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SHARING PRACTITIONERS' PERSPECTIVES:
WHAT IS IMPORTANT FOR INSTRUCTING
ENVIRONMENTAL EDUCATION?

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ABSTRACT

Environmental Education (EE) is important for broadening learners' understanding of their environment. The study described in this paper investigated (a) what knowledge and abilities are important for teaching EE, (b) experiences that have influenced educators' interest and willingness to teach EE, and (c) the preparation educators could receive to better integrate EE into their teaching practices. Data were collected using an electronic survey (n=148) and interviews (n=11). Two themes that emerged were recognizing the importance of outdoor experiences and having the ability to engage learners. Recommendations for improving the preparation of educators included introducing mandatory EE components in teacher education.

SHARING PRACTITIONERS' PERSPECTIVES:
WHAT IS IMPORTANT FOR INSTRUCTING ENVIRONMENTAL
EDUCATION?

My paper describes a study that investigated the beliefs and views held by environmental educators regarding the importance of various knowledge and ability elements for teaching environmental education (EE). In addition, the study considered the various personal experiences which have influenced environmental educators' views and perspectives regarding EE. The results of the study highlighted elements important for instructing EE that may be of value to include within teacher education programs or in other non-formal learning settings. The study was driven by the following research questions: (a) What knowledge and abilities do practicing environmental educators view as most important for teaching EE?, (b) What personal or educational experiences influenced their acquisition of knowledge, abilities and perspectives related to EE?, and (c) What are their views regarding the preparation of future environmental educators? Throughout the process of conducting the study more questions were generated and are listed at the end of this paper to encourage further inquiry within the field.

RATIONALE

The environment is currently undergoing human-induced changes at an unprecedented rate. It has been agreed upon by the Intergovernmental Panel on Climate Change that "warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level" (Intergovernmental Panel on Climate Change, 2007, p. 2). Canadians are very much implicated in this environmental crisis as we are the world's second largest consumers of water, per capita, and are responsible for using the most energy, per capita, in the world (Energy Information Administration, 2004; Organization for Economic Co-operation and Development, 2008).

These complex environmental issues will be of utmost concern to future generations who will live with the consequences of our past and present actions. The recent increase in public interest for environmentally responsible or green products and services can be, in part, attributed to increased media attention. While improvements in industry have been made to mitigate environmental impacts, there is concern that much is being greenwashed that is, portrayed as environmentally responsible when in fact it is not. These depictions result in consumers not being able to trust the content of advertisements (Karna, Juslin, Ahonen & Hansen, 2001). Media sources have created and shaped the public discussion surrounding environmental issues, but many of the more complex and deeper rooted social and economic factors have been excluded from the discourse. For example, the importance placed on purchasing greener products such as hybrid vehicles, displaces the argument to plan communities on a local and more human scale, which would reduce our dependence on fossil fuels for transporting goods and commuting. In order to consider the larger environment context, exploration at a more holistic level is required. For example, consider how just one component of EE, ecology, "not only focuses on integrated systems instead of isolated parts, but it also considers that in every system there are emergent properties that cannot be found in the parts of it" (Korfiatis, 2005, p. 283). However, if corporate and media interests are shaping the public discussion it will be biased

towards exploring those issues that have greater economic implications.

Education provides a means for furthering the public's understanding of environmental issues. Having a multifaceted comprehension provides people with a foundation of knowledge upon which they may base their decisions affecting the environment. There are many tools that may be used, including legislation, policies, financial incentives and disincentives. For example, financial rebates are offered by some government department for completing energy efficient home renovations (Natural Resources Canada, 2008). While the use of these methods creates contexts that influence people to make a particular decision regarding their actions, education empowers individuals to consider the whole picture and to use their own judgment to decide upon the impact they would like have on their environment. Similarly, I am in agreement with Noddings (1995) in her view of the importance of developing caring in students and providing "genuine opportunities to explore the questions central to human life" (p. 368). Therefore, the role of education may be in part to allow learners a chance to observe the current environmental situation from multiple perspectives and gain an appreciation for thinking about environmental issues.

EE has been approached in different manners and using various terminologies. According to Palmer (1998) the term EE was used for the first time in 1965 at a conference in the U.K, regarding conservation of the countryside and implications for education. The term has since been adopted for use at international conferences, such as the first inter-governmental conference on EE held in Tbilisi in 1977. In the 1970s the emphasis of outdoor education and conservation education placed a new dimension on EE. During the 1980s, awareness of global development issues arose, as well as the emergence of values education. More recently, EE has been deeply impacted by the concept of sustainable development as defined in the Brundtland report of 1987 as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (UNESCO, 2002).

