

Elementary Teachers' Perceptions of Environmental Education

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Dedication

This dissertation is dedicated to all teachers, as they make decisions about what is best for their students; and to my mom, Audrey, who was my greatest teacher.

Abstract

Efforts to develop and implement environmental education (EE) in classrooms across the United States need to be grounded in understanding teachers' perceptions of EE. A case study format was selected as an effective means of eliciting a wide range of the teachers' perceptions and capturing an in-depth elaboration of the complexity and internal consistency of those perceptions. The research questions for this study are: 1) *What are the participating elementary teachers' perceptions of EE?* 2) *What are the participating elementary teachers' perceptions of ideal EE?* 3) *What are the participating elementary teachers' perceptions of the reality of teaching EE?* And 4) *How do the individual participating teachers' three types of EE perceptions misalign?* Case studies of four elementary classroom teachers from the same school building were constructed from survey questions, interviews, and resource materials. Analysis and interpretation of the data were conducted using two sets of descriptors, strength and development, of the identified themes. The major implications of this study include (a) efforts supporting the implementation of EE need to account for the context that exists in the school, and how the structure of the school interplays with the implementation; (b) the need for teacher professional development in EE with considerations for teaching context, teachers' personal EE connections, and variability in teacher understanding, and (c) the complexity and diversity in the expression of teachers' EE perceptions needs to be attended in EE implementation efforts, as well as in research exploring teacher perceptions of EE.

Table of Contents

Chapter One	1 - 5
Introduction	1
Rationale	1
Goals and Objectives	4
Overview of the Following Chapters	4
Chapter Two: Literature Review	6 - 35
Section One: History of EE	7
The Precursors to Contemporary Environmental Education	7
The Establishment of Contemporary EE	12
The EE Standards Effort	15
Section Two: Status of EE in the Classroom	19
Implementation of EE at the State Level	21
The State's EE Plan	22
Section Three: Teachers and EE	25
Cautionary Discussion	33
Chapter III: Research Design and Methods	36 - 56
Overall Research Design	38
Context and Participant Selection	39
Data Collection	41
Data Analysis	44
Categorizing Themes of EE Perception	48
Validity of the Study	51
Perspectives Taken	51
Strategies Used	52

Additional Considerations Regarding Bias	54
Limitations	55
Chapter IV: Presentation of the Cases	57 -
A Common Context: The District	57
District Collaborations	58
District Curriculum	60
The School	61
The Individual Cases	65
Jane, Second Grade Teacher	66 - 82
Background Information	66
Teaching experience and personal classroom description	66
Perceptions of EE	68
Personal Experiences and Training Shaping EE	70
Resources Drawn On	71
Perceptions of Ideal EE	73
Teaching Description	73
Goals and Measuring Success	75
Perceptions of the Realities of Teaching EE in Classroom	76
Teaching Description	76
Applied Goals and Measuring Success	78
Outside Influences	80
Heather, Sixth Grade Teacher	83 - 101
Background Information	83
Teaching experience and personal classroom description	83

Perceptions of EE	84
Personal Experiences and Training Shaping EE	86
Resources Drawn On	87
Perceptions of Ideal EE	88
Teaching Description	88
Goals and Measuring Success	89
Perceptions of the Realities of Teaching EE in Classroom	91
Teaching Description	91
Applied Goals and Measuring Success	95
Outside Influences	98
Paul, Kindergarten Teacher	102 - 116
Background Information	102
Teaching experience and personal classroom description	102
Perceptions of EE	104
Personal Experiences and Training Shaping EE	106
Resources Drawn On	107
Perceptions of Ideal EE	108
Teaching Description	108
Goals and Measuring Success	110
Perceptions of the Realities of Teaching EE in Classroom	111
Teaching Description	111
Applied Goals and Measuring Success	113
Outside Influences	114

Rebecca, Kindergarten to Sixth Grades, Art Teacher	117 - 129
Background Information	117
Teaching experience and personal classroom description	117
Perceptions of EE	118
Personal Experiences and Training Shaping EE	118
Resources Drawn On	120
Perceptions of Ideal EE	121
Teaching Description	121
Goals and Measuring Success	121
Perceptions of the Realities of Teaching EE in Classroom	123
Teaching Description	123
Applied Goals and Measuring Success	125
Outside Influences	126
 Chapter Five: Analysis and Discussion	 130 - 184
Question 1 Analysis: What are the participating elementary teachers' perceptions of EE?	134
Question 2 Analysis: What are the participating elementary teachers' perceptions of ideal EE?	145
Question 3 Analysis: What are the participating elementary teachers' perceptions of the reality of teaching EE?	154
Additional Themes	169

Question 4 Analysis: How do the individual participating teachers’ three types of EE perceptions misalign?	176
Summary of Cases	183
Closing	184
Chapter Six: Findings and Implications	185
Question 1 Findings: What are the participating elementary teachers’ perceptions of EE?	187
Question 2 Findings: What are the participating elementary teachers’ perceptions of ideal EE?	188
Question 3 Findings: What are the participating elementary teachers’ perceptions of the reality of teaching EE?	190
Question 4 Findings: How do the individual participating teachers’ three types of EE perceptions misalign?	192
Categorizing the themes that are internal misaligned	193
Misalignments found between themes	195
Implications Across All Four Questions	198
Suggestions for Further Study	199
Bibliography	202
Appendix A: Teacher Selection Questionnaire (Electronic)	208
Appendix B: One on One Interview	210
Appendix C: The Tbilisi Declaration	212
Appendix D: NAAEE National Guidelines for Learners (Pre K – 12) (2004)	214
Appendix E: State of Minnesota EE Guiding Documents	216

List of Tables

Table 3.1	Demographics of Study Participants From Pebble Community School	41
Table 3.2	Data Collection Summary	44
Table 4.1	Demographic Percentages of the School, District and State	62
Table 4.2	Percentage of Students Considered “Proficient” through State Testing and Amount of Change Between Two Years	64
Table 5.0.1	Themes Found for Each Type of EE Perception	133
Table 5.1.1	Question One, Theme One: EE is integrated in teaching	136
Table 5.1.2	Question One, Theme Two: EE is interdisciplinary	137
Table 5.1.3	Question One, Theme Three: EE takes a planetary view	139
Table 5.1.4	Question One, Theme Four: EE is centered on responsibility	140
Table 5.1.5	Question One, Theme Five: EE is inspired by the personal experience	141
Table 5.1.6	Question One, Theme Six: The participant links their passion to EE	143
Table 5.2.1	Question Two, Theme One: EE should include enriched student experiences	145
Table 5.2.2	Question Two, Theme Two: EE teaching should create connections for students	149
Table 5.2.3	Question Two, Theme Three: EE should emphasize collaboration with colleagues	151
Table 5.2.4	Question Two, Theme Four: EE teaching includes a change in teaching context	152
Table 5.3.1	Question Three, Theme One: Teaching EE incorporates academic standards	156
Table 5.3.2	Question Three, Theme Two: Science curriculum is related to teaching EE	158

Table 5.3.3	Question Three, Theme Three: Teaching EE focuses on students applying learning	160
Table 5.3.4	Question Three, Theme Four: Informal assessment is part of teaching EE	162
Table 5.3.5	Question Three, Theme Five: The use of literature when teaching EE	164
Table 5.3.6	Question Three, Theme Six: Time is an issue in the reality of teaching EE	165
Table 5.3.7	Question Three, Theme Seven: Teaching EE relies on a ‘making pieces fit’ implementation strategy	166
Table 5.3.8	Question Three, Theme Eight: Students’ family and parents as a consideration when teaching EE	168
Table 5.A.1	Additional Theme One: The participant uses the internet to research EE	170
Table 5.A.2	Additional Theme Two: EE includes improvements in EE understanding	171
Table 5.A.3	Additional Theme Three: Participant perception of EE success	173
Table 5.4	Misalignment occurring within themes for each participant	176

List of Figures

Figure 3.1	Study Research Design	38
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Chapter I: Introduction

In the United States there is a general consensus that environmental education (EE) is important. According to a recent national Roper Poll, 95 percent of the public supports teaching EE in schools (2001). A majority of elementary classroom teachers concur. According to a national survey, 83% of primary grade (K-4) teachers teach EE in their classrooms (McCrea & deBettencourt, 2000). When asked what is taught in EE, teachers can list the topics that they consider to be EE curriculum, but beyond the list it is unclear what teachers mean when they say, "I teach environmental education." As the EE movement continues its trend towards formalization in the classroom through the publication of national EE standards, there is a lack of understanding in how teachers perceive EE that will affect how these EE standards will be implemented. In order to address this gap in the EE research, the objective of this case study is to develop rich, thick descriptions of participating elementary classroom teachers' perceptions of what environmental education is, what they feel it ideally should be and what they consider the realities of it in their classroom setting, as well as examining any misalignments of those three types of perceptions for each individual teacher.

Rationale

EE has evolved into a contemporary movement that can be interpreted in a variety of ways, based on one's historical and contextualized perspective (Disinger, 2005). In the United States, there is an effort to delineate what EE is and how EE should be taught. National guidelines have been developed recently to address pre K-12 learner objectives, teaching materials, teacher preparation and professional development, and non-formal EE programs (NAAEE, 2004a, b, c, d), articulating a more consistent national view of EE and how to implement it. The national guidelines offer a coherent form of EE for the classroom that can be viewed as a standardization effort associated with changes in state academic standards and teacher training in order to include EE concepts.

Although many states are developing EE initiatives by using the national EE standards, the task of implementing the EE changes has largely fallen to the individual districts and schools in the public educational system (Flanagan, 1999; Smaldone & Dey, 2010). However, since EE is not required or tested under national or state mandates, it is up to the teachers that develop and implement EE. National or state recommendations may or may not be developed and implemented. Under the current circumstances, it is the teachers' perceptions of EE, whatever they might be, that will be enacted. The teachers become the agents of the EE implementation, making decisions about what and how EE is taught. Those decisions will depend on the teacher's understanding or perceptions of EE, which includes their perceptions of what EE is (EE perceptions), their perceptions of what EE should be (ideal EE perceptions), and their perceptions of what EE is in their setting (perception of the reality of EE). Without an awareness and understanding of the current EE efforts associated with bringing EE standards into classrooms, the teachers are making decisions based on their own perceptions of EE when they are teaching their students. In large part, then, the success of EE standards implementation in classrooms will depend on teachers' perceptions of EE.

This stance of EE standards implementation success being dependent on teachers' perceptions is grounded further by Michael Fullan's definition of educational change in his book, *The New Meaning of Educational Change* (2001). He highlights that teachers' perceptions need to be considered to make the change from a subjective reality, where only the mechanics of the reform are *restructured*, into a more effective objective reality, where the social framework and individuals' perceptions are examined and *recultured* so the shared purpose and meaning makes sense to those individuals involved. Essentially, teachers' perceptions need to be attended to before we can make progress in the implementation of EE standards in elementary classrooms. Once we understand the teachers' perceptions of EE, we can plan EE curriculum and development implementation programs that will take perceptions into account. By accounting for

teachers perceptions that both align with and challenge the new curriculum and programs, progress can be made beyond restructuring teachers' EE, into the reculturing of their EE.

