

PROFESSIONAL LEARNING COMMUNITIES AND THE
INTEGRATION OF ENVIRONMENTAL EDUCATION INTO TEACHING PRACTICE

By

LISA CHRISTINE VANDENDOOL

B.Ed., University of Western Ontario, 2006

A thesis submitted in partial fulfillment of
the requirements for the degree of

MASTER OF ARTS
in
ENVIRONMENTAL EDUCATION AND COMMUNICATION

We accept this thesis as conforming
to the required standard

.....
Thesis Supervisor, Dr. Liza Ireland

.....
Thesis Committee Member
School of Environment and Sustainability

.....
Dr. Chris Ling, Director
School of Environment and Sustainability

ROYAL ROADS UNIVERSITY

August 2013

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Abstract

This thesis project investigates the use of one elementary school's Professional Learning Community (PLC) as a means of increasing teachers' abilities and willingness to effectively integrate Environmental Education (EE) in their teaching practices. The study was conducted as an action research project. Teachers worked collaboratively to develop a learning project with a focus on environmental education, integrating multiple curriculum outcomes from Alberta Education's grade three Programs of Study with the intent to implement this project with their students. The PLC was found to be an effective vehicle for increasing teachers' awareness of and willingness to teach EE. It provided the space and time necessary for a more thorough exploration of EE and its importance within the Alberta provincial school system. The teachers were able to work together successfully toward a common goal and became more open to implementing EE by talking through concerns and focusing on commonly held values and objectives.

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Dedication

To this wonder-full, intricate, interconnected planet we call home, to its Creator through whom I live and move and have my being, and to my students- may your future be as bright as the light in your eyes.

Acknowledgements

A big thank you to the teachers at Royal Roads University who have challenged me, shared with me, and fed my mind and soul over the last two years. Thanks to my thesis advisor, Dr. Liza Ireland, who helped guide me through this journey with patience, clarity, and a great deal of insight. Thank you to the teachers who volunteered to participate in this study. Thank you for sharing your valuable time and insights with me. Dad, Mom, and Kelly, I couldn't have done this without your support and encouragement. Thanks for being a listening ear and a kick in my rear. Love you guys!

Chapter 1: Introduction

Background and Research Problem

As an elementary school educator, I constantly evaluate and re-evaluate my teaching methodology, and look for ways to enhance my practice. As a citizen who is concerned about the state of our natural environment, I am equally concerned with the state of environmental education in my home province of Alberta. Having taught for the last six years in a small northern Albertan town, I have come to realize that Environmental Education (EE) has been largely overlooked as a curriculum focus. The Alberta Council for Environmental Education (ACEE) recently conducted a poll of Alberta's youth, and found that they are not engaged in environmental behaviours, and do not have a high degree of environmental knowledge or literacy (ACEE, 2010, p. 8). The poll also found that the education system (teachers and classroom learning) and the workplace are the optimal communication channels for motivating youth to take actions to protect the environment (ACEE, 2010, p. 8). There are several factors that have acted as 'barriers' to the effective implementation of Environmental Education (EE) in Alberta. For teachers, these barriers include a lack of time, and a lack of resources (Thompson, 2004, p. 2). The EE curriculum document in Alberta is becoming outdated (last updated in 1990), and is not mandatory for teachers. Further, the EE curriculum document has been written for junior high grades, and there is no elementary curriculum for EE on the Alberta Education website.

For these reasons, it is time to make changes within Alberta's education system that encourage teachers to develop students' environmental literacy. One way that we can support our teachers in this process is through Professional Development (PD). ACEE has explored many options for increasing PD for teachers in the area of EE, and has focused mostly, up until

this point, on offering workshops for teachers (Worobec, 2012, Current Teacher Professional Learning Practices Section, para. 1). However, this model is quite limiting in that teachers must register themselves for these workshops, as well as receive consent from their school division to attend.

In order to effectively reach a wider range of elementary teachers, a new approach is necessary. ACEE recognizes that there are other methods of PD that have not yet been explored, including an exploration of Professional Learning Communities (PLC's) as a means for educating teachers about EE. They state, "there has been some discussion around the PLC trend but the environmental education community has not explored this area in depth and it is not a common term among environmental educators" (Worobec, 2012, Current Teacher Professional Learning Practices Section, para. 2). ACEE does, however recognize the merit of PLCs:

In education circles, the term 'professional learning communities (PLC)' has become commonplace. A number of school districts have embraced professional learning communities and many have created their own terms such as communities of practice. PLCs have been showcased as a way for school administrators and teachers to enhance their effectiveness to create school change and improvement. Teachers and administrators work together to plan instruction, observe and learn from each other and share feedback (Worobec, 2012, Trends in Teacher Professional Learning, para.5).

One of the benefits of using the PLC model for professional development is that the learning exploration can continue over many weeks or months. Worobec, the Education Director at ACEE, recognizes that, to her knowledge, "there are no environmental education groups in Alberta that focus on teacher professional learning with a long-term engagement over months or years" (Worobec, 2012, Current Teacher Professional Learning Practices Section, para. 2).

Currently, Alberta Education is in the midst of redesigning its entire curriculum. Its vision for the educated Albertan in 2030 is to create engaged thinkers and ethical citizens with entrepreneurial spirits (Alberta Education, 2012). This goal will be achieved through a number of approaches, which include placing greater emphasis on the application of attitudes, skills and knowledge through real-life experiences, as well as enabling more interdisciplinary learning (Alberta Education, 2012). This new approach to education appears to provide an opportunity to incorporate EE into mainstream education. It does, however, present a challenge for teachers to move past discipline focused learning into a more interdisciplinary approach.

The Research Project

In this research, I explore the use of the PLC model as a means for developing EE within elementary schools. Specifically I have asked, are PLCs an effective vehicle for:

- increasing teachers' understanding of EE?
- increasing their ability to effectively integrate EE into their teaching practices?
- increasing their confidence and willingness to teach EE?

I have conducted a case study in the form of an action research project in the elementary school in which I am currently employed, a K-3 school with a student population of over 400. We utilized our Professional Learning Community (PLC) sessions, which are roughly 45 min/week, to design, as a team of five grade three teachers and myself, an integrated, hands-on learning project that can be carried out with our grade three students.

The criteria for the learning project included a focus on EE and the integration of as many relevant curricular outcomes as possible. The PLC team, through discussion and a thorough examination of the grade three curriculum documents, created a school-based project that was

strongly based in curriculum and in nature. The teachers chose to focus the learning project on birds. Because of the curricular links in science to animal life cycles and building with a variety of materials, the teachers felt that this project could be strongly based in curriculum while providing them with a great deal of opportunity to teach their students about sustainability, nature and conservation. Through implementation of this project, which includes creating bird habitat and learning about animal life cycles, students will actively engage in a hands-on, real-life experience, in which they take action to make a positive difference in their world.

This project was sponsored by the Alberta Council for Environmental Education(ACEE). If the PLC Action Research Project proves to be an effective means of integrating EE into the elementary curriculum, ACEE is interested in including this case study in their Framework document for Alberta Education.

Chapter 2: Literature Review

In this literature review, I will examine some areas of research that are pertinent to my research topic. An exploration of Professional Learning Communities (PLCs) is followed by a review of some of the literature surrounding EE and its importance. I will examine the benefits and potential drawbacks of curricular integration, with a specific focus on integration of EE. Finally, I will investigate some of the predominantly held Western worldviews, how these worldviews influence our relationship with the natural world, as these worldviews may come into play during this research project.

Professional Learning Communities

The purpose of my research project is to explore the possibility of utilizing elementary school PLCs for the purpose of increasing environmental literacy in both teachers and students. An understanding of the benefits and barriers of the PLC method has been necessary for the successful completion of this project. PLCs, and in particular school-based PLCs, have been studied at length, and the findings are generally positive. Kornelis (n.d.), in his article “Professional Learning Communities”, affirms that students are more successful when their teachers are themselves supported learners. He views the opportunity for teachers to collaborate as a strength of this model, producing many positive outcomes.

In professional learning communities the culture of isolation and competition is transformed into one of shared risk-taking and problem-solving. By sharing a common vision for the fostering of student learning, teaching professionals commit to finding ways together of fulfilling the vision of their school. Because this shared vision is one that is reached by honoring the ideas, hopes and dreams of all stakeholders rather than reaching

compliance through fear and punishment, a culture of collegiality and collaboration is created. (Kornelis, n.d., p. 1).

Muirhead (2009) reaffirms the positive affect of collaboration stating, “teacher morale improves when teachers themselves are trusted to shape instructional plans.” Teachers become more empowered and develop a sense of agency. For this reason, “learning communities have the potential to generate educational changes within schools” (Muirhead, 2009).

While an increase in teacher morale seems to be a common theme when discussing the benefits of the PLC model, Vescio, Ross and Adams note that in their analysis of research that has been conducted around PLCs, “what researchers typically provided was more specific information on how the teaching culture changed as a result of teachers’ participation in a PLC” (Vescio et al., 2008, p. 2). The limitation to the research that they perceived was that although many researchers provide teachers’ self-reported data that indicated change in practice, teachers often provided no specific information regarding the nature of changes in their practice or thinking (Vescio et al., 2008).

The Importance of Environmental Education

As society has continued to develop, we have simultaneously become more and more disconnected to our natural environment. Children are spending much more time playing indoors, as their lives become more structured and sterile (Louv, 2009; Weeks, 2011).

“Increasingly, nature is something to watch, to consume, to wear- to ignore” (Louv, 2009, p. 2).

It seems that we are in the midst of a re-awakening to the importance of nature in our lives. With the recent publishing of literature such as Louv’s bestseller, Last Child in the Woods many are beginning to recognize how disconnected we have become from our natural world, and

the negative effects associated with this phenomenon. Louv coins this lack of connection ‘nature deficit disorder’, arguing that time spent in nature provides a wide range of positive outcomes, including its ability to alleviate the symptoms of those diagnosed with Attention Deficit Hyperactivity Disorder (ADHD) (Louv, 2008, p. 101). Many researchers agree that time spent in nature and nature education is essential to the well being of humankind and our planet as a whole. Weeks agrees that environmental education offers benefits in a wide range of areas, including increased health of students, especially in regards to ADHD and childhood obesity, as well as more thorough development during childhood (2011). She also shows EE as a fantastic educational tool, as it has the ability to excite students, offer authentic, hands-on learning experiences, and provide them opportunity for more thorough understanding (Weeks, 2011). Students who are excited about learning will receive higher test scores, and are more likely to drop out of school (Bonwell and Eison, 1991; Weeks, 2011). With child obesity rates, ADHD, and environmental degradation on the rise, perhaps we are coming to a place where we are beginning to recognize that something has gone wrong somewhere along the line, and it is time for a change in the way we view our natural world and the ways in which we function within it.