EE is a complex field combining content and educational methods from diverse areas. I have come across different definitions and objectives for EE. However, most are worded

broadly enough that they are not mutually exclusive of one another. One definition of EE that has been influential to my understanding is given by Lucas (1972) who states EE, "can refer to education about the environment, for the (preservation of the) environment, or in the environment" (p. 98). He elaborates that EE may occur as any combination of in, about and for and with reference to any environment (including different geographical locations as well as at multiple scales).

EE within the formal educational sector can be found within curriculum documents as well as through teacher or student led environmental initiatives within the school. However, without a strong presence in the curricula, as is the case in many Canadian provinces, EE has often been omitted and included only by educators who have felt a sense of personal attachment to the subject and value its importance for learners (Canadian Institute for Environmental Law and Policy, 2006; Palmer, 1998). In Ontario, EE is most visible in the subject area of science and technology. It is found within the elementary science document in the form of terminology such as biodiversity, climate change and sustainability (Ontario Ministry of Education [OME], 2007a). At the high school level, the Ontario Curriculum previously included elective high school courses called Environmental Science. These electives were eliminated in 2000, and EE was then integrated into all subject areas (Puk & Behm, 2003). EE content now appears primarily within the sciences, geography, history and civics curricula while it is rarely mentioned within the social sciences or business studies curricula. Occasionally, EE may be creatively brought into secondary schools by teachers in the context of locally developed and interdisciplinary course credits (OME 2007b). The result of not having a discrete subject area for EE has resulted in teachers allotting substantially less time to EE content than they would had it been a specific objective within the curricula (Puk & Behm). Recently, the Ontario Ministry of Education (2007b) has made an attempt to bring EE back to schools by producing a document entitled Ready, Set, Green that highlights existing EE programs and provides a listing of EE teacher resources.

The need for professional educators who are capable and willing to implement EE in their practices is essential if EE is to gain further ground within formal educational settings. The United

Nations Educational, Scientific and Cultural organization produced a series of reports throughout the 1980s regarding EE, one of which referred to environmentally educated teachers as the priority of priorities (UNESCO-UNEP, 1990). Countries such as Spain and South Africa have begun to implement the theory and practice of EE within teacher education at the national level (Palmer, 1998). However according to research by Lin (2002), only 51.45% of teacher candidates in Canada received any training in EE as part of their program requirements, and of those, most held a narrow view of EE, focusing predominantly on science and ecology rather than a more holistic approach. Powers (2004) asserted that inadequate teacher training is the predominant reason why K-12 teachers are not teaching EE. Hence, it can be argued that there is a critical need to improve the preparation of educators as such preparation will lead to more effective EE.

Daskolia and Flogaitis (2003) conducted a literature review to compile a list of teacher knowledge, professional teaching abilities and competency elements that have been considered important in prior EE studies. They then constructed and tested a survey instrument with 48 knowledge and ability elements. The researchers grouped the elements according to themes prior to the study and were interested in determining if particular themes were viewed as more important for EE than others. The knowledge element categories were (a) introductory knowledge of EE, (b) knowledge of teaching practice and evaluation in EE, (c) knowledge of learning and learners, and (d) knowledge of environmental issues and problems. The four ability categories were (a) teacher's management of EE programs, (b) teacher's management of interpersonal relations with and among students, (c) teacher's self-appraisal of teaching practice, and (d) teacher's management of environmental information. The results of their study included a ranked order of importance for each knowledge and ability element, based on statistical analysis of their mean values. This research greatly influenced the development of the survey instrument used in the first part of the method in my study. The second section of the method was composed of interviews which were based upon sections of Hart's (2003) work. Hart used a qualitative methodology, specifically using storied narratives collected through interviews, to consider EE from the practitioners' points of view. However, there were

dilemmas with this approach including, "How to capture the complexity of teacher motivations as tacit, intuitive, and only partially coherent and consistent" (p. 201). This book was very influential in crafting my research study as it encouraged my desire to hear what environmental educators have to say about their own field of expertise. However, it should be noted that Daskolia and Flogaitis, as well as Hart, focused solely on teachers in the formal educational settings, whereas EE also occurs within many non-formal educational contexts.

My study sought the views of a wider array of environmental educators including those who work in schools as well as outdoor centres, museums, youth programs, camps and other contexts. Therefore my research questions, investigating environmental educators' knowledge and beliefs, as well as their experiences that were influential to their acquisition of these elements, will further add to the literature in this field.

METHOD

I developed a mixed-methods approach in order to more fully investigate what environmental educators viewed as important for their profession than would have been possible by qualitative or quantitative means alone. This approach involved the collection, analysis and integration of both quantitative and qualitative data in order to best answer the research question (Tashakkori & Teddlie, 2003). By using an electronic survey instrument (e-survey), I was able to solicit the views of a large number of respondents (n= 148) on the topic of instructing environmental education. However, the survey limits possible responses to the options available, which may not adequately represent the opinion of the participants. Therefore, in addition, I conducted interviews with selected respondents (n=11) to further understand their perspectives and gain snapshots of environmental educators' views and beliefs. By using both methods, I investigated the perspective of a sample of Canadian environmental educators and then analyzed a subsection of these educators' views using interviews to gain a more profound understanding.