Currently there is a limited amount of research regarding elementary teacher perceptions of EE. In the EE research literature focused on elementary teachers, there are studies addressing teachers perceptions of EE programs and barriers to implementation (Ernst, 2007; Middlestadt, Ledsky, & Sanchack, 1999), and others that focus on a particular EE related context, such as teachers' perceptions of experiences implementing specific EE programs or with a particular aspect of EE (Winther, Volk & Shrock, 2002; Ernst, 2007; Simmons, 1998; Sosu, McWilliam & Gray, 2008). While existing research has begun to shed light on teacher perceptions of EE, the richness and complexity of the perceptions have yet to be explored.

A study of teachers' perceptions of EE is needed given that teachers are the people most likely to make decisions pertaining to the implementation of EE for the classroom, and their decision making is likely to be based on their perceptions of EE. If efforts to create a more coherent form of EE in the classroom are to make progress, the restructuring of EE needs to be transformed into reculturing efforts, which includes attending to the teachers' perceptions. A case study format was selected to study teachers' EE perceptions in order to inform those involved in the development and implementation process of EE changes, including administrators, researchers and teachers themselves. Case study provides an effective way of eliciting a wide range of the teachers' perceptions, and capturing an in-depth elaboration of perceptions that is based in real and typical settings. This study's questions were developed to elicit descriptions of teachers' perceptions of what EE is, while also looking at their ideal of EE and how they perceive EE in their classroom reality, and as a way to examine the complexity of how teachers may perceive EE, and how well these perspectives aligned.

Goals and Objectives

In order to address the EE research field's limited understanding of how elementary classroom teachers perceive environmental education, the purpose of the study is to develop rich descriptions, within and across a sample of teachers from one school, of elementary teachers' perceptions of teaching environmental education in the context of their classrooms, while examining the misalignments that exist for those individual teachers.

The research questions framing this study are:

1. What are the participating elementary teachers' perceptions of EE?
2. What are the participating elementary teachers' perceptions of ideal EE?
3. What are the participating elementary teachers' perceptions of the reality of teaching EE?
4. How do the individual participating teachers' three types of EE perceptions align?

Overview of the Following Chapters

The following chapters in this dissertation are designed to construct a rich description of four elementary classroom teachers and their perceptions of environmental education. Chapter two is a view of research literature that pertains to this study. First, a view of the context of EE, both in relationship to similar educational movements and its historical development that is the broad setting in which the cases exist. Then a closer look at the research that has been published in regards to teachers and EE is presented.

Chapter three presents the research design and methods, starting with the ontological stance and the approach to the study. The overall research design, context and participant selection process, as well as the data collection are described. The data analysis process and the subsequent development and analysis of the cases follow, ending with commentary on the actions taken to strengthen the study's validity.

In chapter four, the reader is introduced to the common context for the cases including the district and the school building the four teachers teach in, as well as EE opportunities available to the teachers. This is followed by the individual cases themselves, where the descriptions and reasoning expressed by the individual are depicted to provide a distinct portrait of each teacher's perception of environmental education.

Chapter five brings an extensive cross-case analysis of the cases, where the cases are compared for commonalities, or themes, that carried across the cases for each of the first three questions. In order to answer the fourth question, the chapter ends with analysis that illustrates areas of misalignment that occur within each of the individual's set of EE perceptions.

Chapter six presents the conclusions and implications for each of the research questions posed during the study. It provides recommendations in regards to the implementation of EE standards in the elementary classroom in view of teacher EE perceptions, as well as suggestions for further research.

Chapter II: Literature Review

There is ongoing social concern about human interactions and subsequent impacts on the environment of the planet. Leaking oil wells and discarded plastic water bottles are just two of the many environmental impact topics that the media has recently reported on during the daily news. Individuals, special interest groups and communities are working creatively on issues such as renewable energy, invasive species, and local food harvest and consumption. Within this ever changing and often charged atmosphere of environmental concern, there is a call to educate youth as a means to change society's relationship with the Earth (UNESCO-UNEP, 1978; Lieberman & Hoody, 1998; NAAEE, 2004b). There are a variety of organizations and individuals focused on the task of teaching environmentally related topics and skills to children, from community education programs and environmental learning centers to public and private schools. A vast number of individuals on the frontline of this educational effort are elementary classroom teachers.

This chapter reviews the literature related to the issues of primary interest to this particular study, namely elementary classroom teachers' perceptions of EE. The goal of this literature review is to set a context for the study and to present the nature of educational research that has been conducted specifically regarding teachers and EE in formal elementary classroom settings. The aim of this study is to provide insight into how the participating teachers perceive environmental education, not to evaluate their implementation in the classroom. The reader should be aware that the history and descriptions of EE in this literature review are not meant to set a framework to judge the quality of the teachers' perceptions nor focus on to what they are or should be teaching in the classroom. Rather, it is offered to provide the reader the context of EE, as shaped by its history in the United States and ongoing efforts towards a coherent vision of EE in the classroom, both in the field of EE research and in the public school system.

The first section is an overall history of EE, from selected precursors of EE to the development of the contemporary EE movement. The second section provides an overview of the current status of EE in the classroom. The third section ends provides a narrower focus into EE research regarding teachers and how they perceive EE in an effort to provide insights about how this particular study relates to existing literature.

Section One: History of EE

This first section of the literature review is meant to provide the reader a historical context in which EE can be viewed in relationship to formal elementary classrooms in the United States. The findings cited here are used to form a backdrop to the decisions made in the formulation of questions and treatment of the study. The section is divided into two portions. The first portion provides a brief overview of educational movements associated as precursors of EE, while the second portion focuses on the development of contemporary EE itself. This overview is included to give a broad context to the environmentally based education movement that is EE, and more importantly to underscore the complexity of the perspective of EE that will follow.

The Precursors to Contemporary Environmental Education.

In 1972, a declaration was published by the United Nations Conference on the Human Environment in Stockholm, and it contained a principle, number nineteen of twenty-six, that is often considered the catalyst for the establishment of contemporary EE. Principle nineteen states,

Education in environmental matters, for the younger generation as well as adults, giving due consideration to the underprivileged, is essential in order to broaden the basis for an enlightened opinion and responsible conduct by individuals, enterprises and communities in protecting and improving the environment in its full human dimension. It is also essential that mass media of communications avoid contributing to the deterioration of the environment, but, on the contrary, disseminates information of an educational nature

on the need to protect and improve the environment in order to enable man to develop in every respect. (p. 5)

This globally focused principle gave rise to a series of events that set the foundation for the status of contemporary EE today. However, before this document was created there were several educational movements that are considered precursors of the EE movement. It is these educational movements that laid the landscape on which EE's foundation was built. These movements include nature study, outdoor education, conservation education, and progressive education.

The origins of educational movements associated with the environment have been cited as early as 1762, when Jean-Jacques Rousseau published his educational philosophy in the novel *Emile*, stating education should include a focus on the environment (McCrea, 2006). It is generally agreed upon that contemporary EE has roots in several different educational movements, of which nature study and outdoor education are the earliest cited (Adkins & Simmons, 2002; Disinger, 1998a). Considered precursors of EE, these two approaches in the late nineteenth century represented an overall response to the educational system's formalization of teaching knowledge as compartmentalized subjects, and the urbanization of a population of youth that were now required, through legislation, to attend school for a minimum number of hours and days. This removed them from the rural nature they once would have been familiar with on a daily basis a generation before (Kohlstedt, 2005). Nature study was widely established in the classrooms in 1891 when Wilbur Jackman's *Nature Study for the Common Schools* took students outdoors with an integrated academic approach (Nash, 1976). In a nine page leaflet called "The Nature-Study Movement" printed at the turn of the twentieth century opens with the statement:

The nature-study movement is the out-growth of an effort to put the child into contact and sympathy with its own life. . . .our teaching has been largely exotic to the child; that it

has begun by taking the child away from its natural environment; that it has concerned itself with the subject-matter rather than with the child.

And goes on to say,

Nature-study, as a process, is seeing the things that one looks at, and the drawing of proper conclusions from what one sees. Its purpose is to educate the child in terms of his environment, to the end that his life may be fuller and richer. Nature-study is not the study of a science, as of botany, entomology, geology, and the like. That is, it takes the things at hand and endeavors to understand them, without reference primarily to the systematic order or relationships of objects. It is informal, as are the objects which one sees. It is entirely divorced from mere definitions, or from formal explanations in books. It is therefore supremely natural. It trains the eye and the mind to see and to comprehend the common things of life; and the result is not directly the acquiring of science but the establishing of a living sympathy with everything that is. (Bailey, 1903, p.1)

Nature study itself consisted of simply observing and experiencing objects in nature, and was a dominant movement in early childhood education until the 1920's, losing favor as more rigorous science education was developed (Brice, 1972 and Roth, 1978 as cited in Disinger, 1998b, p. 18).

Outdoor education, often associated with taking students camping in the 1940s, has grown from a nature study focus to a general focus on "education which takes place in the outdoors" (Hammerman, Hammerman, & Hammerman, 2001). Richardson and Simmons stated, "outdoor education involves a structured experience for students, usually involving a challenge (possibly including an element of risk); a period of reflection to help students derive meaning from the experience; and an assessment activity" (1996, p. 3). They go on with this delineated methodology, centering on the use of the outdoors as a context for learning in a variety of subject

areas in today's classrooms, such as the arts, language or social studies, as well as social and behavioral objectives.

Embedded within these two movements was a concern that students were not able to understand how ideas were interrelated when studying them in a classroom setting, be it in primary school or at the college level. Nash writes, "Nature study and outdoor education forced an appreciation of the multiplicity of factors that the classroom tended to isolate. Knowledge was integrated by an integrated environment" (1976, p. 9). Both nature study and outdoor education contribute to environmental education movement in complimentary ways. Both have foci of students learning in a setting outside and are about natural aspects of the environment. Nature study focuses on the appreciation and observation of objects as they exist and processes as they are occurring. Outdoor education focuses on structured experiences and an outdoor context for learning. These two movements were established at the turn of the twentieth century and continue yet today in modern forms, and were joined by the formation of the conservation and progressive educational movements in the early part of the twentieth century.