It cannot be denied that we have done significant and arguably irreparable damage to the planet we call home, and that immediate and effective action must be taken if we are to have any hope for a healthy and prosperous future (IPCC, 2007). It is the youth of today who are charged with the task of managing and repairing the damage that has been done to our natural world. They are being handed a world full of complexities, damaged global systems, and broken networks. It is essential for them to develop strong critical thinking and problem-solving skills in order to begin to deal with these highly complex challenges. If we are to make a shift toward a more holistic and sustainable future, a new educational paradigm is essential (Sterling, 2001).

Sterling calls for an educational paradigm that emerges “around the poles of holism, systematic thinking, sustainability and complexity” (Sterling, 2001, para. 1) insisting that this is necessary in facilitating positive change for a sustainable future.

According to Chawla and Flanders Cushing, “action for the environment in the home or in public arena like schools and communities requires a personal sense of competence and a sense of collective competence, or confidence in one’s ability to achieve goals by working with a group” (2007, p. 437). Their research also found that nature activities in childhood and youth, as well as examples of parents, teachers and other role models who show an interest in nature, are key ‘entry-level’ variables that predispose people to take an interest in nature themselves and later work for its protection (2007, p. 440).

Ultimately, the successful integration of environmental education allows students and teachers to reconnect with nature, and reap all the benefits associated with doing so. It is vital to the health and wellbeing of a person, and ultimately the well-being of the planet for our students to develop the skills and knowledge necessary to move toward a more sustainable future. Students who spend time in nature and who are explicitly taught how to take positive action for the environment are more likely to become citizens who are motivated and empowered to make positive change in this realm (Chawla et al., 2007).

Curricular Integration and Environmental Education

The future of Environmental Education (EE) within the province of Alberta will depend upon the ability of our teachers to effectively integrate EE into their teaching practices. Research has shown that there are multiple benefits of teaching EE. However, Paterson notes that “despite research showing that green classroom or co-curricular programs improve standardized test

scores, such programs have often been overlooked or slated for cuts or elimination by schools focused on testing data” (2010). Gabriel (1996) agrees that EE is rarely taught to children “due in part to a lack of environmental focus in teacher education programs” (p. 5).

It is my belief that the first step toward the successful implementation of Environmental Education within our schools is through curricular integration. According to Case (1991), it is important that we as educators examine our purpose and method of integration, as integration is not always appropriate, necessary, or effective. Case cites Tyler (1958), noting that “the effectiveness of curriculum organization in facilitating integration depends on the extent to which it aids the student in perceiving appropriate relationships” (p. 105). Case goes on to list the four main reasons for curricular integration, which include dealing with the complexity of the world, overcoming rigid perceptions of subject boundaries, respecting the seamless web of knowledge, and promoting greater efficiency (1991, p. 218). There is no better example of a seamless web, no better place to teach students how to become systems thinkers than in nature. Environmental education not only teaches children about the environment, but also teaches them about the interconnectedness of all things and the importance of taking a holistic approach to problem solving. Environmental education is perhaps the most logical subject of all to integrate because all of our human and non-human systems function within our environment, and our environment influences all systems to varying degrees. In addition, teachers who are already feeling overwhelmed with their workloads will be more able and willing to adapt EE into their practices if they are able to achieve greater efficiency through its integration.

The Influence of Worldviews on Environmental Education.

When attempting to influence teacher's integration of environmental education within the school system, as I am attempting to do with this research project, it is important to recognize and understand the dominant worldview that our society functions within. An understanding of some of the most commonly held Western worldviews is vital to developing an understanding of people's relationship to and with the environment. Our worldviews are the lenses through which we perceive the world, and from this place we live, make decisions and act. Ireland explains,

In looking seriously beyond what we teach to how we educate, to understand the extent and depth of this challenge, it is necessary to look not only at our present educational approach but also at the underlying societal paradigm that shapes our perceptions, values and guiding (often taken-for-granted) metaphors. These in turn will shape and direct our educational efforts. (Ireland, 2007, p. 3)

In the book Panarchy (2002), the authors outline some of our commonly held views, or 'myths' of nature, which include: Nature Flat, Nature Balanced, Nature Anarchic, Nature Resilient, and Nature Evolving. The view of nature as flat is described as the belief that there are few or no forces affecting the stability of the system, and no feedbacks or consequences from nature for human action, believing that human ingenuity can surmount all obstacles (Holling, C.S., Gunderson, L.H., and Ludwig, D., 2002, p. 11).

This coincides with the mechanistic view that Foltz (2003) describes. He claims, "the prevailing ethic toward the natural environment within the post-Enlightenment Western worldview has been one of domination and control" (p. 38). It sees the world not as something organic, but as a machine (Foltz, p. 38). Capra explains that the roots of this worldview began to take hold in the sixteenth and seventeenth centuries when the medieval worldview based on

Aristotelian philosophy and Christian theology, changed radically. “The notion of an organic, living, and spiritual universe was replaced by that of the world as a machine, and the world machine became the dominant metaphor of the modern era” (Capra, 1996, p. 19). The entire natural world was seen as mechanical. For this reason, it seemed logical to gain understanding by studying the parts and pieces of things, without giving much study to the whole. The whole was regarded as no more than the sum of its parts. Connections and interactions were not considered important (Capra, 1982).

Capra explains that we need to shift our thinking, learning to take a more holistic approach. He argues that “the behavior of a living organism as an integrated whole cannot be understood from the study of its parts alone” (1996, p. 25) and that the “important concept of the network- the web of life- provides a new perspective on the so-called hierarchies of nature. A shift in our educational system towards a more integrated, holistic, and systems thinking approach will help to challenge the mechanistic worldview that has so infiltrated our educational system, and allow our students to see the whole of nature, which is much more than the sum of its parts (Capra, 1996, p. 29).

Chapter 3: Methodology

Research Design and Rationale

This project has been conducted using the action research model. I have chosen to use this model because it aligns very well with the goal of this project, which is to explore one possible way we can make improvements to the ways we teach environmental education to elementary students in the province of Alberta. Action research, as defined by Reason and Bradbury (2001) is:

A participatory, democratic process concerned with developing practical knowing in the pursuit of worthwhile human purposes, grounded in a participatory worldview. . . It seeks to bring together action and reflection, theory and practice, in participation with others, in the pursuit of practical solutions to issues of pressing concern to people, and more generally the flourishing of individual persons and their communities. (p. 1).

According to Stringer (2007), action Research is “grounded in a qualitative research paradigm whose purpose is to gain greater clarity and understanding of a question, problem, or issue” (p. 19). Stringer holds that “recent developments in thought related to naturalistic, qualitative, and interpretive inquiry have opened the door for a much broader array of research, making possible more localized research that speaks to the issues of professional practitioners in training” (1999, p. xvii). There are a number of interpretations as to how Action Research has evolved as a methodology, but all hold to the same three fundamental aspects of the process. First, Action Research (AR) is rigorously empirical and reflective, second AR engages people who have traditionally been called subjects as active participants in the research process, and

third AR results in some practical outcome related to the lives or work of the participants (Stringer, 1999, p. xvii).

As a qualitative approach, action research does not seek to discover cause-and-effect relationships, but rather tends to ask more open-ended questions (Leedy and Ormrod, 2013, p. 140). Action research is particularly valuable in explaining what goes on in organizations (Avison, Lau, Myers, & Nielsen, 1999, p. 94). Stringer states that “the primary purpose of action research is to provide the means for people to engage in systematic inquiry and investigation to ‘design’ an appropriate way of accomplishing a desired goal and to evaluate its effectiveness” (2007, p. 6).

The objective of my research is to explore the use of Professional Learning Communities as a space for teachers to collaboratively build an action learning project for students with a focus on EE, while meeting a variety of curriculum outcomes from all Programs of Study. The aim of this project is to bring about change in the form of increased teacher understanding of how to integrate EE into their practices, and increased confidence and willingness to do so. Ultimately, the goal is to increase teachers’ abilities to teach EE effectively in an integrated manner. The nature of this project is collaborative, participatory, community-based, integrative, iterative, and change seeking.

McTaggart notes that, “the crucial difference [compared to other research approaches] lies in the commitment of action researchers to bring about change as part of the research act. Fundamental to action research is the idea that the social world can only be understood by trying to change it” (as cited in Brydon-Miller, 2003, p. 15). For these reasons, Action Research (be consistent in your use of capitals) is clearly the preferred methodology.

In the implementation of this research project, the research participants were not viewed as ‘subjects’ but rather participated directly in the research processes. Stringer notes that “action research is based on the assumption that the mere recording of events and formulation of explanations by an uninvolved researcher is inadequate in and of itself” (1999, p. 7). I recognize that these teachers are professionals with a great deal of knowledge and experience to offer. By bringing these teachers together in a collegial atmosphere where they are able to share ideas and build something of worth together, it allowed them the opportunity to feel agentic and empowered to continue down a path of positive change. Brydon-Miller notes that:

A respect for people and for the knowledge and experience they bring to the research process, a belief in the ability of democratic processes to achieve positive social change, and a commitment to action are the basic values that underlie our common practice as action researchers (2003, p. 15).

The process.

Action research is an iterative process with three main steps. There are different ways that action researchers have described this process, but the main tenants are the same. The first step as described by Stringer (1999) is ‘*look*’. During this phase, the researcher will gather relevant information (data), and define and describe the situation. The second step ‘*think*’, involves the exploration and analysis of what is happening in the situation, as well as an interpretation and explanation of why things are as they are. The third step, ‘*act*’, involves constructing a plan or report, implementing the plan, and evaluating the plan (p.18). Avison et al. describe a similar cycle: “Action research is an iterative process involving researchers and practitioners acting

together on a particular cycle of activities, including problem diagnosis, action intervention, and reflective learning” (1999, p.94).

I worked with the teacher (practitioners) as a researcher and fellow practitioner. Stringer notes, “As participants work through each of the major stages, they will explore the details of their activities through a constant process of observation, reflection, and action” (1999, p.19). During this research, participants were given opportunity to evaluate the current state of EE within the school, develop collaboratively an action plan (plan to form a learning project with an EE focus), carry out the action (create the learning project), and finally, reflect on the process. Participants reflected upon the process in their journals at the end of every session.