ELECTRONIC SURVEY INSTRUMENT

The survey consisted of three sections: (a) demographic questions, (b) questions that ranked knowledge and ability elements, and (c) open-ended questions regarding missing elements and experiences influential to their EE practice. The e-survey required 10-15 minutes to complete. The knowledge and ability elements were selected based on an existing instrument by Daskolia & Flogaitis (2003), guidelines developed by the North American Association for Environmental Education (2007), suggestions in Environmental Education Ontario's publication (2003), research by Hart (2003) and my own knowledge as a graduate from an environmental science bachelor's program.

When selecting knowledge and ability elements to be used in the survey, I used a framework set out by Sterling (2001) based upon three orders of learning and change. For example, first order change or learning elements would take place within accepted boundaries of conventional education and leaves basic values unexamined and unchanged. Second order change or learning would have elements of critical reflection, and would examine the learner's assumptions. Third order change or 'transformative' learning occurs when a person considers an issue from a completely different perspective, enabling a shift of consciousness to occur, to be followed by action. Using this framework and my subjective interpretation, I categorized each element into first, second or third order. For example, I labeled, "the goals and evaluation methods commonly used in EE" as a first order knowledge element, "adding components of EE into multiple discipline areas" as a second order ability element, and the knowledge of "complexity of environmental systems viewed through a holistic perspective" as a third order element. This organization of the elements allowed me to create six questions requiring ranking on the part of the participants. Each of the six questions contained six elements, two from each of the three order levels, that participants were asked to rank in order of importance.

INTERVIEWS WITH ENVIRONMENTAL EDUCATORS

The second phase of the data collection used an emergent design strategy, in that the interviews questions were formulated based upon the preliminary results from the e-survey. This allowed further investigation of the factors that environmental educators

had selected as being most important on the e-survey. A standardized open-ended approach was selected for the interviews as they provided an avenue through which the environmental educators could give elaborate and descriptive responses. The set of twelve open—ended questions focused on (a) their views and beliefs concerning elements important to the teaching of EE, (b) personal experiences that had fostered these views, and (c) their opinions regarding how future environmental educators could best be prepared. By using a pre-determined set of questions the interviews yielded (for the most part) responses that focused on the central themes of the study and facilitated the analysis process. I transcribed six of the interviews and a transcriber was employed for the other five interviews. This combination allowed me to experience the transcription process, get a sense for the data and have a greater amount of time to analyze the contents of the interviews.

RESULTS AND ANALYSIS

The electronic survey received 148 responses from environmental educators working in a variety of formal and nonformal settings and many reported working in more than one setting (See Table 1). It is of interest to note that three quarters of participants had experience working in school settings. The educators in the survey were representative of a wide range of experience in this field. The respondents were distributed almost evenly between having 1-5 years experience (32%), 6-10 years experience (32%) and 11 or more years experience (36%). The participants were working all across Canada, in eight provinces and two territories. However, the main jurisdictions in which participants taught EE were Ontario (34%), British Columbia (21%) and Québec (14%). The respondents had a wide array of educational backgrounds as well as certifications; of interest to note are participants that possess Bachelor of Education or teaching certifications (47%) and those that have degrees specifically in environmental studies or sciences (30%). In addition, the majority of participants had formal education or certification related to EE (59%).

Table 1
Settings Where Participants Taught EE

Setting	Respondents (%)
School	75
Outdoor centre	53
Camp	46
Park or conservation area	43
Recreational group	32
Museum	16
Garden or agriculture	14
Other	24

ELECTRONIC SURVEY FINDINGS

The analysis of the survey responses involved entering the data into Excel. Participants had ranked the top three elements in each question (of which there were six). As a result each of the 36 knowledge and ability elements had a certain number of participants who had selected it as the "first," "second" or "third" most important. Using these I found the six elements that had been ranked most important in each question. I also calculated a score for each element by assigning weighted point values. Three points were awarded for being selected as "first most important," two points for "second most important," and one point for "third most important." I then added these points together to find which elements were regarded as most important by the participants. The results of this are displayed in Table 2.