The idea of teaching students how to use resources wisely started as early as the nature study and outdoor education in the late 1800's, but did not take hold because it was considered counter to common public opinion of resource use of the time. The focus on wise use of resources was not widely accepted until the Dust Bowl era occurred in the 1930s, spurring state and federal natural resource agencies as well as non-government organizations to create a conservation education movement to involve citizens in resource conservation efforts as a response to wind erosion, water pollution and other resource problems. These agencies and organizations recognized students would one day make decisions about the environment, and reached out directly to the classroom teachers with the conservation agenda and curriculum materials. The conservation education movement was still not well established with this tact of teacher support, because there was not an institutional initiative associated with it (Disinger, 2005). A shift in the

conservation education movement occurred in 1935, when the National Education Association took on a leadership role, advocating for conservation education in public schools across the nation, and Wisconsin was the first state to require teacher education programs to provide preparation in the conservation of natural resources (McCrea, 2006). The conservation education movement contributed to EE by focusing on human relationships with the environment, and the wise use of resources.

While the conservation movement was taking hold, the progressive education movement began with the educational philosophy and methods of John Dewey, published in 1938, that centered on learning by doing. The definition provided by the John Dewey Project on Progressive Education, out of the University of Vermont states:

Although there are numerous differences of style and emphasis among progressive educators, they share the conviction that democracy means active participation by all citizens in social, political and economic decisions that will affect their lives. The education of engaged citizens, according to this perspective, involves ...the development of *critical, socially engaged intelligence*, which enables individuals to understand and participate effectively in the affairs of their community in a collaborative effort to achieve a common good. (2002, p. 1)

The “active participation by all citizens” through “critical, socially engaged intelligence” reflects attributes that the progressive movement has contributed to EE.

Each of these movements; nature study, outdoor education, conservation education, and progressive education, set the stage for the development of what is considered contemporary EE, both in the United States and abroad. In fact, the earliest public professional use of the term “environmental education” is thought to be by Thomas Pritchard, Deputy Director of the Nature Conservancy in Wales, in 1948 at a meeting in Paris of the International Union for the Conservation of Nature and Natural Resources, where he identified the need for an educational

approach that synthesized the natural and social sciences (Kirk, 1983, as cited by Disinger, 1998b). This history shows a set of educational movements that have contributed to the landscape in which EE was founded. These movements provide a complex set of ideals that create a multifaceted synthesis into a movement called environmental education, and that complexity provides the backdrop to this investigation.

The establishment of contemporary EE.

While there is debate surrounding when the contemporary EE movement was initially established, it is generally thought that societal changes in the 1960s, such as a shift to urban lifestyles and increased public awareness of environmental issues, called for a more relevant and active look at the human relationship with the environment (Bowman, 1972 and Kirk, 1977, as cited by Disinger, 1998b). As mentioned earlier, the generally accepted catalyst for creating a common understanding of EE was principle nineteen from the Stockholm Declaration in 1972. From this, two internationally produced documents were developed that provided grounding to the EE movement that are still used today. They are the Belgrade Charter (United Nations Educational, Scientific and Cultural Organization-United Nations Environment Programme [UNESCO-UNEP], 1976) and the Tbilisi Declaration (UNESCO-UNEP, 1978).

The Belgrade Charter, adopted by a United Nations conference held in Belgrade, Yugoslavia in 1976, provided a widely accepted goal statement for the EE movement:

The goal of environmental education is to develop a world population that is aware of, and concerned about, the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations, and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones. (p. 2)

In the following year, in October of 1977 in Tbilisi, Georgia of the former Soviet Republic, the first Intergovernmental Conference on Environmental Education created the Tbilisi

Declaration. Built on the Belgrade charter, the Declaration is often considered to be an internationally seminal work for EE. As part of the forty-one recommendations in the declaration, recommendation two set forth an outline of goals, objectives and guiding principles for EE to be used around the world. It states:

1. The *goals* of environmental education are:
 - a. to foster clear awareness of, and concern about, economic, social, political, and ecological interdependence in urban and rural areas;
 - b. to provide every person with opportunities to acquire the knowledge, values, attitudes, commitment, and skills needed to protect and improve the environment;
 - c. to create new patterns of behavior of individuals, groups, and society as a whole towards the environment. (p. 26)

It goes on to lay out the five categories of EE objectives, labeled awareness, knowledge, attitudes, skills and participation, each with descriptions of the purpose of each. It is then followed by twelve guiding principles for EE, including lifelong learning, understanding the environment in its totality through interdisciplinary learning in diverse and local environments. It also focuses on problem solving and critical thinking skills, while stressing practical activities and practical experience. Copies of these three portions of the Tbilisi Declaration are included in Appendix C.

The Tbilisi Declaration continues to be used as a grounding document in the ongoing effort to delineate what EE is and how it should be taught in various contexts. Those contexts vary from local to international communities, and include all ages both inside and outside of formal educational settings. This creates a variety and sometimes competing interpretations of what EE teaching is, made up of innovative programs and groundbreaking ideas, mixed with self-serving agendas and unrealistic approaches (Disinger, 1998b).

To add to the complexity, the nature of EE can be interpreted very broadly, from a discipline to a framework for general teaching. EE can be viewed as a multidisciplinary, problem oriented approach to teaching, going against the grain of traditionally compartmentalized education. For some, EE is understood to be a “process rather than a discipline in itself”, a catalyst of other disciplines, or even “purposeful General Education” (Nash, 1976, p. 11 - 12). In this process interpretation, EE has been used as a programmatic framework, providing a context for all learning. This framework approach to EE is often called “environment-based education” (EBE), where the overall educational program creates students’ learning experiences by using the local environment and current issues. NAAEE delineates EBE as:

...environment-based education uses a popular subject matter to improve students’ learning skills and create a wider learning context for students, teachers, and the community. Environment-based education emphasizes interdisciplinary integration of subject matter, problem- and issue-based learning experiences, team teaching, learner-centered instruction, constructivist approaches, and self-directed learning. (2001, p. 3)

The description of EBE focuses on the context of learning, while emphasizing interdisciplinary teaching, problem solving and learner-centered instruction. Ernst takes the definition of EBE further citing the focus of EBE,

... where the environment is used in US schools as a context for integrating core subject areas and a source of real world learning experiences. ...The programs within this type of school-based environmental education share an emphasis on interdisciplinary, learner-centered instruction, the development of critical thinking and problem-solving skills, and consideration of the environmental in its totality – all of which are essential elements of environmental education...

She goes on to include the qualities of engaging students in community-based projects and problem-solving, using the environment as a context for supporting multidisciplinary study over a long duration, ending with the statement,

Thus, this form of school-based environmental education differs from other forms of school-based environmental education (e.g., an annual field trip to a nature center or using environmental activities to supplement the curriculum) in its focus on issue and action skill development in a community participation framework. (2007, p.16)

A variety of EBE programs have been developed, such as the “using the Environment as an Integrating Context” (EIC) Model (Lieberman & Hoody, 1998), place-based education, environmental service learning, and Investigating and Evaluating Environmental Issues and Action (IEEIA) as described by Hungerford, Peyton and Wilke in 1996 (Ernst, 2007). This array of EBE programs highlights how EE has been interpreted and nuanced to fit the variety of settings and missions of those who teach it, including classroom teachers. Overall, the range of EE interpretation, from discipline to programmatic context, sets the stage for current efforts to create a coherent view of EE at the national level that can be implemented throughout the state and local levels.

The EE standards effort.

State and local level programs and policies have been varied, and there has been debate concerning EE’s defining operational characteristics (Disinger, 1998b). To address this debate, there has been an effort to create a coherent approach to EE in the classroom, focusing on a standardized set of guidelines. The standardized approach was undertaken by the North American Association for Environmental Education (NAAEE) in collaboration with the EPA in 1993, which resulted in the publication of four guideline documents in 2004. These national level guidelines were developed to address pre K – 12 learner outcomes, teaching materials, teacher

preparation and professional development, and non-formal EE programs (NAAEE, 2004a, b, c, d). In this effort to create a coherent version of EE, these “Guidelines for Excellence” have taken into consideration the diverse historical background of EE while looking at the educational aspects of subject standards and teacher preparation programs. As an example, the teacher preparation and professional development document describes three ideas to shape an instructional vision for environmental educators as:

Systems

The idea of systems helps make sense of a large and complex world. A system has parts that can be understood separately, but the whole cannot be understood completely without recognizing the relationships among its parts. The human body can be seen as a system; so can galaxies. Organizations, individual cells, communities of animals and plants, and families can all be understood as systems. And systems are nested within other systems.

Interdependence

Human well-being is inextricably bound with environmental quality. We and the systems we create—our societies, politics, economics, cultural activities, technologies—affect the systems and cycles of the rest of nature. Since we are “in” the system, a part of nature rather than outside it, we are challenged to recognize the ramifications of our interdependence.

The importance of where one lives

Environmental education begins close to home, encouraging learners to explore and understand their immediate surroundings. The sensitivity, knowledge, and skills gained by forging this local connection provide a base for moving out into larger systems,

broader issues, and a lifetime of learning about causes, connections, and consequences.

(NAAEE, 2004c, p.3)

Labeled the “Essential Underpinnings of EE” in the document regarding K-12 learners, all four documents are based on a version of these ideas and inform the NAAEE organization’s approach to EE. All four documents, with additional supporting documents, resource reviews and program assessments, as well as training, grants and accreditation opportunities associated with the national guidelines are accessible through NAAEE’s website, which is actively updated on a regular basis.

The NAAEE’s EE learner guidelines are designed around four strands of knowledge and skills, and the levels that are appropriate at fourth, eighth and twelfth grades. The learner strands are as follows:

Strand 1- Questioning, Analysis and Interpretation Skills

Strand 2- Knowledge of Environmental Processes and Systems

Strand 3- Skills for Understanding and Addressing Environmental Issues

Strand 4- Personal and Civic Responsibility

Similar to the Tbilisi goals and outcomes in its focus on learner awareness, skills and participation including responsibility and lifelong learning, the NAAEE guidelines differs slightly in that it includes a particular focus on understanding earth systems, interrelationship of humans and the environment, and local connection for learners. The NAAEE guidelines do not include an explicit focus on an interdisciplinary approach to EE that the Tbilisi declaration does, and student attitudes are noticeably absent in the descriptions, instead using terms such as sensitivity and inclinations.