As I collected my data throughout the process, I continually reviewed and reflected on the information that I received. After each PLC I uploaded the audio recording to the NVivo data analysis program and transcribed it. While transcribing I looked for patterns or themes that began to emerge in the data. I read the participants’ reflective journals at the conclusion of each PLC meeting, again looking for themes and patterns, as well as allowing the feedback to help guide the process. The reflective journals were scanned and uploaded to the NVivo program weekly for later analysis. Creswell (2008) holds that when performing qualitative research, analysis can occur not only after data has been collected, but also concurrently with data collection. Formal data analysis, including coding and the identification of themes began after all data was collected.

This research project was conducted in the span of nine PLC meetings, over four months. During the initial session, we talked about the structure and purpose of an action research process, and our goals for the project. We brainstormed ideas for a focus area and listed some topics of interest. In the second session we read through the Environmental Education framework

document developed by Dr. Liza Ireland and ACEE for the purpose of acting as a guide for Alberta Education's new curriculum development in the area of Social, Cultural, Global and Environmental Responsibility. During sessions 3-4, we read through the grade three curriculum documents, and highlight curriculum outcomes that may be able to tie into the project. Sessions 5 to 8 focused on the construction of the action learning project. During the longer final session, the participants synthesized the unit plan and reviewed the EE Framework document, highlighting relevant indicators that we could tie into the project. During this final session we also reflected as a group about the process. Each meeting concluded with a 5-10 minute period for reflective journaling. This was a key form of data collection.

Contextual appreciation.

My particular research context is as a practitioner on a leave of absence. I collected my data as a researcher in the elementary school from which I am on a leave. I have worked in this school as both a kindergarten and grade one teacher, having taught grade one during the previous two school years. I performed my research with the grade three teachers as my research participants, a group that I have come to know quite well, and have worked with in many capacities.

Data Collection

There are multiple ways that data can be gathered during the action research process. Valid forms of data collection, as outlined by Stringer, include interviews, focus groups, participant observation, questionnaires, documents, records and reports, surveys, and the research literature (2007). For the purpose of this research project, I used a combination of data collection methods. Participants were interviewed upon completion of the project. They also kept a

personal reflective journal throughout the process. As the researcher, I kept notes and a journal throughout the process as well, documenting the process as the project developed. After the recorded PLC sessions, I documented attitudes, potential barriers, and other aspects of the project that I feel noteworthy. These notes, combined with the journals of the research participants, were used as one of my primary sources of data collection. Another main source of data collection was the transcripts of all of the sessions that I had audio-recorded and transcribed using the NVivo software.

Avison et al. outline the importance of the researcher's ability to explain the practice, in order to maintain validity. The action researcher may experiment on improving documentation of the research process through diaries and concept maps, where "explicit criteria should be defined before performing the research in order to later judge its outcome" (Avison et al., 1999, pg. 95). For this reason, I have provided my participants with specific goals, timelines, and topics for reflective journaling. Participants were provided with a list of questions glued to the front of their journals to help guide their reflection (see Appendix A).

Participants and Site

The research project was conducted at an elementary school that contains multiple classes at each grade level, making it an ideal situation for running grade-level Professional Learning Communities (PLCs). Currently, teachers are relieved from their classrooms once during every five day cycle for a 45 minute period, in which time they are expected to meet with the other teachers from their grade level. During this time, teachers are to choose an area of curriculum development to focus on. I came into the school at this time to facilitate the PLC, and conducted

the action research project using the grade three PLC group, composed of five teachers, as my research participants.

Other significant stakeholders include the Alberta Council for Environmental Education (ACEE), as well as the school division in which the project was conducted. ACEE has sponsored this project, and is interested in the project as the findings may be relevant to work that they are currently doing to enhance EE within the province of Alberta. Currently, Alberta Education is in the process of developing an updated curriculum and ACEE has been working in collaboration with them to develop a framework that will outline more effective ways of implementing EE in our schools.

Data Analysis

In order to analyze the data collected in a relevant and meaningful way, I engaged a process of analyzing information to identify significant, or key elements. Stringer recognizes that “interpretive inquiry typically produces large masses of information that has limited use in its raw form” (1999, p. 175). A reduction process of selecting, categorizing, and labeling information- establishes categories of experience that provide the framework and content of accounts that emerge in the body of the report (Stringer, 1999, p. 176). In discussing the plight of the qualitative researcher, Leedy & Ormrod (2013) warn:

Qualitative research requires considerable preparation and planning. The researcher must be well trained in observation techniques, interview strategies, and whatever other data collection methods are likely to be necessary to address the research problem. The researcher must have a firm grasp of previous research related to the problem so that he or she knows what to look for and can separate important information from unimportant

details in what he or she observes...And the researcher must be adept at wading through huge amounts of data and finding a meaningful order in what, to someone else, might appear to be chaos (p. 140).

There are two main processes involved in the data analysis, as outlined by Stringer (2007): categorizing and coding, and selecting and unpacking key experiences (p. 98). The first process, categorizing and coding, involves identifying units of meaning within the data and organizing them into a set of categories that typify or summarize the experiences and perspectives of participants (Stringer, 2007, p. 98). The second process involves selecting key experiences or transformational moments in the process as expressed by the participants and ‘unpacking’ them to identify the elements that compose them (Stringer, 2007, p. 98).

The journal reflections gathered from teachers, as well as my own, were transcribed, and coded using the online software program NVivo. The interviews, audio-recordings, and additional data collected were uploaded, transcribed and coded using the same program. This program is a web-based qualitative research application for data analysis that allows for the layering of attributal data to the original transcription data for deep analysis. It allows users to classify, sort and arrange information, examine relationships in the data, and combine analysis with linking, shaping, modeling, graphing, and searching data.

Codes that have been applied to the data include teacher’s perceptions, beliefs, values, and behaviours towards PLC’s and environmental education. Codes were established only after reading through transcribed materials multiple times to get a sense of what themes were emerging. Leedy and Ormrod note that, “the researcher often determines the specific characteristics to be studied only after carefully scrutinizing the body of material in search of potentially meaningful characteristics to identify and count (2013, p. 158). I implemented

Creswell's data analysis spiral (2007), where I read through the data several times and organized the data, breaking down large bodies of text into smaller units, inserting memos and comments of my own, and then identifying general categories, themes and patterns that emerged (Leedy and Ormrod, 2013).

Credibility and trustworthiness.

During the data analysis, I ensured the coherence of my findings through the use of triangulation, where multiple data sources converge onto consistent conclusions, and any contradictions with the data was reconciled (Leedy and Ormrod, 2013, p. 162). The three main data sources use include audio-recordings of the working sessions, reflective journals, and interviews with participants upon completion of the project.

When interpreting and reporting the data for my readers, I have acknowledged that I am influenced by my own values and biases. However, efforts have been made to minimize my own biases and opinions through the use of these strategies: collecting two or more forms of data, collecting data from a variety of perspectives, and making a concerted effort to look for evidence that contradicts my hypothesis (Leedy and Ormrod, 2013, p. 159). Stringer refers to this technique as "bracketing", where researchers must "bracket" their own understandings, intuitions, or interpretations as much as possible and focus on the meanings that are inherent in the world of the participants (2007, p. 99). To do this I used Stringer's *verbatim principle*, using terms and concepts drawn from the words of the participants themselves, with the hope that the researcher is more likely to capture the meaning inherent in people's experiences (Stringer, 2007, p. 99).

The quality of the data collection has been dependent upon my skills and abilities as a researcher. The strength and validity of the study is dependent upon my ability to effectively gather and analyze data throughout the study. In order to ensure accuracy in my interpretation, participants were contacted after the data analysis was completed, and the transcripts of their interviews, reflective journals, and audio-recordings were made available to them to review, in order to ensure that their voice was reflected accurately (Creswell, 2007).

Limitations and Delimitations

Delimitations.

This study is delimited to the five grade three teachers at an elementary school of over 400 students. My data collection is delimited to qualitative data collection methods, such as interviews, note taking, journaling, and participant observation. My research question is delimited to the exploration of the use of PLCs as an effective tool to increase teacher's ability to teach EE effectively with their classes. Although other avenues to increasing teacher's ability to teach EE, and other methods of professional development could be examined, the focus of this study was chosen due to its feasibility, and my interest in the subject.

Time was delimitation, as I had to work within a strict timeline in order to complete my thesis by July 2013. For this reason I was restricted to a maximum of three months, from November to February in which to work with the PLC group.

This project was also delimited to the development, but not the implementation, of an action learning project. Due to the time and scope restraints of this project, I researched the impact that the action research project may have had upon the teachers, but not the effects that the implementation of the action learning project may have upon the students.

Limitations.

In order for an action research project to be successful, “researchers and practitioners working together in this way need to share a mutually acceptable ethical framework...Successful action research is unlikely where there is conflict between researchers and practitioners or among practitioners themselves (Avison et al., 1999, p.95). To minimize this potential limitation the first meeting involved developing a shared framework for inquiry, where goals and decision-making processes were agreed.

Another limitation of this study is that it does not have the ability to draw descriptive or inferential conclusions from sample data about a larger group. I worked with a group of five teachers, which is a very limited sample size. Although I may be able to speculate results in another scenario, I am not able to generalize my findings. The findings from the study are representative of the particular group of teachers I have worked with, and the context they worked in. Although the outcomes are site specific, they may provide insight into the effectiveness of PLC's as an avenue for developing an integrated approach to teaching environmental education within our schools.

Chapter 4: Presentation of the Data

Throughout my research project I encountered many unexpected twists and turns along the way. Working with this group of grade three teachers was an experience that was both very rewarding and eye-opening for me. There were things that I expected to find, that I did not, and things that emerged that took me quite by surprise. I will begin the discussion by first examining the effectiveness of this PLC in terms of particular challenges, and then move to a discussion that deals more specifically with its ability to promote EE.

When I initially became interested in examining the school-based PLC as a potential vehicle for furthering EE, I approached the principal at my school of employment, and asked her if it would be feasible to work with one of the school's PLCs during the course of my research project. She thought it would be best to present my proposal to the staff at a staff meeting, and ask if there were any PLC groups that would be interested in working with me. After presenting my proposal to the staff, the grade three teachers approached me as a group and expressed their interest in working with me during their PLC time. The objective of the project, as I presented it to teachers, was to develop an integrated, hands-on unit plan with an environmental education focus that incorporated as many curricular outcomes as possible. Based on their interest, it was decided that I would work with the grade three teachers during their PLC time to develop the unit plan and explore my research question.

When I first began working with the teachers, they had already been meeting as a PLC for two months. A meeting schedule for the year had been established, and norms had been set.