Table 2
 Ranking of Most Important Knowledge and Ability Elements

Ranking	Element	Order of learning and change ^a			Number of respondents who selected element as:		
		1 st	2 nd	3 rd	1 st choice	2 nd choice	3 rd choice
1	Ability to engage learners (i.e. facilitate questions and encourage analysis and interpretation of content)	•			67	47	17
2	Knowledge of the importance of developing relationships with the natural world through first-hand experience		•		86	20	12
3	Knowledge of place (i.e. experience of environment through local cultural history, geography and ecology)			•	64	29	19
4	Ability to teach EE from a holistic perspective by underscoring the complexity and interconnectedness of the natural environment with society, technology and the economy (i.e. include concepts such as systems dynamics, participatory democracy and the precautionary principle)			•	65	19	30
5	Ability to facilitate holistic experiences that nurture a deeper caring and appreciation for the environment			•	53	41	14

Table 2 (Continued)
 Ranking of Most Important/ Knowledge and Ability Elements

Ranking	Element	Order of learning and change ^a			Number of respondents who selected element as:		
		1 st	2 nd	3 rd	1 st choice	2 nd choice	3 rd choice
6	Ability to teach students to assess the ecological sustainability of their everyday choices and behaviours (i.e. calculate environmental footprint)	•			44	43	27
7	Ability to role model reasoned, respectful and environmentally responsible behaviours to students		•		46	34	34
8	Knowledge of the responsibilities associated with EE (i.e. value-based elements are approached responsibly, behaviour modeled in class is conducive with EE)		•		47	40	18
9	Ability to connect with members of your community to share knowledge and create opportunities for environmental actions (i.e. with local interest groups, elders/seniors, local businesses)			•	36	37	34
10	Knowledge of own personal views regarding environmental issues and their relation to instruction of EE			•	37	32	28

Note. The ranked order was determined by the calculation of weighted point values for each knowledge and ability element, as described in the Method Section.

The order of learning or change was assigned to each element prior to the e-survey based on definitions by Sterling (2001).

The two most importantly viewed elements were the "ability to engage learners (i.e. facilitate questions and encourage analysis and interpretation of content)" and "knowledge of the importance of developing relationships with the natural world through first-hand experience." In a follow-up question on the survey, it was asked which element of the 36 listed was the single most important for teaching EE. The top selections were similar with "knowledge of the importance of developing relationships with the natural world through first-hand experience" being selected by 25% of respondents and the ability to engage learners was chosen by 12%. It should be noted that 30% of respondents viewed no one element as most important to teaching EE. Another means of considering these results is to look at them through the orders of learning model by Sterling (2001). Of the ten elements listed in Table 2, I had designated six of them as requiring third order learning (elements ranked 2nd, 3rd, 4th, 5th, 9th, and 10th on Table 2). That is, I viewed these elements as requiring a shift of perspectives from the ones found within conventional educational settings in order for these elements to be valued. This is perhaps significant in that many of the participants are not limiting their perspectives of knowledge and abilities of importance to those that are already commonly present in educational settings. There is emphasis being placed on striving for a different approach to EE, such as being more holistic, reflective and place-based in educational approach.

The final section of the survey elicited open-ended responses regarding what important knowledge and abilities were lacking and information on participants' influential EE experiences. The responses were quite varied and included elaborations on the importance of enabling first-hand outdoor experiences with learners and the significance these types of experiences held for the educators. In addition there were numerous mentions of having knowledge of the learners in order to involve them as

much as possible. For example, by being flexible in approach and adapting EE to the age, learning styles and interests of the students. Additionally, knowledge of nature and science, local environmental issues and resources, as well as relevant policies and regulations would also be important. The abilities of role modeling green practices, facilitating learner driven learning and actions, and engaging in reflective practice were also mentioned by numerous participants. Furthermore, participants elaborated on the significant influence working in various EE settings (NGOs, camps, parks) had on their development as educators. As well, many recalled the importance of childhoods spent outdoors, parents demonstrating environmental actions and post-secondary education related to environmental issues as being influential to their development as educators. The e-survey findings were used to design the questions posed in the semi-structured interviews I conducted with I I of the original survey participants.

FINDINGS FROM THE INTERVIEWS

The major themes that emerged from the interviews with eleven environmental educators are described below. While each individual had their own views, I did not attempt to construct case studies about each participant, but rather to share their views in a comprehensive manner. The study identified 12 main themes of which I will explore five in the context of this paper: (a) environmental awareness, (b) outdoor experiences, (c) environmental action, (d) influential educational experiences and (e) making changes to teacher education. Quotes have been labeled with the participant's transcript number followed by a dash and the line number of the quote (e.g., T6-149). The selection of quotations was based on providing an overview of the range of perspectives held by the participants.

PARTICIPANTS

The I I participants were selected for interviews, from the e-survey respondents, with the aim of representing a diversity of professional backgrounds. The sample consisted of five men and six women. These participants also varied in the number of years of experience teaching EE. While I selected the sample based on having equal representation from those with fewer than 6 years experience, 6-10 years of experience and 11 or more years of

experience, once I interviewed the participants their experience was best described otherwise. Six of the participants stated that they had between 5 and 10 years of experience, whereas the other five had between 20 and 30 years. Still, this resulted in 2 diverse ranges of experience. They were from across Canada, with representatives from four provinces, five taught in Ontario, three in Quebec, two in British Columbia and one in New Brunswick. They worked in many settings, including schools, camps, outdoor centres, outdoor guiding operations and museums.