As these EE guidelines are put forth at the national level in an attempt to create a coherent vision of EE, they are placed against a backdrop of programmatic approaches to EE and

earlier precursors of the EE movement, such as nature study and outdoor education. To add to the complexity, local level interpretations of EE are being weighed amidst other supported and implemented initiatives at the district and school level. In 2007, the National Council for the Assessment of Teacher Education (NCATE) accepted the revised version of guidelines document for teacher preparation and professional development, approving a national set of standards for teaching pre-service environmental educators. While these standards are available, they have yet to be fully implemented, which may be due to the strength of other standardized educational movements and initiatives implemented at the state level, such as those based in the national No Child Left Behind Act of 2001 (NCLB). Gruenewald and Manteaw wrote of the impact of the high stakes testing and atmosphere of accountability fostered by NCLB on the EE movement,

One consequence of the ‘high-stakes’ environment surrounding NCLB is that the pressure to prepare for tests inhibits the development of outdoor, experiential, project-based learning, or community-based learning. In an era where even recess is being eliminated from the curriculum in schools across the nation, there are fewer opportunities to participate in collaborative inquiry projects, to contribute to community problem-solving, or to be initiated into the political process of local democracy. (2007, p. 181)

The authors argue that this concentration on test preparation is superseding all developing EE initiatives, as well as existing EE opportunities. With this in mind, NAAEE’s Guidelines for EE Excellence are available for creating coherence of EE in elementary classrooms across the United States, but the current educational atmosphere is not overly conducive to dialog among teachers and EE professionals regarding the possibilities surrounding EE initiatives, much less for immediate adoption and implementation of the standards in a coherent way. Therefore, in order to focus efforts and make progress in implementing EE standards, the implementation needs to be informed on the existing teacher EE perceptions amid the varied historical contexts and approaches to EE.

Guiding documents providing EE principles and outcomes at the international and national levels, starting from principle nineteen in the Stockholm Declaration, to the most recent interpretations of the NAAEE's "Guidelines for EE Excellence", provides a coherent vision for EE in elementary classrooms as shown in the learner guidelines. For this study, the complexity of the development of contemporary EE, as well as the initiative towards using EE standards amid other educational movements and initiatives, provide a call for purposeful understanding how teachers interpret EE for their classroom. The context of teachers teaching EE in the classrooms is the next focus of this literature review.

Section Two: Status of EE in the Classroom

As teachers worked to interpret what EE is in the context of their classrooms, the National Environmental Education Advisory Council (NEEAC), released a report to congress in 2005, titled, *Setting the Standard, Measuring Results, Celebrating Successes; A Report to Congress on the Status of Environmental Education in the United States*, to summarize the status of EE fifteen years after the National Environmental Education Act of 1990 was passed. While the report uses research from the field of EE, it is presented solely as an action plan for the future, using generalizations across the research findings to ground the recommendations. In the summary, it states,

The Council finds abundant evidence that every state in the nation has responded to this call for action. Since the National Environmental Education Act was passed in 1990, the overall quality of environmental education has improved measurably across the nation. Professional development programs are flourishing, and high-quality instructional materials (increasingly aligned to state academic standards) are being used in both formal and non-formal settings. Environmental education – with its emphasis on critical thinking, interdisciplinary teaching, and learner achievement – is also helping to meet educational reform goals.

The report then lays out eight recommendations for action within three distinct categories:

Setting the Standard

1. Update the National Environmental Education Act for the 21st century.
2. Broaden the audience and leadership of the environmental education field.
3. Improve the quality, accessibility, and dissemination of environmental education materials and programs.

Measuring Results

4. Develop a framework and tools for measuring the effectiveness of environmental education.
5. Support and strengthen long-term research initiatives.
6. Establish an outcome-based grant program to enable states, territories, and tribes to deliver environmental education programs and services.

Celebrating Successes

7. Develop assessment-based professional development programs for formal and non-formal educators to improve their ability to teach environmental concepts and skills to learners of all ages.
8. Build public understanding of the value of environmental education and increase the number and diversity of talented young people pursuing environmental careers. (p. 3)

While this framework may serve as a useful general vision for what EE may become within U.S. education, the document makes no mention of the context of what is happening in schools, nor of the experiences of teachers trying to teach EE. If the findings of their research are so positive with regards to the implementation of EE across the nation, one might question why the recommendations are so basic, such as the need to “develop a framework and tools for

measuring the effectiveness of EE.” While the document cites positive outcomes in terms of the implementation and quality of EE, the claim is questionable since data was not cited to support it and how the claim that EE has “improved measurably” across the nation was derived.

This section of the literature review touches on the status of EE at the state level. It gives a clearer view of overall state implementation of EE, and EE curricula and its use, as well as the particulars of the state in which this study is centered.

Implementation of EE at the state level.

A report published in 2001 looked at the components of what they called “comprehensive EE programs” at the state level over a three year period (Ruskey, Wilke, & Beasley, 2001). According to this report, states are advocating or supporting comprehensive EE programs that are integrated into the formal K-12 curriculum. The study provides an overview of how widespread several critical components of EE programs’ support structure, such as state requirements for including EE across the curriculum, addressing EE learning objectives and assessment strategies (Archie, 2001). This data was collected through email communication with individuals across all of the states. These individuals were selected because of their roles and status of EE involvement at the state level, including governmental and EE interest groups. They were provided with definitions of the categories, but allowed the participants to interpret if and how the components occurred in the state.

The most prevalent EE program component is a computerized EE resource network for 80% (40) of the states, whereas the least prevalent components are EE pre-service training requirement for teacher certification for 18% (9) of the states, and requirements for including EE in curriculum in 36% (18) of the states. While a variety of components could be available at the state level, it highlights a trend found in other studies. A growing number of states have environmental education programs with curriculum guidelines and funding sources; however the task of interpreting EE for implementation in the classroom has largely fallen to the individual

districts and schools in the public educational system (Flanagan, 1999; Disinger, 2005). While states are working at creating comprehensive EE programs, the degree of development in the states are highly variable, with many more states having resources and assessment, and less focusing on requirements for teaching and training. Ruskey, Wilke, and Beasley (2001) also cite a decline in the number of facilities, both government and non-profit, and the amount of funding available during the three year study. This limits the amount of support and resources available to those teaching EE to students, including teacher education and learner assessment. These trends highlight the concern that arises as the use of EE standards is being recommended at the national level, where teachers are responsible for teaching EE at the state level, but can be left interpreting how to do so, including gathering resources and implementing EE in their classrooms. As an example of state interpretation of EE, a description of the EE program components for the state of Minnesota, in which this study took place, are as follows.

The state's EE plan.

As an example of how a particular state may interpret the implementation of EE, and to provide insight to the context of this study, information on EE plan for the state of Minnesota is described below. A state statute titled "Environmental Education Goals and Plan" was passed in 1990, following the passage of the national level Environmental Education Act of 1990.

Published under the state's broader Waste Management Act, this guiding statute says:

(a) Pupils and citizens should be able to apply informed decision-making processes to maintain a sustainable lifestyle. In order to do so, citizens should:

1. understand ecological systems;
2. understand the cause and effect relationship between human attitudes and behavior and the environment;
3. be able to evaluate alternative responses to environmental issues before deciding on alternative courses of action; and

4. understand the effects of multiple uses of the environment.

(b) Pupils and citizens shall have access to information and experiences needed to make informed decisions about actions to take on environmental issues. (1990)

The state also published two guiding documents stemming from this statute, a state-wide plan, and a scope and sequence document for k-12 learners. The state-wide plan was first published in 1993 with plans to update every ten years. It is currently on its third addition in 2008, and it lays out the state's EE plan, in coordination with the statute, saying:

To address emerging issues, the state needs an environmentally literate citizenry. People who are environmentally literate:

- understand the complexity of natural and social systems and their interrelationships.
- demonstrate the knowledge, skills, attitudes, motivation, and commitment to work individually and collectively toward sustaining a healthy natural and social environment.
- have the capacity to perceive and interpret the health of environmental and social systems and take appropriate action to maintain, restore, or improve the health of those systems. (Kennedy & Stromme, 2008, p. 6)

It then lays out the considerations needed for a variety of settings, such as home, work and schools, and the groups and individuals who are involved in those settings. Because the school and k-12 learners are of contextual concern for this study, a complete copy of the state's guidelines for these three areas are included in appendix D. In summary, the state guidelines focus on a comprehensive EE program that is relevant and integrated into the existing subject areas. Learning objectives include observation and analysis skills, understanding the complexity

of natural and social systems and their interrelationships, as well as action oriented towards ensuring environmental quality.

This document works in conjunction with the state's scope and sequence document that lays out learner benchmarks, or the knowledge and the sequence for learning that knowledge. It also includes a framework of concepts needed for teaching EE, described as the five Key Systems concepts, which assist in understanding the application of each Benchmark to environmental lessons (Landers, Naylon & Drewes, 2002, p. 9).

The document uses a structure of learner benchmarks for grade levels pre K – 2, 3 – 5, 6 – 8, and 9 – 12 (adult) that build from the previous grades, and provides descriptions of key concepts and supporting concepts, and their applications to natural and social systems (appendix E). As a resource, it provides alignment documentation with an earlier version of state academic outcomes, but has not been updated to align with the new academic standards system. Both of these documents can be found online in the state's electronic resource page for EE (<http://www.seek.state.mn.us/eemn.cfm>), which also includes links to resources, research, leadership training, advisory task force and general public and business EE information.

Similar to the national goals and outcomes in its focus on the skills and participation, as well as the understanding the complex systems and interrelationships, the state guidelines differ slightly from the national document in that it includes attitudes, and includes key systems concepts with the benchmarks. They are very similar in strands, and the state is more explicit on what each of the goals would look like, including sample indicators for student learning.

The state has created guidelines for EE in the state, including a scope and sequence portion for learning. There are also efforts by the state's department of education to incorporate some EE related benchmarks into the academic standards for science. There has not, however, been an effort to assess the guidelines or newly created standards. The guidelines are simply that,

guidelines for learning, and the districts and the teachers are left to interpret EE for their classroom.

Section Three: Teachers and EE

An article by Salmon (2000) discusses findings made by the Independent Commission on Environmental Education after reviewing 100 K-12 EE teaching materials used in classrooms. The study found there is a lack of quality materials available for teachers to teach EE, citing factual errors and the lack of a progressive building of knowledge. The findings go on to suggest that teachers are put into a situation where it is difficult for them to judge quality because there isn't a relationship between the authorities that promote the material and how good it is. If a well known EE organization backs a particular curriculum, it does not mean that the curriculum is of high quality. Studies on particular EE materials, such as programs like SEER's EIC, demonstrate their quality, but often are school wide or larger initiatives, and not usable by independent classroom teachers. This makes the teacher's role as front-line facilitator of EE implementation in the classroom increasingly important, because they are making decisions through their perceptions of what EE should be and what the materials should be covering. The focus then shifts to the teachers themselves, and how they approach EE in the classroom.