Challenges Faced in Running an Effective PLC

As with any collaborative project, there were a variety of challenges faced by our working group. The group generally worked well together, and experienced success in the goals of the project. However, a variety of issues emerged throughout the process, including certain aspects of the PLC structure, aspects of the curriculum design, and participant attitudes that need to be acknowledged.

Scheduling.

One of the things that did not take me by surprise was finding that the teachers all felt that the PLC meeting times were not long enough to maximize our flow and efficiency. The PLCs at this school are set up in a way that the teachers meet for 45 minutes once during every five-day cycle while their students attend an assembly run by our Vice Principal and the Student Advocacy Counselor. This assembly is held directly after the children finish eating their lunches. Teachers are responsible for first dropping their students off in the assembly room, and then making their way to the PLC meeting room. Needless to say, by the time teachers rounded up all of their students, got them settled in the assembly room and made their way to the meeting, there was usually only 35-40 minutes left.

During the follow-up interviews, one of the questions that I asked the participants was what they felt were the main barriers to an effective PLC group. All five participants stated that they felt the main barrier was a lack of time.

Because our meeting times were so short, some of the participants expressed frustration with other members when they were 'off topic'. One participant stated that *"it's very frustrating to get anything done, especially sometimes when you have a goal...and everyone is on*

a tangent and nothing gets done. It's just frustrating." Other members seemed to feel that room needed to be allowed for discussions that were 'off topic', and that this should be taken into account when designing PLC meetings. One participant states that there was,

"limited time to get through everybody's thoughts, and stuff like that. Like, without enough time, not everybody gets to get things off their chest that they need to get off their chest. To get down to work, there's lots of things that have to be gone through before you get down to work. That's just the nature of the business."

Yet another participant also felt that lack of time was an issue, which made staying on topic more important. She did acknowledge that *"human nature is to get off topic easily, and to get talking, and sidebars, and things like that."* but felt that members should attempt to stay focused, as that getting off topic was *"not being respectful of the actual mission or goal for the day."* This participant also shared her difficulty in monitoring the conversations because she didn't want to hurt anyone's feelings.

As a facilitator, maneuvering through these meetings proved to be tricky at times, as the group had previously established norms and had been meeting together for over two months before I stepped in and we started this process. For this reason, and due to time constraints, we did not take time to review the norms that they had set out for their meetings at the beginning of the school year, and I attempted to step into the rhythm that the group had already established. In reflecting on the process afterwards, however, I should have taken time at the beginning of my time with them to review the norms, and stress the importance of staying on topic due to our time restraints. This being said, as a teacher myself, I recognize that teachers

often feel like they are an island, with very limited time in a school day to converse with colleagues, so when they do finally have the opportunity to sit down and converse with adults it is a challenge for them to completely avoid sharing stories and catching up with each other. Amongst the group generally, there was a very collegial atmosphere, with lots of laughter, story sharing (mostly laughable anecdotes about students and teaching). Although this ate up some valuable time, in my opinion, this 'off topic' element of the meetings was in itself of value, as it gelled the team, provided stress relief, and created an enjoyable working environment.

In addition to off-topic conversations, participants found that it took time at every meeting to review what had been done in past weeks, where we last left off, and how we had decided to move forward. One participant expressed in his journal,

"I am finding it hard to follow what is happening from week to week; this is a time constraint problem. I wonder if a full day would help round out the process. We would be able to focus without distraction and time pressure. In the middle of a busy day it is sometimes hard to focus."

In reference to the meetings, another participant stated, *"It's always like, ok, what did we do last week? And then we have 10 minutes [left]."* As the facilitator, I provided the group with a timeline of our weekly schedule, and goals for each week. Even with the general timeline and goals mapped out, a significant amount of time was spent revisiting the specifics and details of what was discussed and decided in previous meetings.

Our last working session as a group was not a regular PLC meeting, but the grade three teachers really wanted to dedicate an extra bit of time to this project, so they invited me to join

them during the morning of a day that was scheduled for them to meet together as a grade level. Not being restricted to the 45-minute time limitation, all of the participants noted a marked increase in the effectiveness and efficiency with which our group worked, and were impressed with how much we were able to accomplish that morning.

When discussing this marked increase in productivity, one member stated that, “we needed to divide.” During the last meeting, the group members were able to divide up into smaller teams to accomplish different tasks related to the project. One made phone calls to community members to gather support for the project. One member wrote up a rationale for the project, two members gathered resources related to the project, and one member worked with me to finish compiling the written unit plan. This style of working was not possible when our group was contained to a 45-minute block. Another participant noted that, on the morning of the longer working session, *“if you looked at the clock [this morning], by the time we got started and on track, 20 minutes had passed, so realistically, half of our PLC.”*

The participants were all very pleased with the amount of work that was accomplished in the final session. During the previous sessions participants often complained of feeling too rushed, distracted, unable to focus, preoccupied, and frustrated with not being able to get much done. However, during the final session none of these complaints were voiced, and the atmosphere in the meeting seemed much more relaxed and less frantic. *“There was no pressure,”* one participant explained. Participants seemed to feel rewarded and empowered after the final session, and began talking about the difference between the final (longer) session and the previous 45-minute sessions. One participant reflected, *“I think realistically our PLC should not be built into our schedule like that. I think it’s useless”*

Different working styles.

Another issue that seemed to be exacerbated by the time constraints of our PLC related to the different personalities, and working and learning styles of the various members of our group. These teachers all had different ways of working, and different ideas about how to construct lessons and unit plans. Because this was the first time that these teachers had ever worked together in a group to construct an integrated unit plan, this project, at times, proved especially challenging. Some of the older teachers in the group leaned more towards putting together a binder of resources that they could access, while some younger teachers refused, said that they would absolutely not use a binder, and suggested that we compile an online unit plan with links to relevant websites, videos, graphic organizers, etc. In the end, the group agreed to put together an online unit plan, with the option to print off resources and compile in a binder for those teachers desiring hard copy materials.

Some teachers stated that they would rather work on their own, while others preferred working as a member of a group. One participant journaled,

“I hate group work. I hate dealing with others and their nonsense off-topic conversations. I hate when people go on a tangent and are off topic. It is incredibly annoying and nothing gets done. I’ve always hated working in a group because usually I or two people do all of the work and the others in the group do nothing but gab about irrelevant ‘crap’ and they are unable to contribute anything useful to the group project. In my opinion, for effective PLC there should be only two people involved to get anything worthwhile accomplished. Even when ‘norms’ are in place, people still do not get their work done in the way

it is supposed to be... I can't stand wasting my time in PLC meetings. Some people just don't get it."

This strongly worded journal entry voiced the frustration of a member who was task-oriented and valued efficient and effective use of time, and had a difficult time dealing with situations where she felt that others did not place the same value on their time together as she did.

Conflicting attitudes and personalities.

It became evident to me that some members of the group were more task-oriented, while others were more people-oriented in their personalities. The task-oriented members seemed to become agitated when other members of the group began 'chit-chatting' about subjects deemed 'off topic'. As you may have previously noted from the above discussion, this agitation seemed to become amplified when the task-oriented participants felt rushed for time.

Some participants viewed the differences among members as a weakness of the group, while others perceived it as a strength. When one member was asked during the final interview what she regarded as the main barriers to an effective PLC group, she listed, "*differences in opinions, people's own emotions and stuff getting into things.*" This same participant journaled,

"I am learning through the process that large PLCs are very difficult to get much accomplished. Also, time continues to be a problem; there isn't enough of it. I understand people have differing opinions and work at different rates/speeds/think differently, but I find it frustrating."

On the other hand, another participant stated during her interview, when asked in what ways she thought PLCs to be important and/or effective, *“They are both important and effective because it gets us talking and sharing. All of us, even though we're all different and teach in different [ways], we are on board with what is essential.”* While she acknowledged the differences between members, she felt that the talking and sharing among colleagues was vital, and that they found common ground in essential areas. Another member journalled, *“We have an excellent team with different skills.”*

Although the differences between members were perceived as either positive or negative, the general feeling among members of the group was collegial, and most members agreed that the group worked very well together. The negative feelings and moments of frustration that were experienced by some members were perhaps amplified due to the time constraints faced by the PLC. During the 45-minute PLC sessions the atmosphere was more tense and rushed. All of the frustrations expressed by group members were either during or after these sessions. However, none of these sentiments were expressed after the longer PLC session.

Response to the First Reading of the EE Framework Document

During the first session with the participants, the main objectives were to familiarize the participants with the steps in an action learning project, to define the goals and parameters of our project. We brainstormed some ideas for an integrated unit that would have an EE focus that were feasible and that the students and teachers would have an interest in. During the second session we read through the indicators in the Environmental Education Framework document that was recently put together by Dr. Liza Ireland, while working with a multi-stakeholder

advisory committee, for the Alberta Council for Environmental Education. The aim of this document is to help integrate environmental education into the Alberta K-12 Curriculum. I had suggested to the group that we read through this document to give them a better sense of what EE encompasses, and to perhaps incorporate some of the indicators from the Framework into our project.

As we read through the document during the second session, we highlighted indicators that we felt might fit into our integrated unit plan. The teachers' reaction to the framework document was mixed. Because many teachers did not have much familiarity with EE, there was some confusion about the wording of some of the illustrative examples, as well as a general lack of comprehension regarding the indicators (see Appendix for EE Framework's Learning Outcomes for ages 5-10). Many of them voiced that it would be easier for them to understand the meaning of the indicators if they were provided with illustrative examples to accompany the indicators (the same as provided along with the Alberta curriculum documents). One participant says, *"It would be nice to have some examples of what that looks like- like a descriptor. You can take your own interpretation of it, and I might interpret it differently than you might, so it might be good to have a few illustrative examples."*

There was a marked sense of frustration that the participants shared in their reflective journals after the first two sessions. There was a sense that these teachers were having difficulty investing in, or seeing the relevance of the project we were working on before the curricular connections were made. After our second session, where we read through the EE indicators put forth in the framework document, one participant journaled the following:

“I’m not really sure what the end result [of this project] will look like, and I’m not sure if it will be worthwhile. Often I find change difficult, so introducing this idea of ‘environmental education’ into my current teaching practice seems difficult and unimportant at this point. Until I am forced to use the curriculum, I don’t think I will change anything with my current teaching practice. I already do ‘environmental education’ and I am not ready to do more.”

Lack of familiarity with Environmental Education

As you may have gathered from the above section, there seems to be mixed feelings amongst these teachers with regards to environmental education. On one hand, they recognize the value (at least to some extent) of EE to their students. On the other hand, they have a strong sense of responsibility to teach the students content that is outlined in the Alberta curriculum documents, and recognize that they are not explicitly mandated to teach EE. The following section outlines some of the barriers that this group of teachers faced with regard to teaching EE, followed by an outline of how the PLC was used as a vehicle to work through some of the issues teachers encountered, and give them the tools necessary to incorporate EE effectively into their teaching practices.