ENVIRONMENTAL AWARENESS

The theme of environmental awareness includes elements such as creating interest and engaging learners about the environment. All of the participants brought up the theme of environmental awareness, either as possessing knowledge related to the environment or as the ability to inspire awareness and engagement within learners. With reference to possessing specific knowledge, one participant explained, environmental educators must "have been with nature, and understand nature and be in awe of nature and then and only then can these environmental educators foster environmental literacy" (T3-334). Being environmentally aware was a prerequisite for many of the environmental educators to do their work.

The educators also indicated the importance of assisting their students to becoming environmentally aware. As one participant stated, "My job is to increase awareness, create engagement possibilities and create interest at every age level" (T1-49). Many suggestions were made regarding what abilities would be useful to possess to encourage environmental awareness in students including knowledge of how much information to share and choosing the appropriate times to do so. For example, one participant stated, "I could easily swamp them with way too much information so I have to pick and choose what I teach them" (T1-321).

According to Krathwohl, Bloom, and Masia (1964) awareness occurs when the learner is "conscious of something [in this case their environment].. ..it does not necessarily imply attention.... [and] the individual may not be able to verbalize the aspects of the stimulus which cause the awareness" (p. 176-177). Interview participants viewed the ability to create awareness as

being dependent upon providing appropriate and adequate environmental information in order to "ignite curiosity" (T9-243) among learners. Sobel (2008) states the necessity to approach environmental issues, such as climate change, "from a perspective that maximizes hope" (p. 141) in order to minimize the risk of breeding "ennui and helplessness" (p. 146) due to the overwhelming nature of environmental problems. Sobel also offered the recommendation that a more appropriate approach would be to provide nature experiences to the youngest generations in EE programs, a view echoed by many of the interview participants.

OUTDOOR EXPERIENCES

The majority of the participants emphasized the value and importance of providing EE experiences outdoors to their learners. Similarly, participants were interested in knowledge and abilities related to outdoor experiences and nature. As one educator stated, "Being outside with nature is the first most important part of actual EE" (T3-330). A number of the educators viewed EE, experiential education and outdoor education to be closely related. For example, one educator elaborated "EE would be a more hands on, experiential based learning, that is not taught through a textbook, or a lecture format" (T7-15). While another educator stated that, "My whole focus, is I want people outside. And I think that it's really important that we talk about it, the environment when we're in it" (T5-273). It appeared that for some participants EE's objectives were interchangeable with those of experiential education and outdoor education. One participant explained that environments, possibly outdoor environments although it was ambiguous, can be used to teach EE as well as other concepts. She stated:

You have a concept like data management, some boring math moment.. .if you use the environment as your vehicle to get to that destination, some days the environment is where you end up and some days, it's how you get to something else.. .. So, you can either use it to illustrate a point or just have it be the point. (T4-169)

Knowledge of outdoor activities for EE was mentioned by all of the participants as being important. Therefore, not surprisingly, having the means to bring learners outdoors was

another element that emerged often during the interviews. The ability to facilitate outdoor experiences for learners included having appropriate safety certifications and integrating EE within existing curricula and school settings.

Many participants explained in detail how they were able to integrate EE within the curricula of their particular settings. In a non-formal setting, a participant explained how she was able to bring EE into guiding by including "ecological concepts into the adventure trips" (T 8-49). Another educator working in a formal educational setting gave an example of teaching EE indoors using materials brought in from the natural world, he shared:

We'd bring back into the classroom, insect larvae, aquatic insects, and various crustaceans. We'd do net sweeps in the water and bring them back in the classroom for examination. The children would have their own aquariums. All the desks would be covered with bottles, and boxes, and jars and every horizontal space would be equipped with these containers. We'd grow plants in them and put duckweed in. (T 10-85) From the accounts of these educators, being able to connect students in some way to the natural world was essential to EE even if it involved bringing the outdoors inside.

ENVIRONMENTAL ACTION

Most of the educators made the link between teaching EE and having the ability to spark action among their learners. A participant expressed this by considering the relationship between a sense of connection and action, she stated, "You need to touch the people and their feelings inside so they can actually change their mind. If you just give them numbers and facts, they're not going to change their habits and their ways of life" (T2-42). According to another participant, educators must go even further and provide learners with knowledge and abilities to implement change. She argued that, "Telling people, kids, about climate change is a pointless exercise if it's not going to connect them with why it's important out there, in their own backyard, and how it is that they're going to implement change" (T5-546). This view was shared by a number of participants and many offered suggestions as to what educators should be able to do in order to help empower students to act in environmentally responsible ways.