In formal classroom settings, a teacher is primarily responsible for the students' learning, including their EE experiences. According to McCrea and deBettencourt (2000), editors of a national report on K – 12 teachers' teaching of environmental studies topics in their classroom, almost 70% of teachers report teaching environmental topics in their classrooms, with the highest percentage (83.0%) in the primary (K-4) grades. In this report, teachers were randomly selected from all subject areas and grade levels, and across the nation to respond to a survey focusing on the topics, techniques and resources they used in their classrooms. The most commonly listed topics contributed to EE in the classroom by the K-4 teachers, were recycling and waste management (94% of the K-4 teachers indicated teaching it), endangered species (92%),

conservation of energy (75%) and forests and wetlands (73%). The teaching methods most commonly used by K-4 teachers was hands on activities or projects (91%), discussion of environmental topics covered in textbooks or other reading materials (90%), fieldtrips (61%) and problem solving exercises (55%). However, the teachers were not asked about how they chose the particular EE topics they included in their classroom and what aspect of EE they attended to, which is not uncommon in the field of EE research. There is an assumption that the EE topics are selected for the same educational purposes by all of the teachers, or that there is a single interpretation of why the topics were selected by teachers, especially since there was a commonality in what teachers are selecting as EE topics and activities. Regardless, the scope and diversity of the teachers' perceptions of EE are not considered, and are unknown.

This next portion of the literature review specifically looks at the available literature regarding how teachers perceive EE in order to strengthen the rationale of how this study was implemented and how the findings of this study may inform the field of EE. The literature on teacher EE perceptions includes studies that focus on a variety of teachers, including pre-service, secondary and elementary school teachers. When these studies were examined, the characteristics of the non-elementary school based studies were based in very different contexts, backgrounds and situations than those that would be found in relationship to elementary teachers. These pieces of literature were not considered germane to this study, therefore not included. Additional studies were found that made incidental comments about teachers' perceptions of EE, but were so limited they did not inform this study. Pertinent studies focusing on EE perceptions of elementary classroom teachers in the United States were examined to shed light on current understandings of teacher perceptions of EE. Several went beyond elementary school, including teachers teaching beyond elementary school, and offer some insights to what researchers mean by perception and

how they assess it. Descriptions of these studies are presented to show their similarities and draw conclusions across the findings.

Existing studies looking at elementary teachers' perceptions of EE utilize both qualitative and quantitative approaches to explore this topic. These studies explored the teachers' perceptions of training and implementation of EE, the commitment to EE, as well as barriers to EE in the classroom.

The first study that looked at teacher's perceptions focused on training and implementation of an EE curriculum and how they changed over time. Winther, Volk and Shrock (2002) interviewed eight teachers three times over a year, ranging from elementary to high school, who had participated in a National Science Foundation teacher-staff development workshop for a new EE curriculum. The study found teachers perceived administrators were supporting their EE efforts simply because it facilitated other school goals. Participants initially perceived the specialized EE training as overwhelming, largely because it was different from their previous teaching practice. Winther et al.'s findings indicate that over time teachers perceived their training sessions as ultimately useful, even when that training was initially seen as problematic. This study highlights the fact that teachers perceptions of EE training shift when they are working to adopt new EE initiatives.

The concern that teachers' relationships to EE are complex was the main focus in article by Sosu, McWilliam and Gray (2008). This complexity was evident because the authors used a mixed methods approach to predict teachers' commitment to EE. Their findings from both the quantitative questionnaire and qualitative interviews showed that the teachers' perception of control or autonomy when teaching EE is the most significant factor that influences their decisions to engage in teaching EE. If the teachers perceived that they had control over what they

taught in regards to EE, and that they could make decisions independently of other people, such as fellow teachers and administrators, they were more likely to engage in teaching EE. Another significant influence on the teachers' EE commitment was subjective norms described as the influence of the people in the participants' social circle on their behavior. A belief in the importance of teaching EE and some environmentally related life experiences of the participant were also identified as salient. The authors used these findings to support the argument that factors affecting teachers' commitment to EE were numerous and act synergistically. While efforts were made to include teachers' perceptions of what they should be doing compared to what they were doing, much of the complexity of their perceptions was lost in the data analysis. The understanding of the relationships between these factors and the teachers' commitments were simplified to see if they were predictable, hence losing the richness of the teachers' perceptions

Focusing specifically on perceived barriers to EE implementation, Ernst investigated teachers' perceived influences on their decisions to use and implement EBE, and included a comparison to teachers who use other forms of EE (2007). This study aimed to encourage more widespread adoption of the EBE formal instructional approach. Ernst surveyed a national convenience sample of 287 K – 12 teachers who practiced EE or EBE in their classrooms. The survey consisted of sixty-nine predetermined factors of potential influence and asked participants to rate in terms of their relative helpfulness or hindrance. The study found five persistent barriers perceived by teachers included: (a) emphasis on state testing, (b) lack of funding, (c) lack of planning time, (d) emphasis on state standards, and (e) lack of transportation. These five barriers were the strongest regardless of the teachers' approach to EE. This study demonstrates a consistency among teachers nation-wide who implement EE in their classrooms. While Ernst's study did not look directly at teachers' general perceptions of EE, it does provide an overview of challenges that classroom teachers perceive as barriers to their successful EE implementation.

How to determine which subjects were appropriate for inclusion in an EE curriculum, and what kinds of settings would be beneficial is also a topic that has been explored in relationship to perceived barriers to EE implementation. In 1998, Simmons collected responses from fifty-nine elementary school teachers in the Chicago metropolitan area, as they rated items on a questionnaire using a 5-point Likert-type scale. The items were in regards to perceived benefits and barriers to using natural settings for EE, appropriateness of teaching particular subjects (e.g., math, science, and language arts), appropriateness of teaching specific activities (e.g., plant studies, listening and observation activities, and reading), and perceived resource needs. The items were used four times while referring to four different sets of photographs depicting natural settings that could be used for EE experiences: (a) rivers, ponds, and marshes, (b) deep woods, (c) county park, and (d) urban nature.

The results from Simmons' study showed the teachers had distinct perceptions for each of the four natural settings, for example urban nature was perceived as a less appropriate but safer setting for teaching EE than the other three. Although teachers' perceptions of each setting varied, there were certain commonalities. The teachers perceived providing nature experiences as being an important part of the curriculum, indicated that their students would enjoy these experiences, and that participation in programs at natural areas would be educationally worthwhile. They were, in turn, concerned that they were not particularly "well trained" to teach in natural areas, desired more training, and needed the training before they took their students to the natural settings. The author also noted contrasting perceptions teachers expressed were both knowing what to do with their students, and knowing what teaching techniques to use in each setting. While the teachers perceived the outdoor settings as favorable to their EE teaching, the findings suggest they were, at the same time, noticing deficiencies in their own preparation to teach EE.

An additional research report that pertains to teachers' EE perceptions that included barriers was prepared by Middlestadt, Ledsy, and Sanchack in 1999 for the NAAEE, titled *Elementary school teachers' beliefs about teaching environmental education*. This qualitative study of 172 fourth, fifth and sixth grade teachers who had received training in EE focused on their self reported views and behaviors on a semi-structured questionnaire in order to identify strategies these teachers used to overcome barriers to their EE teaching. While the participant selection was based on having training in EE, it did not specify the type of training but only that it needed to have occurred in the last five years. Participants' EE training included college courses and workshops provided by the school or through an EE program. It was found the teachers perceived that EE was not only a way to teach about the environment, but also an innovative way to achieve basic educational goals like reading, math and student skills, a point that was not made in the other literature. The findings also indicate that social norms, which are similar to the subjective norms in the previous study by Sosu, et al. but focus specifically on the expectations of others around the participants, are factors that influence whether teachers teach EE, in that teachers who have learned to gain support from principals, other teachers, parents and members of the community are more likely to teach EE.

While focused on teachers' perceived barriers, the Middlestadt, et al. study also found that the trained teachers' perceived advantages of teaching EE included students becoming simply more aware of the environment and environmental issues (40% of the teachers), students would learn to care about the environment and appreciate nature (26%), students would learn of their impact on the environment (18%), and EE helps students accept their responsibility for the earth (15%). It found that teachers believed students have a better understanding of interdependence as a concept, such as cause and effect, and life is interrelated (26%). Teachers' perceived items that helped facilitate teaching EE included materials and time (41%), money (23%), having realistic

classroom experiences and activities (15%), and supportive school EE policy (13%).

Interestingly, even though all of the teachers were participants in the study because they had training in EE, only 25% considered training and increasing their knowledge about the environment as helpful in overcoming barriers to their EE teaching. This study offers insight to how teachers have chose to implement EE in their context, and what they perceive to be the goals of EE. It is focused on the teachers' perception of the reality of teaching EE, and just begins to address the complexity of what they perceive EE to be.

Finally, a qualitative study looked at the gaps between advocated practices and teaching realities in EE, touching on the barriers of EE as well as perceptions of EE itself. Robertson and Krugly-Smolka's 1997 study based on the observations and interviews of three environmentally committed teachers in schools that offer environmental programs. This study examined teachers' views about EE, about the program itself and looked at factors that contribute or inhibit to successful EE program implementation. It was found that the teachers are finding that environmental education is a difficult task within the realm of schools for three main reasons. First, EE practice is not easy because time, materials, and schedules affect the things the teachers believe are necessary to support activities in EE programs. Second, teachers perceived EE as full of conflicting ideas and were unsure what EE really was. Last, the teachers were not certain that they were permitted to do many of the things that are necessary to accomplish the lofty social and political goals of environmental education. While the issues of EE practice were echoed in Middlestadt, et al. (1999) and Ernst (2007), none of the other studies captured as much depth to the teachers perceived barriers of EE.

The complexity of how the three teachers perceive EE was captured in the Robertson and Krugly-Smolka findings, unlike all but Sosu et al. The findings included the following four points. First, the teachers emphasized the idea that environmental concerns were beyond

recycling and related measures yet all focused on such activities. Second, similar to the philosophy of nature study, inherent within the methods was the assumption that exposure of students to certain activities or experiences is sufficient to bring about change in attitudes and behaviors. Third, although the teachers spoke of EE more in terms of changing social behaviors, they volunteered the information that they were not science educated, and were concerned that they should be finding ways to include more of a science component in the environmental education work they do with students. Fourth, when not using prepared curriculum documents, the teachers developed a program based on personal experiences and ideas.

In summary, while the contexts of the research conducted associated with teacher EE perceptions are very diverse, the findings across the literature support the following four summarizing statements regarding teachers' perceptions of EE. First, EE student environmental awareness and care of the Earth tend to be perceived as the main goals of EE teaching. Second, social and personal norms, such as approval from colleagues and administrators as well as personal experiences, were perceived as important influences to the teacher when implementing EE in their classrooms. Third, EE implementation was often overwhelming, due to barriers including lack of time, money and/or materials, as well as a focus on other academic goals, such as high-stakes academic testing. EE was also perceived as overwhelming because the new EE was different than the teachers' previous teaching. Lastly, as teachers perceived EE to be science related as well as social skills related, they also perceived themselves as lacking an understanding of EE that would bring EE beyond basic themes, such as recycling. Teachers' EE perceptions in the literature are treated as a single phenomenon, whereas this study parses out the perceptions into EE as an idea and how it is perceived as an ideal version of EE teaching, as well as the perceived realities of teaching EE.