Because teachers often feel that there is not enough time in a school year to thoroughly cover all of the specific learner outcomes outlined in the provincial curriculum documents, anything that is regarded as periphery or that lies outside the scope of the curriculum, tends not to be a priority. This may be especially true for grades where students are expected to write provincial achievement tests (PATs), a form of standardized testing used to measure student success across the province of Alberta. The grade three students in Alberta are required to write

the PATs at the end of the school year, so these grade three teachers do feel an added responsibility to cover all curricula thoroughly. One teacher commented, referring to the grade three curriculum, *“The amount of stuff we have to cover in our curriculum this year, is like...overwhelming!”*

The absence of a relevant Alberta Ministry of Education environmental education curriculum document for elementary students is significant in many ways. First and foremost, it shows a lack of priority on the part of the province with regards to environmental education and stewardship, which translates down to both teachers and students. Secondly, it was evident from working with this group of teachers that there was a significant gap in their knowledge base pertaining to EE. This was demonstrated clearly near the end of our second session together, after completing the reading of the EE Framework Document, where one teacher expressed *“What is environmental education? I don’t even know what it is.”* As you can imagine, this took me quite by surprise. After all, I had clearly explained the purpose of my research project to the entire school staff before we started, and the grade three PLC team had approached me and expressed interest in working with me to develop an integrated unit plan with an EE focus. For this reason, I assumed they understood the value and purpose of environmental education. We had then spent the first two sessions talking about the scope of the project, and reading through the Environmental Education Framework document recently developed for upcoming revisions to the Alberta K-12 curriculum. As a researcher, I made the mistake of assuming that this group of teachers had a baseline of knowledge regarding EE similar to my own. However, this turned out to not be the case at all.

It struck me that perhaps this lack of familiarity with EE is not isolated to this particular group of participants, but rather common among Alberta’s educators. With a lack of priority

given to EE, and no mandatory EE curriculum, many teachers have very limited exposure to EE themselves. If they lack familiarity with the subject, they may lack confidence teaching EE because they themselves have never been exposed to it. It is likely that most or all of these teachers were not taught EE while in grade school, and were not taught how to teach EE while studying to become teachers. Furthermore, there is a distinct lack of professional development pertaining to EE that is available to teachers as professional development made available to teachers in this province focuses primarily on mathematics and literacy.

One conversation that I had with a participant seems to suggest this is the case:

Me: Would you say that you currently teach environmental education in your classroom?

Participant: No

Me: Why not?

Participant: Never thought of it.

Me: Hmm

Participant: That's what would make the curriculum document important right?

Staying United and Motivated

It was clear to me after listening to the comments made in the first two sessions, and from reading through participant journal entries, that these teachers were lacking a clear direction with this project, lacking a clear understanding of EE, and were frustrated by the time constraints and by differences in opinions among group members. I realized that we needed to find common ground to work from in order to allow this project to move forward. To my great delight, we

were able to find this common ground during our third session, when we began to integrate the grade three curricula into our project.

Curriculum as common ground.

Being able to refer back to the prescribed grade three curriculum was definitely a uniting factor for this group. Although each teacher had their own ways of doing things, the curriculum document kept us focused on a common goal. In the third session we began to examine the curricular outcomes that could be met through our integrated unit. The participant, who had previously shown the most distain for group work and the project, wrote in her journal, *“After PLC today I feel that things are starting to make more sense, and connect to relevant curriculum.”* She commented again later, *“After highlighting more outcomes it is clear that doing this project will incorporate many outcomes in many different curricular areas.”*

After beginning to link the project with relevant grade three curriculum, other participants expressed similar sentiments in their journals. One member writes, *“I really like that we are fitting specific learner outcomes into our task. This really brings home how important this project is. Our group seems to be functioning more efficiently.”* Not only did this participant note that it was the incorporation of the curricular outcomes that made this project important to her, but also that the group seemed to function more efficiently when able to focus on curricular connections. The same sentiments were shared in another participant’s journal: *“Some good curricular connections were made today. Things are moving in a positive direction.”* The curriculum document was a key element in shaping this project, and keeping teachers focused on a common goal.

The importance of integration.

These teachers not only became excited about the project because they began to see curricular connections, but also became excited about how well a variety of different outcomes began to fit together into one cohesive unit. Now, instead of viewing this project as just one more thing to add to their plates, they began to see it as reducing their workloads as they were able to cover such a variety of outcomes in one unit.

Integration may be of particular importance within the field of EE, both in making connections to the prescribed curriculum, and as a ‘time-saver’. At this point in the history of Alberta’s education system, curricular integration of EE may not just be logical, but also necessary if it is to be added to teachers’ already overloaded schedules. Teachers often feel that they don’t have enough time to get through the entire curriculum they are expected to cover in a given school year and they are not eager to take on more, especially if it is not aligned with curriculum. One participant states:

“I like the idea of being able to do it [EE], but with testing, and time constraints and stuff like that, it's difficult. In a perfect world it would be great to do all learning project-based like that right? Like, I'd spend all spring doing that. And not worry about it. Because I think the kids will learn more from doing that than they will from all the other stuff we have to do. But we still have to do all the other stuff, right? And fit it in. So, in a perfect world I would love it. It would be way more interesting for everybody. Unfortunately, it's not a perfect world, so...”

It is evident that these teachers are feeling overloaded and unable to add anything else to their workload, unless mandated to do so. This is the reason that the participants displayed

hesitancy with the project until the third session, where they were able to make curricular connections, and realized that this integrated unit would not be adding to their workload, but rather, through integration, reduce their workload.

An integral part of EE is in developing the ability to perceive and understand the interconnectedness of all things. One teacher in the group asked me what the difference was between EE and science. We talked about it as a group for a short time, and one of the things that came out of our discussion was the feeling that EE is more value-based. Science teaches us the ‘what’ but EE can delve into the ‘why’. As a group we discussed that while science is more likely to be dissected, EE can fit the pieces together and teach students about how all things are connected. According to the National Environmental Education Advisory Council, environmental education is what can best help us as individuals make the complex, conceptual connections between economic prosperity, benefits to society, environmental health, and our own well-being. (Report to Congress, September 2000). If our students understand the interconnectedness of nature, and realize that we are a part of nature, then they will understand the importance of preserving nature, as we are also preserving ourselves.

Curricular integration was a key aspect of this project. When originally designing this project I knew that in order to be granted approval to do a hands-on, environmentally focused project within the school it would need to be strongly based in curriculum. Since there is no EE curriculum, the only option was to integrate the other subject areas wherever we could. I was not at all sure how this was going to turn out, as neither I nor any of the other teachers in the PLC had ever taken on a project like this before.

We knew we wanted to integrate different subject areas, but we didn’t know the best way to go about doing this, so we just began reading through the curriculum documents. Before we

began reading through these documents, we had brainstormed a few ideas for action learning projects that had an EE focus. The teachers agreed that they would like to do a project that incorporated our newly constructed school garden, but they weren't sure what the focus should be. As we read through the science and social studies curriculum documents we began to realize that 'gardening' didn't necessarily fit as well into the grade three curriculum as we thought. Learning about plants and plant life cycles was covered in grade one, where the grade three science curriculum focused on animal life cycles, as well as building with a variety of materials. While reading through the outcomes for these sections, the idea slowly emerged to develop an integrated unit about birds and bird habitat. The students would learn about bird life cycles, while constructing different structures to support the bird habitat, such as bird feeders, houses, and baths. They would invite guest speakers from the Lac La Biche Birding Society to talk about bird habitat, and the importance of nature conservation. The teachers also planned to make connections between the bird unit and our school garden through activities such as planting a bird garden and discussing the ability of birds to manage pests in the garden.

It was an amazing experience for me to watch this plan emerge and evolve. The teachers suddenly caught fire as their passion was ignited, and all of a sudden their vision was clear. They could clearly see that this project was strongly curriculum-based, while getting the students outside and providing them with a hands-on, authentic learning experience. Reading their journal entries after this session, it was clear that they had become suddenly energized about the project. Here are some excerpts from different participants after that third session:

"I really like that we are fitting specific learner outcomes into our task. This really brings home how important this project is. Our group seems to be functioning more efficiently."

“After PLC today, I feel that things are starting to make more sense and connect to relevant curriculum. I think the idea of “Backyard Birds” is a great one because it already has connections to many outcomes in science (building, animal life cycles) and even language arts research. I can see the garden environment encouraging butterflies and birds to enter our environment. I like the idea that birds can be observed year round.”

“I’ve realized how sharing and looking through the outcomes of science our project would be integrated. We wouldn’t be adding work to our load, rather it would be making our load easier. PLC is going efficient- no problems- sharing is wonderful. It works well!”

“Process is going well... lots of good curricular connections.”

Through these comments and through observing a marked increase in the willingness of these teachers to move forward with this project, it became evident to me that I had needed to meet these teachers where they were at. They were hesitant to take on an EE project until they were able to see the relevance of the project to them personally. The PLC process provided the space and time necessary to get to know these teachers, their values, attitudes and priorities, and work with them to weave EE into their practice in ways which were personally relevant and motivating to each of them.

As teachers, we all agree that curricular integration is important, but I was curious to see what these teachers felt was the purpose of integration. To me, as an educator, I see the most important reason for curricular integration is to allow students the opportunity to make connections across disciplines and increase their understanding in a way that allows them a fuller appreciation of the ways in which all things are interconnected. In developing this understanding, students may simultaneously develop a greater awareness of their own interconnectedness to the natural world, and the importance of protecting and conserving nature. I wondered if the other teachers felt the same, so during my final interviews with the teachers, I asked them why they felt that curricular integration was important. The following are their responses:

“I think that when you can integrate different curriculum, like our social, our science, and then the physical and the affective domain, and things that this project lends itself to... it's quite amazing. And I think that the children won't even realize they're learning. They won't even realize that they're in school. They'll just think ‘Wow! We got to do this today! We got to do that today!’ And again, that's just sort of the best learning there is out there for children.”

“Well, just like with anything, when you teach anything integrated, the kids make more connections and they get a better understanding of it. Whereas if you teach it in isolation they don't necessarily understand it as much as they could.”