Jensen and Schnack (2006), state that, "One of the overall objectives of environmental education is to build up students' abilities to act—their action competence—with reference to environmental concerns" (p. 471). Examples were given of individual actions that could be accomplished by students. Jensen and Schnack also discussed the need to have students act on the larger environmental issues directly, which would occur when a student "decides to do something... whether it is a question of a change in behaviour or an attempt to influence the conditions of life" (p. 476). A similar view was held by one participant:

Because for the first years, 4, 5, 6, it's more taking care and teaching the different actions. Show them how to recycle; show them how to play in nature and stuff like that. As it goes on you can understand problems and the solutions.. ..Finally tell them the solutions like the Montreal Protocol and the fact that we can choose products that don't have CFC's. (T1 1-37; T1 1-49)

In this quote it appears that the interviewee would be in agreement with Jensen and Schnack in that teachers should be familiarizing their students with environmental actions.

The majority of participants agreed that teachers could have a positive influence by role modeling environmental behaviours. While role modeling by the educator can encourage students to emulate their environmental habits, this technique does not encourage learners to truly think about their actions. Therefore, this method may have limited impact on future actions, especially if the student is in a new context outside of the educational setting in which they had become habituated to the actions. As Jensen and Schnack (2006) explain, role modeling focuses on behaviour modification, rather than the thought and decision processes required before taking new actions. Educators could encourage action more directly by offering students experiences in which to "gain knowledge, form positive attitudes about the environment, and practice action skills" (Chalwa & Cushing, 2007, p. 441).

INFLUENTIAL EDUCATIONAL EXPERIENCES

Beliefs regarding teaching are influenced significantly by formative educational experiences (Taylor & Caldarelli, 2004). Many individuals enter teacher education programs already

possessing well-established views on the profession as a result of having spent a better portion of their lives as students within classroom settings. In the present study, many of the participants shared important educational experiences; however, there were surprisingly few comments regarding positive EE related formative experiences occurring in traditional indoor classrooms. As one educator stated, "The great irony is that is in school, we teach kids about the rest of the world within the confines of four walls as if somehow we can relate...it's a bit sad really" (T9-83). However, more of the educators did feel their university experiences, in arts, science, recreation or education degrees, had influenced their views and abilities with regards to EE. One educator in particular described being significantly influenced by completing a Master's degree, related to the environment that was based entirely on principles of experiential learning. She recalled:

We traveled on a school bus and we camped out every night. You're living in this community, so you have to deal with these people, yet every experience we did we talked about it beforehand and we talked about it after and it really made me look at my impact on the planet. I learned things that I'd never even thought about before. (T6-116)

University courses and programs were mentioned by nine of the educators as having been beneficial in learning how to instruct EE. They were useful to many of the participants as it assisted them in gaining subject-specific knowledge that had been useful to incorporate when instructing EE. All the participants viewed potential ways of using formal teacher education to help prepare other educators to instruct EE.

MAKING CHANGES TO TEACHER EDUCATION

The overarching trend among educators was to recommend various changes to teacher education. The interview participants provided a series of suggestions on how teacher education's content, course structures and admissions policies could be modified to better prepare new teachers for EE. As one participant stated:

If EE were the thrust in teacher training. If that was at the very core of it. If teacher training was EE, then everything would flow out of that and people would be able to better prepare our society to be adapted. (T 10-217) A number of educators focused on the need for content to be presented in manners more conducive

to EE, such as holistically. One interviewee thought that content would be best received if there was "integration across all subject area, curricula areas" and that future teachers would benefit from "tools and tricks, and tips for getting that knowledge transferred into engagement" (T5 -533). Another goal of EE in teacher education is for future teachers to see that EE transcends subject boundaries and can be incorporated everywhere. A participant's vision of this situation is a B.Ed. program where "you came out of it, thinking of yourself as an environmental educator even if you came in thinking of yourself as an art teacher or a French teacher" (T8-294). In order to accomplish this most participants thought EE must be present in the teacher education program.

More than half of the participants suggested that a mandatory course on EE become part of all teacher education programs. However, many teacher education programs do not include EE components. Participants felt that teacher education programs, particularly one-year degrees, have a very limited amount of time. This concern led one educator to question the need to perhaps have teacher education programs that were longer in duration, perhaps with "one year of general teaching and one year of specialty" (T9-511).

The need for a change to teacher education programs, specifically by having EE become mandatory within all such programs, was advocated by the majority of participants. This parallels the view that future educators need to be able to deal with "complex real world problems [and that] requires a significant shift in school curriculums" (Paige, Lloyd & Chartres, 2008, p. 23). However, there were mixed views among the educators regarding the way EE content should be included in teacher education programs.

Many jurisdictions have mandated that EE be incorporated in teacher education, for example Wilke (1985) shared how the state of Wisconsin did so more than twenty years ago. In Ontario, a recent report made a recommendation to have EE become a teachable subject, and it appears that the Ministry of Education may adopt this proposal in the near future (Ontario Ministry of Education, 2007a). One recommendation stated that all student teachers should be given training as well as the science behind environmental issues as EE "is a content area and can be taught" (Ontario Ministry of Education, 2007a, p. 10).