Cautionary Discussion.

These studies represent numerous approaches to understanding teacher perceptions around EE. Quantitative studies provide us with some useful information regarding teachers' perceptions of EE. Several studies identified barriers to implementation of EE as rated by teachers (Ernst, 2007; Middlestadt, et al., 1999). Simmons (1998) also looked at the issue of barriers to EE implementation, but specifically explored teachers' perceptions of the use of outdoor settings for teaching EE. Sosu, et al., (2008) identified factors that influence teachers' commitment to teaching EE. While these studies identify the significance of selected factors perceived by teachers in the implementation of EE, they do not allow for teachers to describe their own perceptions. The teachers were required to respond to preselected sets of possible responses.

Middlestadt, et al (1999) used self reporting as a means of allowing teachers to identify perceived barriers to EE and strategies to overcome them. This study also allowed for some exploration of innovations reported by teachers to achieve broader education goals. Qualitative studies, like Middlestadt, et al., and Robertson and Krugly-Smolka, (1997) provided more nuanced insights into teachers' perceptions of EE.

The studies described above give valuable insight to teachers' perceptions of some aspects of EE, but there are limitations in regards to the interpretation of the findings in broader contexts. The findings are limited by the participant selection process, the particular aspect of EE being researched, or the fact that the respondents were offered a predetermined set of responses.

The first limitation pertains to the selection processes used to determine who could participate in the study. The selection process often excludes a majority of the general teacher population. The participants of the studies were found to be selected by EE affiliation, such as teachers participating in the particular EE program implementation that is being studied (Winther, et al., 2002), or as teachers that were trained environmental educators (Robertson & Krugly-

Smolska, 1997; Middlestadt, et al., 1999). In these studies, if the specifics of the participant selection process are understood, the readers can consider the narrowness of the samples when considering the relevance of the findings.

The second limitation is related to the narrow focus of the research in the studies. The studies often are focused on one aspect of EE, such as looking at a particular EE teaching setting (Simmons, 1998) or attribute (Sosu, et al., 2008). The findings from these studies are limited in relationship to a general teacher populations' experience, in that the EE aspect studied is very specific and may not be encountered by a majority of teachers. It is understandable why studies specify the EE aspect being examined, often to provide information on a particular resource. Conclusions coming from studies limited by the participant selection process or a focus on one aspect of EE may be considered less informative of the general population of classroom teachers and their perception of EE until viewed amid the landscape of available literature.

The third limitation regarding these EE perception studies is that the researchers offer a predetermined the set of questions that were asked and the possible responses. Caution is advised when viewing all of the studies focusing on teacher perceptions of EE provided a predetermined set of factors for the participants, for the teachers perceptions are not examined in their totality and the complexity is overlooked. As previously mentioned, the last two studies, by Middlestadt, et al. (1999), and Robertson and Krugly-Smolska (1997), provided ways for the participating teachers to voice additional perceptions by using semi-structured interviews and surveys with self reporting portions. This noticeably added to the richness of the findings and insight to the complexity that existed in the perceptions.

While studies that have one or more of these qualities provide valuable insights in regards to the issues surrounding teachers' EE perceptions in elementary classrooms, they provide a narrow view of the interactions, tensions and decisions teachers may experience in relation to those perceptions. This study, while also limited in the number of participants selected, attends to

the above issues by selecting only participants that have a common non-EE based context from which all of the teachers are teaching. It also focuses solely on the participants' perceptions of EE itself, allowing the participants to explore their perceptions including the context in which they perceive is ideal for EE and their reality of EE, as well as allowing the participants to delineate what is included in their perception of EE descriptions without entirely predetermining what should or should not be included. In comparison to other teacher EE perception studies, this study treats the phenomena of perception differently than how it is typically studied. Instead of a generalized view of EE in the classroom, this study parses out and examines the teachers' perceptions of EE as an idea, what would be ideal EE, as well as EE in their reality.

Within this literature review, the history of and current status of EE has been described to lay out the landscape and backdrop of this study. The current research on EE, and more specifically teacher perceptions of EE, were delineated to give context to how this study will help inform research and implementation associated with EE. Standards and program based efforts will change how elementary classroom teachers have traditionally addressed EE in their classroom, which largely have been personal interpretations of what students need to know concerning their relationship with the environment. If progress is to be made to change the national climate of EE in the classroom, we need to understand the EE perceptions of teachers in the classroom.

Chapter III: Research Design and Methods

“Till we ourselves see it with our own eyes, and perceive it by our own understandings, we are still in the dark.” --Locke.

This study looks at how elementary classroom teachers perceive EE. It uses a multiple case study design (Yin, 2003) to examine the perceptions of individual classroom teachers in order to assemble a thicker description of elementary teachers’ working understanding of EE. The objective is not to evaluate the validity or determine the quality of their descriptions, but to provide a window into how they perceive environmental education. The research design and methods are based on that objective in relationship with the four main research questions.

Creswell writes, “When researchers conduct qualitative research, they are embracing the idea of multiple realities” (2007, p. 16). Based on this ontological stance, I approached this study with the goal to capture each individual’s perceptions of EE in their classrooms. I am strongly influenced by Creswell’s description of Social Constructivism in this study:

In this worldview, individuals seek understanding of the world in which they live and work. They develop subjective meanings of their experiences – meanings directed toward certain objects or things. These meanings are varied and multiple, leading the researcher to look for the complexity of views rather than narrow the meanings into a few categories or ideas. The goal of research, then, is to rely as much as possible on the participants’ views of the situation. Often these subjective meanings are negotiated socially and historically. In other words, they are not simply imprinted on individuals but are formed through interactions with others (hence social constructivism) and through historical and cultural norms that operate in individuals’ lives. (p. 20 -21)

The concepts of multiple realities and developing subjective meanings are the impetus for this study, for as the literature review reveals, the field of EE research do not fully address the complexities of how individual elementary teachers perceive EE. Multiple cases of teachers' perceptions within a common context can offer some insight and inform our understanding of the complex status of EE as a part of elementary teachers' curriculum and instruction.

The approach of multiple case studies to look at the teachers' EE perceptions was warranted to illustrate the intricacies of the teacher perceptions in that the approach lends itself to "show different perspectives on the issue" (Creswell, 2007, p.74). It should also be noted, the intent was not to generalize to all teachers, but to visit the multiplicity in EE perception, and to facilitate understanding, where that multiplicity might be commonly grounded.

The research questions framing this study are:

1. What are the participating elementary teachers' perceptions of EE?
2. What are the participating elementary teachers' perceptions of ideal EE teaching?
3. What are the participating elementary teachers' perceptions of the reality of teaching EE?
4. How do the individual participating teachers' three types of EE perceptions misalign?

In this chapter, I present the overall research design used to explore these questions. I will introduce the context of the study and the rationale for selecting the teacher participants that are included in this study. I will describe the data collection procedures and analysis methods for assembling the descriptions of teachers' perceptions of EE. I also attend to issues of credibility and dependability of the study, explaining my background as a science teacher, further addressing the lens I bring to this study. Finally, I communicate some of the tensions and limitations associated with this study.

Overall Research Design

The overall research design is centered on the descriptions of environmental education the teachers provided during one on one interviews. In order to construct a thicker and richer understanding of their perceptions of EE, I also analyzed questionnaire data collected during the participant selection process. In addition, I investigated contextual information related to the participants, including public documents and existing data from interviews relating to the district, including information about the school as well as EE programming made available to the district's classroom teachers as part of the district. To further triangulate the descriptions, I investigated the available EE resources each participant cited during the interview and in questionnaire. The relationships of the different data sources are illustrated in Figure 3.1.

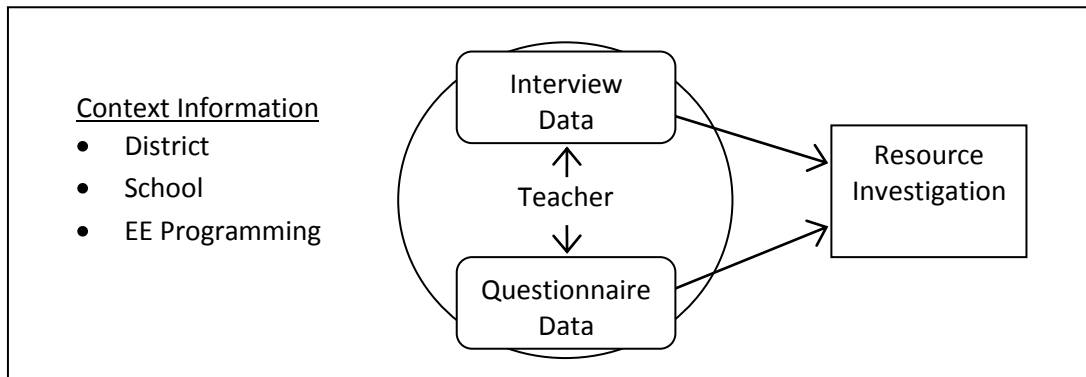


Figure 3.1: Study Research Design. This figure illustrates the relationships between the data used in the study, as represented by the four rectangles of Context Information, Interview Data, Questionnaire Data and Resource Investigation, and the participating teacher.

Context and Participant Selection

The teachers in this study were purposely selected from a common context. The context of the study focused on classroom teachers teaching in an elementary school (kindergarten through sixth grade) in a school district in the Upper Midwest having a variety of EE resources available to teachers on a voluntary basis. While not representative of all possible settings in which a teacher may be teaching EE, the common school did offer a manageable setting for comparisons between cases to address possible perceived context differences encountered by the participants.

The first stage of the study was a questionnaire that would provide a baseline data set to inform the analysis of the cases (Appendix A). The questionnaire was also the tool used to identify potential participants for the case study. It was delivered electronically to all of the K – 6 classroom teachers in the district (approximate total N = 192). Access to the individual schools and the teachers was facilitated with help of district administration, in particular with the district's curriculum coordinator (DCC), and carried out by email correspondence with the teachers through the principals of each of the buildings.

The primary focus of the questionnaire was to contact possible study participants while doing a preliminary exploration of teachers' perceptions of EE. This was done by asking for descriptions of the amount of EE in their classrooms, the satisfaction level of the amount of EE in their classroom, the relative importance of particular EE outcomes, the topics covered that they felt fit under EE, the primary resources used to teach EE, and any formal EE training experienced by the teacher. There was also conjecture before the questionnaire was given that the understanding of EE may be different in individuals who had taken formal EE training compared

to those who had not because of the exposure and resulting familiarity to the terminology and the pedagogical possibilities of EE.