“It's been proven that integrated is very effective, because you're first of all covering so many outcomes, and we've got to see that. We've got to be able to see that. Even though I'm teaching the social studies, there's still tons of language arts outcomes that im covering. So, taking something and making it into a unit, get's the kids to... you can do more of it, rather than individual here and there and isolated. So it's the time again, and getting them motivated, with something like birds.”

“It's going to make a positive effect, obviously (well, obvious to me) but, it's the whole integrating things helps make more connections. And more connections means more learning. Research tells you that, but most of us knew that long ago. That's what makes it a good learning experience.”

Overall, the participants perceived integration to be an effective tool for increasing student learning due to the increased opportunity for students to make connections, and apply their learning in different situations and subject areas. Participants also saw integration important as a time-saver. They felt that curricular integration allowed them to cover more curricular outcomes in a shorter amount of time. Although teachers may not have made direct connections between the value of integration and environmental education, they realize that integration provides students with a more well-rounded understanding of what they are learning about. An integrated unit that connects the curriculum with nature, such as the unit we created, is a form of EE, even if the label is not recognized.

What's best for the kids.

Throughout my time working with this group of teachers, the other very clear motivator for all of the teachers was doing what was best for their students. When I first asked them if they would be interested in working with me on this project, they immediately associated the project with the garden project that I had spearheaded at the school the previous school year. Although this project had no direct connection to the garden project from the year before, the teachers referred back to that school garden time and time again throughout the course of our meetings. They expressed repeatedly how excited their students were to plant the veggies, water them, watch them grow, and harvest them. They talked about the learning that occurred with the students as they built birdhouses, brought them home, and watched with awe as the birds took up residence in their backyard trees and had babies. Because these teachers had already experienced the positive effect/affect that this project had upon their students, I believe this opened their minds more to the benefits that environmental education can bring to their students. Although they may not have identified the garden project as 'environmental education' at the time it was taking place, they did value the learning experience that it provided the students. The following are some of the statements made by the participants in regards to their students:

"I like that we have kept the garden part of the project- it means so much to our students to become involved in a school-wide activity. I am now more aware of the EE focus."

“I am excited to see the children’s designs for the bird feeders- we will be researching it tomorrow in computers.”

“I do think this PLC is worthwhile because we are attempting to do something that is the best for the kids.”

“Learning how to care for our world is important for the kids to learn.”

“If we could do projects that are good for kids regularly, that would be nice.”

“To see how it affects the kids would be my overall evaluation of the whole thing. If it's really good for the kids then it's worth doing, and if it's not, it's not. You can't know that 'til you try it. But the process has worked well.”

“It's a child-centered project. It's not about testing, it's not about gathering data and smart goals and all that stuff. It's about doing something that would be beneficial for the kids for a lifetime. It's a big global idea, which is nice. Right? It's what teaching should be about. Not all this other nonsense.”

At the end of the project, during the final interview, the same participant who had questioned *“What is environmental education?”* when questioned on whether his view of EE had changed over the course of the PLC, stated the following:

“It's changed my perspective on how we maybe do it in the school. Maybe more importance of it than I thought before, possibly. Just kind of never really thought

of it before, but it's important to think about I think. Especially when you think about teaching little kids, and changing minds and stuff like that, right. It's one of those things that does need to change."

These admissions by teachers that they had simply not thought to teach environmental education up until this point in their teaching careers indicates a possible gap in our educational system that needs to be addressed. However, it is interesting to note that, from this statement above, it is evident that after only nine brief PLC meetings the participant's attitude toward environmental education began to shift significantly.

Response to Second Reading of the Environmental Education Framework Document

One of the key limiting factors in the development of this EE focused project was a lack of clear direction due to the absence of a provincial EE curriculum document. Teachers acknowledged that teaching their students about the environment, conservation and sustainability was important but they seemed to have no frame of reference for where to begin or how to build an environmental ethic with our learners. Because we did not have an EE curriculum document, we decided to try to incorporate some of the indicators laid out in the draft Environmental Education Framework document (Ireland, 2013). We had read through the Framework once during the second session, but because of the teachers' lack of familiarity with EE, and because we had not yet decided on a focus for our unit plan, we were unable to pull in any of the EE indicators outlined in the framework at that time.

Significantly, teachers had much less difficulty interpreting the EE framework document the second time we read through it, during our very last session together, once they had a context

to relate it to. When we read through the document the second time, we had spent a significant amount of time on our project and had a clear vision of what we wanted to do. The purpose of the second reading was to highlight the indicators that would fit into the project that we had constructed. The teachers now had a frame of reference for the indicators (that being the vision of our bird habitat project). This frame of reference, perhaps, acted in almost the same way that illustrative examples would, and gave the teachers a clearer understanding of the indicators.

One participant expressed that she was glad that they were not responsible to teach the indicators outlined in the EE framework document as she already felt overwhelmed with the amount of curriculum she had to cover during the grade three year. She remarked,

“I see this [EE indicators] as fitting into both social and science, and I'm hoping that's how we can do it. Bring a little bit into different subject areas. You could always bring it into language arts too. But it is big. Like you were saying, there's no way we could just [add this curriculum on] not this year. Not the way our curriculum is dealt with right now. And I know this is part of a futuristic thing because it's quite involved and there is so much to it.”

Other teachers expressed the same sentiment. They felt that an EE curriculum document would be feasible only if teachers were able to easily integrate the outcomes with what they were already expected to teach. One teacher, when thinking about the possibility of teaching EE, stated,

“For these [indicators] to be do-able they have to be integrated into the curriculum effectively, because a teacher's not going to say, 'Ooh I have this

separate document, I'm going to teach this on top of whatever I'm already doing, and have it not connect' right?... It has to be an easy and logical connection. It can't be obscure."

Significantly, the teachers were able to understand this document more thoroughly when they had a context to apply the indicators to. They were also more open to incorporating the EE indicators into the project when they were able to see how the EE indicators could be integrated with other curricular outcomes that they were required to cover. Teachers will more readily adopt a provincial EE curricular document if it contains strong links to other areas of the curriculum that they are required to teach.

Worldviews, Attitudes and Values

Participating in this project with these wonderful, educated and dedicated teachers was such a great learning experience for me in so many ways. One of the biggest lessons that I learned in working as a member of this group was that not all teachers view environmental education the same way that I do. Even though these teachers willingly and eagerly signed up for this project together as a group, there was still a certain amount of resistance to the notion of teaching EE to students. Teachers felt that EE held ties to certain attitudes and values that they would be responsible to teach, and some worried that they may not agree with the values that they perceived to be attached to EE. One teacher asked, when attempting to clarify the purpose of EE, *"Is it to teach the kids that we're all one with the universe kind of thing? Like is it this hippie stuff? Or is it...I don't know what it is."* He was genuinely concerned that he would be required to teach his students values that he did not agree with. The other teachers in the group

expressed similar concerns. The following is an excerpt from a conversation that took place during one of our sessions:

Participant 1: *"I guess I'm playing devil's advocate a little, just because, we're kind of preaching to the kids that the environment is really important, which it is. But, in a way we're trying to teach them values that might not necessarily reflect what's at home. Do you know what I mean?"*

Participant 2: *That would be my concern."*

Participant 3: *"But that's part of everything we do as teachers. I know exactly what you're saying, but it's the same as a lot of things we have to teach as teachers. A lot of it's not taught, or re-enforced, or even believed in."*

Participant 4: *"But connecting to what she said, or even what [participant 2] said, talking about going shooting animals. Some people...their values might be PETA and destroying animals and furs is a bad thing, whereas, if you look at our culture here, they depend on that for their survival."*

Participant 2: *"It's a lot different here. There are kids that I have in my class, that have more experience in knowing about nature than I probably ever will, because it's part of their whole..."*

Participant 3: *One of my parents called in and said 'I can't come in today because I've got two deer on my table' and I can't even imagine, right!"*

Participant 5: *"What I see is the relationship between people."*

Participant 1: *“But there's still lots of preaching about things that happen... I don't really want to be preaching to the kids that the environment is more important than people, because to me people are more important than grass.”*

Participant 3: *“I think it really depends on how we're teaching too.”*

Participant 5: *“That's why you need the examples. Rather than you're worshipping the environment, you depend on the environment for, some people, you depend on your environment here.”*

Participant 2: *“That makes sense! Yep.”*

Participant 4: *“I think it's just developing an understanding that we influence our environment and we can potentially destroy our environment. I think it's being mindful of that so that we protect it and don't destroy it for future generations. I think we kind of want to get that idea in their heads, because what's going to stop them when they become adults from spilling oil in a lakes and doing those sorts of things.”*

Participant 2: *“Yeah, that's social responsibility.”*

Participant 3: *“Helping the environment is helping yourselves, and helping others.”*

Participant 1: *“Yeah, and I totally agree with what you are all saying. I'm just saying that sometimes it's kind of pushed down our throats a little bit.”*

It was clear that this group of teachers did not initially identify with the term ‘environmental education’ in as positive a way as I had hoped. Some of them associated EE with the term ‘environmentalist’, a term that carries negative connotations for some people, or

conjures up images of hippies chaining themselves to trees. There were members in the group with strong religious affiliations (Muslim, Christian), who may have been concerned that EE was attempting to replace worship of God with worship of nature. There were many factors at play in forming the worldviews, attitudes and values of the members of this PLC in a small, conservative, religious, northern Albertan community where the Oil and Gas Industry is what drives our economy.

As the facilitator of this PLC group, this conversation initially took me quite by surprise, and I was not immediately sure of where to go from here. As the researcher, I tried throughout this process to find the line between ‘objective observer’ and ‘active participant’. I realized that in order for this project to proceed, the teachers had to feel comfortable with what we were doing and the direction in which this project was developing. I took a few moments to regain my bearings, and then attempted to re-assure the group, appealing to the values that are most common amongst people everywhere- health, happiness, and relationships. The following (although far from eloquent) was my response:

“We do need to take care of our natural spaces, and we rely on our natural spaces for our livelihoods right? So I mean, within that, there's a broad range of what that entails. That's the challenge. Because there are varying perspectives on what is okay. To what degree do we need to go to protect our environment? Some people think that the world's coming to an end. There are people that don't believe in climate change. But I think we all believe in health, happiness, family, the things that connect us are the things that we want to protect. And I think it's... teaching EE effectively is finding those commonalities with people.”

Again, just as this PLC used the curriculum document to find common ground among the group, the PLC was instrumental in finding common values in the same way.

