaching practices of ecological education/environmental education/education for sustainable development (ECE/EE/ESD) teacher educators.

During 2009-2010, I will be interviewing teacher educators who meet two criteria. First, participants must have educated teachers in the field of ECE/EE/ESD in the education department of any Canadian university for at least three full course equivalents. Second, participants must have conducted and published research in ECE/EE/ESD. Interviews will be carried out over the phone and recorded on a digital voice recorder. Following an interview, I will email the interview transcript to the respective participant, potentially with some follow up questions. The participants will have a chance to alter the transcript if any inaccuracies or lack of depth exist.

Participants will be granted anonymity during the reporting of the data. In accordance with university policy, all data will be stored for five years following the study. Findings will be incorporated into a Masters thesis and possibly a published project report.

Participation may allow individuals to further develop their understanding of practices in ECE/EE/ESD, and to contribute their own unique teaching practices to this cross-Canada study.

If you give your consent, it is important for you to understand the following:

- There are no risks involved to individuals participating in the study.
- You have the right to withdraw your consent at any time.
- Your anonymity and confidentiality will be protected, unless you chose to waive your anonymity.
- The data will be stored for five years following completion of the research project.
- You will receive a summary of the project, upon request, following the completion of the project.
- You understand that the interview will be recorded.

If you are willing to participate in this research study, please sign the attached form. If you have any questions or concerns regarding the study, please contact Ron Berg at (807)-767-0047 or by email at rgberg@lakeheadu.ca, Dr. Tom Puk at (807)-343-8710 or by email at tpuk@lakeheadu.ca, or the Research Ethics Officer at (807)-343-8283 (email: susan.wright@lakeheadu.ca).

Appendix C – Letter of Informed Consent

By signing bellow, you agree that:

- You have read and understood the cover letter for the study.
- You agree to participate.
- You understand the benefits of the study, and what those are.
- You understand that you are a volunteer, can withdraw from the study at any time, and may choose not to answer any question.
- You understand that the data you provide will be securely stored at Lakehead University for five years.
- You understand that the research findings will be made available to you if you request it and that the contact information for making such a request is available on the cover letter which has been left in your care.
- You understand that you will remain anonymous in any publication of research findings.
- You understand that the interview will be recorded.

_____
Name (Print)

_____ _____
Name (Signature) Date

If you have any questions or concerns regarding the study, please contact Ron Berg at (807)-767-0047 or by email at rgberg@lakeheadu.ca, Dr. Tom Puk at (807)-343-8710 or by email at tpuk@lakeheadu.ca, or the Research Ethics Officer at (807)-343-8283 (email: susan.wright@lakeheadu.ca).

This study is based on case study methodology. Therefore, we are asking participants to consider waiving their right to anonymity by signing below with a third party witness. If you choose not to waive your right to anonymity, all data will be anonymous.

_____ _____
Participant's Signature Date

_____ _____
Witness's Signature Date

Appendix D – Statement of Introduction

Hi, my name is Ron Berg. I am a graduate student at Lakehead University and I am writing to see whether you would be interested in participating in the research I am conducting. The purpose of this research is to compile a list of best practices in Ecological Education, Environmental Education or Education for Sustainable Development from the point of view of teacher educators in Faculties of Education across Canada. To qualify for this study, you need to have taught three full course equivalents in a teacher education program in Environmental Education and you need to have conducted research in the field of Environmental Education. Involvement will consist of a one hour interview, with an email follow up that will allow you to review and alter the interview transcript as you see fit.

It is important that you understand that:

- There are no risks involved to individuals participating in the study.
- Your participation is voluntary and you have the right to withdraw your consent at any time.
- You can decline to answer any question.
- Your anonymity and confidentiality will be protected unless you chose to waive your anonymity..
- The data will be securely stored at Lakehead University for five years following completion of the research project. Only Ron Berg and Tom Puk will have access to the data. While conducting the study, the data will also be securely stored.
- The interview will be audio recorded, and by signing the consent form that I will mail to you, you consent to such recordings.
- You will receive a copy of the thesis, upon request, following the completion of the project.

So are you interested in participating in this research?

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