This selection process resulted in fifteen people who indicated that they would be open to participating in an interview, five of which were teaching in classrooms from one school, where as the rest of the candidates were scattered across seven other schools. All five teachers from the school were asked to participate in the study, and all five agreed. Due to a life event that prevented one teacher from finishing the data collection process, a total of four teacher participants from the one school make up the cases for this study. They included three women and one man. Their teaching experience ranged from two to twenty two years in the classroom. One participant was an art teacher, and taught all grades, kindergarten through sixth, in her classroom at different times during the school week. The other teachers taught kindergarten, second and sixth grade (Table 3.1).

Table 3.1

Demographics of Study Participants From Pebble Community School^a

Participants	Years of Teaching	Current Grade	EE Training Received	Satisfaction of EE in their classroom
Jane ^a	22	2	Extensive, area EE trainer	Should have slightly more EE
Heather ^a	13	6	Local Arboretum training	Should have significantly more EE
Paul ^a	4	K	Project WILD Training, College Environmental Studies	Should have slightly more EE
Rebecca ^a	2	K-6	No formal training	Should have slightly more EE

Note: ^aPseudonyms used for names of school and teachers.

Data Collection

Data was collected at several stages during this study. A questionnaire, an interview, and resource reviews were the three stages that involved the participants. Addition information was also gathered and analyzed in regards to the district and the school site, as well as the EE programming the district was participating in provided by a local Arboretum site.

The first stage, as mentioned before, was an electronic questionnaire that was primarily used to find and group candidates for the study while exploring teachers' perceptions of EE. It was eight questions long and included items for collecting demographic data at the end of the survey. (Appendix A) Information beyond the categories of formal EE training and satisfaction

level with the amount of EE in the classroom for grouping candidates was collected to offer further triangulation during the analysis. The survey collected information on the participant's estimation of time spent on EE during the school years, as well as how much time they would like to be spending on EE during the school year. Data was also gathered on what the teachers considered their top four resources when teaching EE, and they were asked to describe the topics taught in their classrooms that they feel fit under the heading of EE as well as what they felt should be included in the curriculum that would be considered a part of EE. There also was place to add additional comments below each survey question.

The second stage of data collection for the study focused on the individual teachers. It included semi-structured one-on-one interviews to gather specific information on the participants' definitions and conceptualizations of EE and to examine the factors influencing them. (Appendix B) The interview attended to the four main study questions, and offers insight to the teacher's perceptions of ideal EE and realities of EE teaching coincide.

The interview started with gathering background information about the teacher and how they depict their classroom to give context to the teacher's perceptions and build rapport. The teachers were then asked to describe EE and how they came to perceive it in that way. This led to a discussion about the realities of teaching EE, and how they envision their ideal situation and the goals they would be achieving while teaching EE in that situation. The focus of the interview was on the teacher's perceptions and how they describe their perceptions of EE, ideal EE and reality of EE. The "how" of the teaching was usually referenced in examples, often to demonstrate the reasoning of the teacher and their decisions. Throughout the interview, additional probing and clarifying questions were asked if the responses were brief, conflicting or confusing. The participants were encouraged to talk about their perceptions and where they came from. The setting for the interviews was decided by the participating teacher during non-contract time and

could include their classroom or alternative public meeting places, such as a local coffee shop. The hour long interviews were audio recorded and transcribed at a later time to expedite the interview and facilitate accuracy during analysis.

In addition to the questionnaire and interview, contextual information was gathered to further inform and triangulate statements made by the teachers. Teacher descriptions of their teaching context were combined with public information about the district and school contexts, such as district website information and school newsletters, as well as program curriculum and student demographics (such as socio-economic, ethnicity), and offsite EE program participation and required school-wide learning initiatives. Existing data from interviews of the district's curriculum coordinator and the arboretum's environmental education coordinator were also used in framing the context and in triangulation of the participant interview data.

Additional data was collected outside of the interviews and questionnaire. For instance, when resources were mentioned by the teachers as items used in EE teaching, they were noted or collected to add to the context description. Participants were asked to provide examples of resources, such as curricular artifacts that pertained to environmental education, as they were brought up during the interview or electronically after the interview. These resources were often in the form of lesson plan materials, classroom informational texts, as well as school, teacher and informational websites, school fieldtrip information and other items that pertain to either the school or the individual teachers in regards to EE. Additional visits with the teachers to look at these artifacts were needed in several instances, but did not include any formal interaction with the teacher. Other items were accessible through the internet and the arboretum facility. All of the resources collected were used as contextual information while creating the case descriptions for each of the teachers, and provided an additional lens to present the richness of the participants' perceptions.

Table 3.2

Data Collection Summary

Data Source	Method	Intent
Questionnaire	Electronic delivery via school principal, voluntary response	Participant selection and demographics, preliminary perceptions of classroom EE objectives and topics
Interviews	Semi-Structured In-Depth Interviews in Classroom or Public Place	Teacher background and classroom description Exploration of EE, ideal of EE, and realities of teaching EE Processing of discrepancies
Context Descriptions	Public documents and internet sites Interview data of District's Curriculum Coordinator and Arboretum's Environmental Education Coordinator	Grounding and triangulation of teacher descriptions
Resources	Investigation of artifacts, via internet and/or on hand	Triangulation of teacher descriptions, Contextual information

Data Analysis

In order to bring out the nuances in the teachers' perceptions of EE while constructing a concise story for each case, the data from the questionnaires and interview transcriptions were coded by individual. Coding starting with a "provisional" (Miles & Huberman, 1997) or "lean coding" list (Creswell, 2007) based on this study's main questions, as follows: perceptions of EE, perceptions of ideal EE, and perceptions of actual EE teaching. Instances where the teacher stated

what EE was by definition or example were coded as part of their EE, such as, “I think it [EE] is seeing our world, our environment, your community, your home. Looking at the detail of it, or using a magnifying glass if you will” (30028, 33:00). If the teacher mentioned what they would like to be doing in regards to EE or what it should look like or accomplish, it was coded as part of their ideal EE, such as, “If we can put things into a whole big picture kids get them better, and their responsibility” (30025, 6:40). When speaking about what they were actually doing in the classroom in regards to EE, or the student learning or outcomes, they were recorded as actual EE, such as, “They were able to take anything and turn it into what their imagination was seeing” (30022, 24:15). Throughout this process, if portions of the participant’s comments about EE were difficult to place, they were looked at under the context of the questions the participants were answering, using the same coding descriptors used for the comments. In addition, the background information shared at the beginning of the interview was coded for general teaching experience and classroom descriptions. On occasion, a teacher would also explain a different part of their curriculum to give context to the complexity of teaching in general, and this portion was coded as background information as well.

The resources teachers spoke about were also tabulated as a check list for the triangulation process, as well as an additional contextual theme in the cases. As the interview process and the coding progressed, an interesting dynamic was noted relating to the teachers themselves and EE that added to the understanding the intricacies of the teachers’ perceptions of EE, such as “I’m glad that you came to talk and made me more aware of what I did, it was good; but I need to go further with it” (30022, 26:28). Because of this, an additional code was added based on the teachers’ self awareness when talking about EE, and is briefly explored at the end of each case.

After the initial coding was completed, the four sets of data, labeled Background information, EE, Ideal EE and Reality of EE teaching, were then sub-coded based on teaching descriptions and goals. When the data that did not fit into these two sub-codes was analyzed, two additional sub-codes based on resources and influences also emerged.

The transcripts were reviewed again to make sure all EE related statements were captured and coded properly. The resulting coding scheme was then used to organize the data and construct each case story, and they are structured as follows:

- 1) Background Information
 - a) Teaching Experience and Personal Classroom Description
- 2) Perceptions of EE
 - a) Personal Experiences and Training Shaping EE
 - b) Resources Drawn On
- 3) Perceptions of Ideal EE in the Classroom
 - a) Teaching Description
 - b) Goals and Measuring Success
- 4) Perceptions of the Realities of Teaching EE in the Classroom
 - a) Teaching Description
 - b) Applied Goals and Measuring Success
 - c) Outside Influences
- 5) Individual's Realizations About Understandings

The analysis of the cases, found in chapter five, subsequently focused on the themes that were found within each of three types of perceptions in order to answer the study's first three questions. Before examining the analysis process, an explanation of the "three types of perceptions" framework used is warranted. A focus on three "types" of perceptions was used in this study because of the concerns surrounding the situation teachers are currently in relating to EE. The meaning of EE in the current context of EE standards implementation can be confusing

or unknown to teachers, and they may view EE through such lenses as content, pedagogy, process or mind set. This, in consideration of the issues surrounding the research done concerning teachers' views of EE in a prescribed or assumed context, sets a framework to analyze how the teachers' perceive EE. The teachers' perceptions were broken into layers based on EE understanding, desired context, and actual context. The three types of perceptions are laid out as follows

The first research question, "What are the participating elementary teachers' perceptions of EE?" looks at the teachers' EE perceptions. The label of EE perception attempts to parse out the participants' perception, or intellectual cognizance, of EE as a "something" without a set context, thus simplifying constraints on how they understand EE. This was attended to by structuring the interview questions so the participant could say anything they feel they need to about EE without qualifying or quantifying their answer according to a setting, which may or may not have included their teaching, beliefs, experiences, or understandings that lead to the description of their EE perception. This openness to their interpretation was to avoid funneling their answer into a process, curriculum, or stance that they are not familiar with, disagree with, or are confused by when considering their perceptions of EE.

The second question, "What are the participating elementary teachers' perceptions of ideal EE teaching?" focuses on teachers' ideal EE perceptions. The label of ideal perceptions attempts to parse out the participants' perception, or intellectual cognizance, of EE as a "something" in a "context". This perception description now adds what the participant uses as an ideal context, where they choose how to constrain or possibly enhance their descriptions of EE by grounding it in whatever they perceive to be the ideal. It does tend to become more teaching oriented, because they are centering EE in a place or with a purpose or with a goal or with

whatever they feel is going to make the EE ideal, but the questions were open ended and the teachers still used definitions with the teaching and personal connections within the themes.

The third question, “What are the participating elementary teachers’ perceptions of the reality of teaching EE?” looks at the teachers’ perception of the reality of EE. The label of perception of reality attempts to parse out the participants’ perception, or intellectual cognizance, of EE as a “something” in a “context that is real”. There are now three layers within this perception. The EE itself, the context of where they teaching, and how they perceive themselves in that context. The context of where they are teaching is factual information about their setting; they do not get to choose the context for their perceptions as they did for research question number two. This third question focuses on how they perceive their EE within the framework of their particular context. It is important to note this type of perception includes the understanding they are also perceiving their context, “seeing what they believe they will see” of the school in which they work. For example, Jane and Heather both are required to teach content that is included in the state’s academic standards, but the analysis shows they perceive this requirement differently. Granted, we need to consider that they are in two different grades with different curriculum, but the context is similar, they are in the same building with the same principal and so forth. With this framework of three types of perceptions, the analysis process began.