After this conversation took place, I was unsure as to where the participants stood on the issue of environmental education, or what they had taken from the session. However, throughout the course of our following sessions and final interviews there were many comments made by the various participants that indicated that there was a deep care for nature among them. It was just expressed in different ways. Although most participants seemed to not identify with the term 'environmental', the desire to preserve and protect our natural environment was still very much present. One participant commented in his final interview, *"Even the way we think in Alberta, there's still an environmental responsibility. Like, even though I'm not really an environmentalist, I still see the sense of it. I still have a sense of environmental responsibility right?"*

I had one of the best moments of my time with these teachers during the final moments of the final session. The one participant who had displayed the most resistance, and questioned the idea of EE the most throughout the study, volunteered to write up the rationale for the unit plan that we had put together for the students. He sat there quietly typing away for the next 15-20 minutes and then quietly handed me what he had completed. The following is what he wrote:

Environmental Education: Project Rational

In a world reliant on fossil fuels, processed food and video games, children are becoming continually less connected with their natural environment. They spend most of their time in constructed environments designed to distract; these environments may be

within the manipulated realities of video games, movies and TV shows, or inside homes schools and sports complexes.

The purpose of this project is to reconnect our students with the environment that surrounds them. Through the construction and maintenance of a school garden our students will be provided with an opportunity to create and explore a natural environment. It is our hope that this interaction will help our students become more involved with, or understanding of, environmental issues prevalent today.

Spending time in a man-made natural space should provide a point of comparison that will allow our students to look at natural and unnatural environments surrounding our community. Looking at animal life cycles – birds specifically – and building bird houses and feeders will connect this project to specific grade three science curricular outcomes.

It is important, however, to understand the overriding focus of this project. We want to plant ideas in our students' minds and emotions – seeds that will grow with them throughout their lives, motivating them to become aware and environmentally responsible citizens of the world.

It is quite evident that this teacher- the one who asked, "*What even is environmental education?*" and "*Is it this hippie stuff?*" actually had a very clear sense of the importance of EE. He had just not identified with the frame of 'environmental' language that was being used, or had not identified his values as being 'environmental', even though they may well have been. For example, during one session, while another participant was raving about how much she loved gardening and being out in nature, he stated, "*I hate gardening. It makes me angry.*" To the

observer, he may have come across as a person who did not appreciate or value nature from this statement. He also challenged the notion that we could do EE in a garden, as a garden is not a natural environment. However, later in the session, his reasoning for his disdain for gardening emerged. He explains himself further:

“I was thinking about weeding and things that I hate doing. The reason that I hate doing it is that I refuse to use chemicals anymore. I won't use chemicals in my garden. So my garden is a pile of work now. But it's important not to use those chemicals too, and it's important to kind of learn that if you have dandelions in your lawn, who cares? My yard is not a natural environment, that's why I hate it- because I have to look after it. Dandelions are part of the natural environment, grass is not a natural environment in Lac La Biche [LLB]. The town of LLB is so far from a natural environment it's a joke. Everybody just mows down every tree that they see around here right. Our natural environment is the forest. So our school yard is very artificial, and the garden that we're building is a very artificial environment too. I'm sitting here thinking about that. I think what I would do is get my kids to compare, when we build all this stuff for birds, which we don't have to do, I'm going to say 'let's look at this garden that we built for the birds, and then let's go two steps over to the forest and see how many more birds there are and think about why'.”

Although this teacher would never self-identify as an environmentalist, and his resistance to the movement may perhaps lead one to believe that he did not see any purpose or value in educating

his students about the environment, there was a sense of environmental responsibility within him that seemed to emerge and grow throughout the course of our time together.

During final interviews, when asked if she had gained a better understanding of EE through the PLC process, another participant commented:

“I did. There are lots of things that I did learn... about how we need to give back to nature. I was always (makes motion of throwing water bottle in garbage) plastic- throw away, Styrofoam- throw away. But I'm starting to see that now we've got to recycle, we've got to give back to nature, we've got to grow, we've got to make things that are natural continue to be natural. And stand up for it.”

When asked the same question, another participant responded:

“It's changed my perspective on how we maybe do it in the school. Maybe more importance of it than I thought before, possibly. Just kind of never really thought of it before, but it's important to think about I think. Especially when you think about teaching little kids, and changing minds and stuff like that, right. It's one of those things that does need to change.”

The PLC provided space and time for the participants to reflect upon their current teaching practices, their values, and challenged them to become more proactive in teaching students the importance of protecting the environment. One member stated that the PLC *“has given me kind of a sharper view of my own values.”* Although each of the participants did, in fact,

understand the importance of earth care before this PLC, this gave them a space to explore a little more deeply, and encouraged them to incorporate EE into their teaching practices in new and exciting ways.

The PLC also allowed participants to share their own values, and to realize that not everyone's values are the same when it comes to the environment. This is an important realization, as it is part of the challenge of teaching EE. I, as the researcher, as well as the other participants, developed a better understanding that as environmental educators we must learn to 'meet people where they are at'. We must find common ground and appeal to common values as a baseline for discussion and action for environmental protection. One member expressed:

"I think what I've gained is, again, the different views that people have, even within our PLC about the environment, about the likes and dislikes with regard to the environment, and about perception of what's natural and what's not natural, and just different things like that. People all have a different idea. What I might think is amazing, and fun and wonderful, it... even as adults we realize that some others don't. So we have to be open to that with our students too. That once we start a project like this, you know, not everyone is going to buy into it quite the same as everyone else, and that's ok. It's just like any other kind of learning. I say to my students often, 'you know, you don't have to love it, but yes, I'm encouraging you to do it'. Because there are many things that aren't our favourites but we still have to try."

Chapter 5: Discussion and Recommendations

This study provided insight into the use of a school-based Professional Learning Community (PLC) as a vehicle for increasing teachers' ability to effectively integrate Environmental Education into their teaching practices. The recommendations and conclusions drawn in this chapter are contextually situated to the participants involved in this particular PLC, and specifically apply to this group during the time period in which I worked with them.

The data gathered in this study indicate that the school-based PLC effectively increased the teachers' ability and willingness to teach EE. For the participants in this study, there was a clear connection between involvement in the PLC and an increase in their perceived awareness of environmental education and willingness and ability to incorporate EE into their classroom teaching. There are several things that could be done in order to maximize the effectiveness of a PLC of this nature as a vehicle for change.

Increased time

This study indicates that in order for a Professional Learning Community to achieve its full potential, there should be sufficient time allotted for meeting and collaborating. "Educators frequently identify time constraints as the major barrier to collaboration" (DeFour et al, 2010). This was certainly the case with the PLC described in this study. The amount of time that teachers were given for the PLC (45 minutes every fifth day of school) was not enough for teachers to get settled, review where we left off from the previous session, further build our project, and discuss our goals for the following session. This PLC would have been more effective if the teachers were given longer sessions, even if this meant reducing the frequency of

the sessions. For example, if teachers were to meet for 90 minutes every tenth day of school, instead of the current 45 minutes every fifth day. Under such a schedule they might have experienced an increase in their productivity, as experienced during the last two-hour session.

Re-framing Environmental Education

As is evident from some of the discussions documented in the previous chapter, the term ‘environmental’ for some teachers invoked a frame of reference with which they had negative associations. As discussed earlier, one teacher asked, “*What is environmental education anyways... Is it to teach the kids that we're all one with the universe kind of thing? Like, is it this hippie stuff?*” He was letting the group know exactly how he related to the word ‘environmental’. For him the word did not have a positive frame. Other teachers expressed similar concerns that teaching environmental education meant that they would be asked to teach their students values that were not in alignment with their personal values.

According to Lakoff (2010), we think in terms of unconscious structures called ‘frames’, which is how we make sense of all knowledge (p. 71). He notes that, “many frame circuits have direct connections to the emotional regions of the brain” (p. 71) and “repetition of ideological language will strengthen the circuits for that ideology” (p. 71). He further argues that we lack the ideas that we need in the case of the environment because of the fact that there are so many other issues tied up together with ‘environment’ such as economics, energy, food, health, trade and security (Lakoff, 2010, p. 76). He argues that, first and foremost, “progressives need a much better communication system, which involves planning the frames that are needed in the long-run” (2010, p. 76).

Lakoff's claim can serve as an important reminder during a crucial time in Alberta Education's curriculum development process. As a province, we have taken on the task of updating and improving our current curriculum, in an attempt to place greater emphasis on a holistic approach that includes environmental education, under the banner of "Social, Cultural, Global and Environmental Responsibility" (Alberta Education, 2013). This curriculum initiative suggests that we need to ensure that we frame environmental education in a way that opens the minds of teachers to educating students about the environment in meaningful ways, rather than turning teachers away.

The history of the environmental movement invokes negative frames for some. Bonnett explains, "the environmentalist approach assumes that it implies a systematic action policy developed by those who 'know' and imposed on those who don't" (2002, p. 10). He argues, also, that the term 'sustainable development' is also problematic. Bonnett claims that although this term has wide appeal because it combines "the highly desired goal of development with the equally highly desired goal of conservation" (2002, p. 11), there are major flaws in that it fails to define an actual value system that these goals are based upon. This terminology will break down as soon as value-based questions begin to arise (Bonnett, 2002, p. 11). Bonnett argues for sustainability as a state of mind, arguing that the questions that underlie all of our policy development should be "What constitutes a right relationship with nature?" and "What should be our basic stance toward the natural environment?" (Bonnett, 2002, p. 12). As Alberta works toward a new curriculum for the students who will be our future leaders, it is vital that we ask ourselves these questions, and encourage teachers to ask the same of their students. Asking these questions of us and our students opens the door to allow people with diverse perspectives and worldviews to engage in a conversation. Bonnett states,

Our relationship with nature, whatever its kind, is an important aspect of our own identity- and thus of our self-knowledge. The way we regard and treat nature- the whole which sustains us and of which we are a part- says a lot about the sort of beings we are as well as the sort of beings we regard everything else to be (2002, p. 14).

Appealing to Common Values

During my time working with the PLC in this study, I found that the most effective way to challenge some of the negative associations that participants had with the term ‘environmental’ was to appeal to our common values, such as health, happiness. By helping teachers see how these values were all connected to a healthy environment, negative frames began to corrode. They began to understand that adopting a sense of environmental responsibility did not go against their values, but rather aligned and supported their pre-existing values. Many teachers were worried that teaching EE would mean teaching their students values that were contradictory to their own. To address the competency indicators relating to “Social, Cultural, Global and Environmental Responsibility” ACEE developed the Environmental Education Framework Document for Alberta Education. The document emphasizes that its goal is not to teach students what to think, but rather how to think. It would be extremely beneficial if this emphasis were carried through clearly in the curriculum documents to be released by Alberta Education in the near future.