The interviewees had different views on how EE could be integrated. One quote exemplifies how an educator was divided on this issue, "I would say ideally, you do both. You have environment in other subject areas but you also have people who are specially trained and you have a separate subject called environmental studies, environmental science" (T9-547). This format of integrating EE would be allow for specialization in EE for interested educators, while still ensuring that all future teachers had been exposed to some minimum of EE content. It appears that having interdisciplinary courses could offer a solution, and this avenue has already been explored in the literature.

Bonnett (2007) considered that conceiving of EE as a holistic and cross-disciplinary would misleadingly imply the existence of "some single environmental grand narrative to be conveyed. Instead, it should be developed from within the differing perspectives that existing school disciplines have to offer" (p. 717). One interviewee considered the matter on a similar level, stating:

There is a need I think, for cross-disciplinary, not just in professional domains, but academic ones as well, reaching right down to elementary school. We need to be looking at the principle even in something like art, or even religion... .. There is this need for examination outside the boundaries to make sure that the principles being applied in history or geography, or mathematics, or literature, or religion, are consistent with the principles that are being derived elsewhere. (T 10-53)

Because universities are divided into faculties working from within their respective frameworks and theoretical underpinnings, offering courses that cross these boundaries can prove challenging. However, faculties of education may be excellent places to attempt these types of courses, as diverse subjects are already approached during the instruction of teaching methodologies.

DISCUSSION AND IMPLICATIONS

The participants whom I interviewed seemed to be passionate about their work, and appeared committed to doing their part to make their actions, and those of others, environmentally responsible. These individuals are currently part

of a subset of educators who are actively engaged in EE, despite that some had not had extensive EE in their own educational experiences. However, if EE becomes a formal part of the curriculum or public interest increases in the future, a broader range of educators may consider integrating EE in their practices. Therefore, the recommendations of these educators to begin implementing EE in teacher education more formally may be of importance in the development of future educators. However, assuming that not all teachers and educators will have had extensive previous knowledge or experience related to the environment, there should be means available to assist in preparing them to instruct EE. This could also be done using various methods, such as having EE become part of teacher education programs, as well as through mentorship experiences, and/or certification programs.

The purpose of educator preparation would be to assist in providing EE that surpasses merely teaching subject content but also includes some of the affective elements such as values and feelings that were viewed as important by many of the participants and in the literature. Having educators, who are environmentally aware, aiming to include outdoor experiences, and able to reflect on their practices, may permit second or third order learning on the part of the educators, resulting in a different quality of education for the students.

The educators' views in both the e-survey and the interviews were reflective of the importance of higher order learning as they selected knowledge and ability elements that would require reflection on different approaches and elements found in EE rather than merely improving the efficiency or effectiveness of current instruction. As noted in the results section, I had designated six of the top ten elements ranked by e-survey participants as being characteristic of third order learning. These included knowledge of place (i.e., experience of environment through local cultural history, geography, and ecology), as well as the ability to teach EE from a holistic perspective.

While my study did provide a snapshot of a number of environmental educators' views on a wider scope, it was unable to sufficiently delve into the particular options for implementing EE in teacher education or professional development. Therefore, of interest to investigate in future studies would be reviews of case

studies where EE has become part of teacher education, where EE certification programs are in place, or where professional development or mentorship programs for EE are being incorporated. In addition further elicitation of the views of educators working solely in non-formal contexts would be of interest to compare with those in my study, many of whom worked in both schools and non-formal settings.

In order for widespread environmental actions to occur, changes are required at various levels, including the political and economic realms. However, at a smaller scale, having individual educators who are capable and willing to integrate EE within their teaching practices is of immediate importance. Thus allowing students an opportunity to learn and think about their environment and future.

References

- Bonnett, M. (2007). Environmental education and the issue of nature. *Journal of Curriculum Studies*, 39, 707—721.
- Canadian Institute for Environmental Law and Policy [CIELP]. (2006). A survey of national environmental education and education for sustainable development laws and policies: lessons for Canada. M. Binstock & J. Gray-Donald (Eds.). Retrieved, April 21, 2007 from <http://www.cielap.org/pdf/EEESDpolicy.pdf>
- Chawla, L. & Cushing, D. (2007). Education for strategic environmental behavior. *Environmental Education Research*, 13(4), 437-452.
- Daskolia, M. & Flogaitis, E. (2003). Theoretical formulation and empirical investigation of a conceptual model of teachers' competence in environmental education. *Canadian Journal of Environmental Education*, 8(1), 249 — 267.
- Energy Information Administration. (2004, February). Official energy statistics from the U.S. Government. Retrieved April 22, 2007, from <http://www.eia.doe.gov/emeu/cabs/canenv.html>
- Environmental Education Ontario. (2003). *Greening the way Ontario learns: A public strategic plan for environmental and sustainability education*. Toronto, ON: Author.

- Hart, P. (2003). *Teacher's thinking in environmental education: Consciousness and responsibility*. New York: Peter Lang Publishing.
- Intergovernmental Panel on Climate Change. (2007, November 17). *Climate change 2007: Synthesis report- summary for policy makers*. Retrieved April 25, 2008, from http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf
- Jensen, B. & Schnack, K. (2006). The action competence approach in environmental education. *Environmental Education Research*, 3, 471—486.
- Karna, J., Juslin, H., Ahonen, V. & Hansen, E. (2001). Green advertising. *Greener Management International*, 33: 59 – 70.
- Korfiatis, K. (2005). Environmental education and the science of ecology: Exploration of an uneasy relationship. *Environmental Education Research*, 11(2), 235 — 248.
- Krathwohl, D., Bloom, B. & Masia, B. (1964). Taxonomy of educational objectives: The classification of educational goal _Handbook 11: Affective Domain. New York: David McKay.
- Lin, E. (2002). Trends of environmental education in Canadian pre-service teacher education programs from 1979-1996. *Canadian Journal of Environmental Education*, 7(1), 199 –215.
- Lucas, A. (1972). *Environment and environmental education: Conceptual issues and curriculum implications* (Doctoral Dissertation.) Ohio State University. (ERIC Document Reproduction Service No. ED068371)
- Natural Resources Canada, Office of Energy Efficiency. (2008 January 17). *Retrofit your home and qualify for a grant*. Retrieved April 25, 2008, from <http://www.oee.nrcan.gc.ca/residential/personal/retrofit-homes/retrofit-qualify-grant.cfm?attr=4#eligible>
- Noddings, N. (1995). A morally defensible mission for schools in the 21st century. *Phi Delta Kappan*, 75(5), 365 - 368.
- North American Association for Environmental Education. (2007). *The guidelines for the preparation and professional development of environmental educators*. Retrieved, January 25, 2008, from

- <http://www.naaee.org/programs-and-initiatives/guidelines-for-excellence/materials-guidelines/educator-preparation>
- Ontario Ministry of Education (2007a). Science and technology: Grades 1-8. In Ontario Curriculum. Retrieved April 22, 2007, from <http://www.edu.gov.on.ca/eng/curriculum/elementary/scientec18curr.pdf>
- Ontario Ministry of Education (2007b). Ready, set, green: Tips, techniques, and resources from Ontario educators. Retrieved March 20, 2008, from <http://www.edu.gov.on.ca/eng/document/policy/readySetGreen.pdf>
- Organization for Economic Co-operation and Development. (2008). OECDfactbook 2008: Economic, environmental and social statistics. Retrieved, May 5, 2008, from <http://ocde.p4.siteinternet.com/publications/doifiles/08-01-01gl.xls>
- Paige, K., Lloyd, D. & Chartres, M. (2008). Moving towards transdisciplinarity: An ecological sustainable focus for science and mathematics pre-service education in the primary/middle years. *Asia-Pacific Journal of Teacher Education*, 36, 19—33.
- Palmer, J. (1998). Environmental education in the 21st century: Theory, practice, progress and promise. New York: RoutledgeFalmer.
- Powers, A. (2004). Teacher preparation for environmental education: Faculty perspectives on the infusion of environmental education into preservice methods courses. *Journal of Environmental Education*, 35(3), 3 — 11.
- Puk, T. & Behm, D. (2003). The diluted curriculum: The role of government in developing ecological literacy as the first imperative in Ontario secondary schools. *Canadian Journal of Environmental Education*, 8, 217 — 232.
- Sobel, D. (2008). *Childhood and nature: Design principles for educators*. Portland, ME: Stenhouse.
- Sterling, S. (2001). *Sustainable education: Re-visioning learning and change* (Schumacher Briefing No. 6). Bristol, United Kingdom: Green Books.
- Tashakkori, A. & Teddiie, C. (Eds.). (2003). *Handbook of mixed methods in social and behavioral research*. Thousand Oaks, CA: Sage.

- Taylor, E. & Caldarelli, M. (2004). Teaching beliefs of nonformal environmental educators: A perspective from state and local parks in the United States. *Environmental Education Research*, 10, 451-469.
- UNESCO (2002). Teaching and learning for a sustainable future: A multimedia teacher education programme. Retrieved, April 23, 2008, from http://portal.unesco.org/en/ev.php-URL_ID=3994&URL_DO=DO_TOPIC&URL_SECTION=201.html
- UNESCO-UNEP, (1990). Environmentally educated teachers: The priority of priorities? *Connect*, 15(1), 1 — 3.