With a project of this nature, it was imperative that the members of our PLC focus on our similarities rather than our differences, as well as on common goals to work toward. I found that the curriculum documents acted as the common ground that we needed to find. The teachers were comfortable and familiar with the curriculum documents, and felt much more at ease

beginning the project from this place of familiarity. I realized the importance of also meeting these teachers where they were at in terms of their familiarity, level of comfort with, and knowledge of EE. From this non-threatening place of safety teachers were better able to remain open-minded.

Environmental Education as a Provincial Priority

In Alberta right now EE is seen as a curriculum ‘extra’, but a shift in mindset needs to occur among our educators, and throughout our province. It could be argued that in fact educating students about the preserving, respecting, and valuing the natural environment is of highest importance, as it is the natural environment which supports and sustains us through all of our other human endeavors. All other learning seems futile if we inhabit a dying planet.

Curricular priority.

For the PLC described in this research, the existence of a current environmental education curriculum document would have had a number of very positive effects on the development of the action research project. We had access to the latest draft (October, 2012) of ACEE’s Environmental Education Framework document, which, although helpful in guiding the process, was not regarded by teachers as an officially mandated curriculum. First, an officially endorsed curriculum document would provide a rationale for the project. The teachers in this study were hesitant to take on an EE project because they felt unable to justify it. With no mandated EE curriculum, and so many curricular outcomes to cover in other areas, they were hesitant to devote the time to a project of this nature. Second, the presence of an endorsed EE curriculum document would not only allow teachers to justify teaching EE, but would also indicate that EE was a provincial priority. Currently these teachers do not feel that they are receiving genuine

support for environment-related projects. When asked what further support he would need in implementing EE in his classroom one participant stated,

It seems like it's going to be just one more thing to do and it's not going to be considered as important as the other things we do, right? That would be the problem. I would like to see honest-to-goodness support for it. My interpretation of environmental education is it's project-based learning, things like that - really inquiry-based kind of thing. Which I love, but, I think there's false support for that kind of stuff, it's not real support. If I'm not doing my proper testing and stuff like that, there's not... I'd like to see a real, honest support for that kind of stuff, not just kind of... it's just an extra thing to do.

The presence of a document from Alberta Education that encouraged the integration of EE into all subject areas, and provided illustrative examples to which teachers could easily relate, would be extremely beneficial as a guide in developing a project of this sort. As noted in the findings, the provincial grade three curriculum documents used in the development of this project acted as a common denominator to keep teachers united, and provide vision and goals for the project. The lack of an EE curriculum left teachers feeling like they were ‘spinning their wheels’ when attempting to identify EE goals and objectives for the project. Once teachers began to see how EE could be effectively integrated with existing curriculum they became excited and energized about EE and about the project. Teachers realized that this type of learning project, through integration, would actually save them time, cover curricular outcomes more efficiently, and provide a hands-on, relevant, meaningful and fun experience for their students.

Accessible Professional Development.

If the province is to make EE a provincial priority, then it will need to ensure that teachers are provided with easy access to professional development in this area. This professional development would focus on increasing teacher understanding of EE in ways that are personally relevant. Professional development in EE should appeal to teachers' shared values and focus on how the integration of EE with the other subjects and requirements in the curriculum will benefit students.

Professional Learning Communities for Enhancing EE

Professional learning communities have, time and time again, proven their effectiveness as spaces for collaborative inquiry to design and implement program improvements for the purpose of enhancing student learning. "The evidence suggests that when this occurs, not only do the students prosper, but the school culture becomes enriched and teachers enjoy greater professional satisfaction (Sagor, 2010). I believe that the effectiveness of the PLC in which I worked in this project came from the space and time that it provided for teachers to digest, mull over, and discuss new and sometimes difficult ideas and perspectives in relation to EE. As the facilitator, I was able to get a much better read on where these teachers were coming from, what specific issues they were struggling with, and what topics needed to be reviewed for a more thorough understanding. If I had been leading a one-day EE workshop, for example, I do not believe that I would have had the same effect on these teachers.

One of the main challenges faced by environmental educators is to discover the barriers that an individual or a group may have to face in regard to implementing EE, and to learn how to skillfully and gently break down these barriers in a way that motivates and empowers. This can

only be done by appealing to core, commonly held values, and showing how EE can support and further the development of values, such as health, happiness, and community building. A PLC can provide the much-needed space and time to go through this process with the participants. It is my recommendation that PLC be seriously considered as effective means for increasing teachers' understanding of EE and their receptivity to teaching it.

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Appendix A: Questions for Reflective Journaling

- What am I learning through this process?
- What, if any, are the barriers to the use of this PLC as a means for advancing environmental education within our school?
- What could make this PLC more effective/efficient?
- Do you feel that the work that we are doing in this PLC is worthwhile? Why or why not?
- What would better the work that we are doing in this PLC?
- How do you find working as a member of a PLC team?
- How important is environmental education in elementary schools? Are we doing enough? What could make it better?

Appendix B: Indicators outlined in ACEE’s Environmental Education Framework

Age Grouping 5-10			
Element 1: Interconnections			
Category	Cognitive	Affective	Psychomotor
1.1 Ecological Systems and Processes	<ol style="list-style-type: none"> 1. I describe how living and non-living systems work and interact. 2. I compare and contrast the similarities and differences between living and non-living systems. 3. I evaluate whether a local ecosystem is healthy. 	<ol style="list-style-type: none"> 1. I accept the importance of diversity in ecosystems. 2. I cooperate with others in supporting living and physical systems. 3. I value all species and their need for survival. 	<ol style="list-style-type: none"> 1. I discover living and non-living systems and processes. 2. I investigate with others what species needs are and how they are provided for. 3. I create with others the conditions for wildlife in my community.
1.2 Social systems & technology	<ol style="list-style-type: none"> 1. I explain how human systems interact with non-human systems. 2. I dramatize/demonstrate how humans can live sustainably with non-human systems 3. I choose examples of social, cultural, global, political, economic and technical systems, structures, beliefs or actions that help people, both individually and collectively, to live sustainably. 	<ol style="list-style-type: none"> 1. I accept social systems need to interact positively with non-human systems for the health of the biosphere and all species. 2. I discuss how humans can improve their social systems and technology to adapt to the needs of humans and the non-human world. 3. I pursue new ways, individually and collectively, to improve human and non-human interactions. 	<ol style="list-style-type: none"> 1. I distinguish between social systems and technology, structures, beliefs and actions that support non-human life and processes and those that do not. 2. I develop new ways to interact socially, economically and technically based on biomimicry. 3. I imagine and create new ways to address human needs based on biomimicry.
1.3 Wellbeing & Interconnections	<ol style="list-style-type: none"> 1. I explain how I am part of the natural world. 2. I demonstrate ways I improve my health through my interactions with the natural world. 3. I evaluate how to improve my and other’s health and wellbeing through positive interactions with the natural world. 	<ol style="list-style-type: none"> 1. I am aware of how different environments affect me. 2. I respond positively with wonder to time spent in natural environments. 3. I seek out ways to connect with the natural world, individually and collectively. 	<ol style="list-style-type: none"> 1. I use all my senses in exploring my natural world, individually and with others. 2. I discover new ways to enjoy spending time in nature independently and with others. 3. I adapt my daily habits to include time spent in nature.
Element 2: Diversity			
Category	Cognitive	Affective	Psychomotor
2. Identifying and clarifying perceptions, feelings, ethics values and actions	<ol style="list-style-type: none"> 1. I identify diverse feelings, ways of perceiving and valuing the environment. 2. I compare and contrast the impact of diverse social and cultural perspectives on the environment. 3. I generate new understandings, ideas and values from a diversity of perspectives. 	<ol style="list-style-type: none"> 1. I accept there are different perceptions, feelings and values in relation to the environment regionally, socially, culturally, and globally. 2. I consider respectfully diverse perspectives in relating to the environment. 3. I value new ideas from diverse perspectives and worldviews regionally, socially, culturally and 	<ol style="list-style-type: none"> 1. I distinguish & clarify differences between diverse beliefs, ethics and actions. 2. I promote diversity in ways to interact sustainably with the environment. 3. I adapt and develop innovative ways of interacting sustainably with the environment in response to diverse perspectives in relation to the environment regionally, socially, culturally and globally.

		globally in relation to the environment.	
Element 3: Responsibility & Citizenship			
Category	Cognitive	Affective	Psychomotor
3.1 Investigation & Evaluation Knowledge & Skills	<ol style="list-style-type: none"> 1. I identify ways adventure safely in the natural environment, alone and with others, considering available resources and constraints. 2. I analyze the impacts of various options on others, both human and non-human. 3. I create new ideas based on what we experience and group discussions. 	<ol style="list-style-type: none"> 1. I recognize the needs of others, human and non-human as well as others' wants and values. 2. I cooperate with others in exploring the natural world. 3. I value the input of others and seek consensus. 	<ol style="list-style-type: none"> 1. I engage a diversity of senses to explore the natural world. 2. I discover new wonders through exploration of the natural world with others. 3. I create opportunities to explore and investigate the natural world based on sharing ideas within a group.
3.2 Action Competence			
3.2.1 Systems Thinking	<ol style="list-style-type: none"> 1. I identify parts of a familiar system at home, school or in the natural environment. 2. I explain how the removal or malfunction of part of the system affects the whole. 3. I assess potential desirable and undesirable effects and risks of actions on others. 	<ol style="list-style-type: none"> 1. I recognize how my actions affect others, human and non-human and may need to change. 2. I believe my actions can have a positive effect in creating positive change in a larger system. 3. I value working together peacefully to solve issues. 	<ol style="list-style-type: none"> 1. I identify a variety of elements in a system through exploration. 2. I discover new connections in the natural world through working in groups. 3. I adapt and develop with others new ways of interacting as conditions change.
3.2.2 Futures & Design Thinking	<ol style="list-style-type: none"> 1. I identify continuities, trends, and patterns in relation to personal experience of events and places. 2. I predict events and changes based on trends and patterns that have been personally and socially experienced. 3. I generate ideas for products and environments that respond to people's needs and reflect a view of their personal future. 	<ol style="list-style-type: none"> 1. I accept the need for change in objects, places, and behaviour over the immediate past. 2. I demonstrate flexibility by adjusting designs and actions as a result of feedback. 3. I anticipate the impact of my designs and actions on people and environments in the immediate future. 	<ol style="list-style-type: none"> 1. I follow a systematic design process to realize designs and actions for change in the immediate future. 2. I envision, through group discussions, future events and places from a projection of personal experience by making drawings of what might be imagined for the future, and explain the need that would be met by key features. 3. I demonstrate flexibility by adjusting my designs and actions as a result of feedback.