Categorizing Themes of EE Perception

To start the analysis process, the case descriptions were used to create a list of topics and themes mentioned by each participant. This created four theme lists, one for each participant, which were then compared to highlight the common themes across the cases. While the participants’ EE perception descriptions were complex and ideas were woven throughout the discussion, themes were placed under the most related type of perception as delineated by the study’s first three questions; base EE perception, perception of ideal EE, or perception of the

reality of teaching EE. The original transcripts and survey answers were used as a reference check for the context of the comments made by the participants to capture the nuances of what the participants were saying. Themes were captured specifically for each type of perception to ground the analysis for the last question focusing on the individual participants' misalignments across the perceptions. By placing each theme under one perception, the ensuing analysis had a starting point as they were compared to the other types of perceptions for that individual.

After the themes were developed, and exemplar comments from each individual were compiled for each theme, the themes were categorized in two ways. First was the **strength** of the theme in the participant's perception. Marked as one of three strengths, it could be a **significant** theme where it was a major part of the EE perception description, an **occurring** theme but not central to the participant's EE perception, or an **incidental** theme to the EE perception being mentioned as an aspect of general teaching or implied in the participant's descriptions.

When comparing the strength of themes across cases, it was noted the richness of the participants' perceptions was not represented. A second categorization of the themes was then used to give insight to the participants' integration or understanding of the individual themes in their EE perception, regardless of how significant the theme was to their perception. This category considers four levels of **development** of the theme in the participant's EE perception descriptions. If the theme was mentioned but was not expanded upon, or not expressed as important to the EE perception, it was labeled as **existing**. Themes being explored by the participant for meaning within their EE perception were labeled as **exploring**. If the theme was understood and implemented within the perception, with further plans to expand in the EE perception, it was an **establishing** theme. Lastly, if the participant had expressed a theme as fully implemented and expanded in the EE perception, it is labeled as **embedding**. This last level of

development may include continual enhancement of the theme by the participant to stay current in their teaching or understanding, but was fully incorporated into their EE perception.

Strength of theme in participant's EE perception

Incidental: The theme was included in the descriptions of the participant's general teaching role or was implied in reasoning associated with EE perceptions, but not directly related to the EE perception. The theme may or may not provide context to a portion of the EE descriptions.

Occurring: The theme was mentioned in relationship to the participant's EE perception, but not a major focus. The theme may also provide context to a portion of the EE descriptions.

Significant: The theme was mentioned as a major focus of the participant's EE perception, having a foundational or pivotal relationship to their EE descriptions.

Status of theme development in participant's EE perception

Existing: The theme was mentioned by the participant while describing their EE perception, but was not expanded upon, or expressed as important to the EE perception.

Exploring: The theme was expressed by the participant as an aspect they were investigating for meaning or function within their EE perception description.

Establishing: The theme was understood and implemented in the participant's EE perception with further plans to expand on the theme.

Embedding: The theme was fully implemented and expanded in the participant's EE perception, and may include continual enhancement.

For the final question, focusing on each individual's misalignments of themes across the types of EE perception, the three sets of themes gathered from the first three questions were analyzed within each case. Each of the themes were examined for descriptions that were conflicting, changed dramatically in strength, or inferred a shift in understanding between the EE

base perception, ideal EE perception or perception of the reality of teaching EE in an individual. This process involved going back to the participant's original descriptions and comparing the statements that were grouped under a common theme regardless which type of EE perception the theme had been originally categorized under. The statements within these groups were compared with each other, and any misalignments were noted.

Validity of the Study

Throughout the process of conducting the study, particular perspectives and actions were taken to strengthen its validity. They are based in Creswell's lists of perspectives and strategies (2007, p. 206 - 208), and the main points that informed this study are summarized as follows.

Perspectives taken.

The concept of "triangulation" used in this study is strongly influenced by Richardson's description of a crystal, as cited by Creswell, "I propose that the central imaginary for "validation" for postmodern texts is not the triangle... [but] a crystal, which combines symmetry and substance with an infinite variety of shapes, substances, transmutations, multidimensionalities, and angles of approach." This image of a crystal further points out the intricacies of perceptions, in both researcher and teacher participants, and the process of presenting them in a written form that can be considered valid. Richardson goes on to describe this process in vivid imagery, "Crystals are prisms that reflect externalities and refract within themselves, creating different colors, patterns, patterns, and arrays casting off in different directions. What we see depends on our angle of response – not triangulation but rather crystallization" (Richardson & St. Pierre, 2005).

This concept for study is then further informed by Creswell's stance that an attempt to assess accuracy of findings in qualitative research are best described by the researcher and

participants, while keeping in mind “any report of the research is the representation by the author” (2007, p 206 - 207). This perspective is humbling in the responsibility given to me as the researcher and writer to validate the study to my readers. With that in mind, I base the validity on strategies that have been accepted as ways to validate qualitative research studies. These strategies include extensive triangulation, peer review and debriefing, member checking, rich, thick descriptions, and clarifying researcher bias (Creswell, 2007).

Strategies used.

The first strategy I engaged was extensive triangulation to capture a “crystalline” image of the teacher’s perceptions. This included using questionnaire data, existing interview data, resource analysis, arboretum programming, and public documents on the district, school and arboretum. It also included a level of commitment to in-depth understanding of the context of the cases and presenting them in the study.

Peer review and debriefing throughout the writing process with other education researchers was also an essential strategy of the validation process. A writing group of six professors offered honest and forthright peer review from the study proposal stage to the final publication. Insight, verification and clarification found during this study were, in part, due to open discussions with peers of the diverse backgrounds in education research.

Member checking was viewed as a necessary validity strategy. Case notes were returned to the participants so they could offer corrections, clarifications and insights. Open communication about resources and context questions was also in place throughout the study to validate the perceptions of the teachers as I assembled descriptions and analyzed the cases. Finally, the case descriptions were then given back to the corresponding participating teachers, for comments and feedback, to validate the interpretation of the participants’ perceptions.

One of the most influential validation strategies listed by Creswell in relation to this study was the effort to construct rich, thick descriptions of each case. This effort was done in earnest, focusing on allowing readers to make a determination on whether findings can be transferred to other settings due to shared characteristics (Creswell, 2007). Each of the original transcripts was considered in their entirety on several occasions, with none of the comments set aside, in order to cross check the understanding of the teachers' comments and create descriptions that captured all of the nuances made available from the participants' interviews.

Lastly, the effort to clarify researcher bias in relationship to the study is an important piece of the validation process. By explaining my biases, I offer another facet of the study's image to come into focus for the reader. It should be noted that I have had a professional relationship with this particular district before and during the study, having taught middle school science there in the past, and now am part of a pre-service teacher training relationship with the district and classroom teachers.

As a science education researcher and teacher of pre-service K – 12 teachers, my biases also include a strong interest in the environment and the relationship the human species has with it, as well as an equally deep concern for my students as they are learning how to make decisions while teaching in the context of society and youth. This concern also includes teachers in classrooms across the state and beyond, who are teaching within a setting that is demanding and often minimally supportive of teachers in their growth as professionals, most specifically in this lens of environmental education.

When this study began, I realized the uniqueness of my affiliation with the participants when I looked through the candidates' names from the questionnaire. I had worked with three of the individuals in different teaching situations. When the final four individuals had accepted an

invitation to participate in the study, one of the four happened to be someone I had been working with on an unrelated project as the study began. The existing relationship was collaborative before the study, and I feel it increased the trust level during the interview process. The other three individuals I had not met, but because I kept the interview process open and focused on what they perceived, I feel the rapport between us built quickly on all accounts. As the study was conducted, my professional contact was limited to study specific interactions, which enabled me to view the data from an external perspective.

Additional considerations regarding bias.

As I started the study, I made a particular effort to not assume teachers felt EE was a good idea in their classroom. During the pilot study for this study, I did interview one individual that was fed up with the hype surrounding EE, and insisted boldly and concisely that EE had been taught in her grade level for years, and that EE was blown out of proportion. With that in mind, I went into interviews letting the teacher set the tone. In each of the four cases, EE was viewed as a favorable topic in the classroom, which may highlight one of the tensions of the participant selection process.

The way participants were selected may also create a bias in that it was a voluntary questionnaire, delivered by the principals in the building in May of the school year. Because of the voluntary nature of the questionnaire, and delivery by a school administrator, the candidates who were interested in EE potentially would be more likely to finish the questionnaire in the limited amount of time that exists in the spring of the school year than those who were not interested in EE. This would bias the study in having candidates who tend to feel they teach EE, and may have fairly high comfort level with the concept of EE. In regards to the four cases selected from the possible candidates, the context itself was the determining factor. Since the case

selection process warranted a common school context, the four cases should not be treated as a representative sample from the questionnaire.

In addition to these situations, I also notice the inclination for all of the participants to try to say “the right thing” or what I might want to hear. Several individuals asked if their answers were right or what I wanted. This was troublesome, and when coupled with the fact EE is a popular topic in schools and the media during the time of this study, and the teachers are hearing EE terminology and concepts presented in pop culture, my concern is they are using terminology they do not always understand fully in order to please me as the researcher.

Limitations

Because I was interested solely in the teacher’s perceptions of EE, classroom teaching was purposely not observed or analyzed. The traditional trend of EE research pertaining to elementary teachers has focused on what teachers are teaching in the classroom, not the perceptions the teachers are operating from when making decisions about what to teach and how to teach it. By describing the resources teachers cite during the study, some insight can be given on the teachers’ classroom instruction, but is viewed as, at most, a cursory view of EE practice and should not be expanded beyond that. With that said, there are limitations to the study because it is focusing on perceptions. They should not be analyzed on whether they are right or wrong, or if they are the same, but how the teachers convey their own understanding.

An inherent limitation to the study, too, is the generalizability of the findings from the four cases. It is not the intent to be able to generalize to other teachers in the school, questionnaire participants, district or beyond. This qualitative study is intended to bring a new perspective to teachers perceptions of EE and the influences shaping them by providing rich, thick descriptions

that the reader can glean their own a sense of how EE may be perceived by teachers in elementary classrooms.

In the next chapter, the context of the study is presented, followed by the case descriptions of Jane, Heather, Paul and Rebecca.

Chapter IV: Presentation of the Cases

This chapter is structured to describe the common context of the cases, as well as the individual cases. First, the overall context of the study is given by providing a description of the district and several relationships it has with educational facilities outside of the district, as well as a portrayal of the school where the teachers work. Afterwards, the cases of four elementary classroom teachers – Jane, Heather, Paul, and Rebecca* - are given in a complete narrative. In each case, the descriptions and reasoning expressed by the individual are depicted to provide a distinct portrait of each teacher's perception of environmental education.

Individual attention is brought to each teacher's perceptions of environmental education, separate from any grouping or generalization, because each teacher represents an individual case with its own character to be studied. In these detailed narratives, the reader is encouraged to delve into the individual teachers' perceptions, appreciating the nuances of the lenses they use, and join in examining the complexities that exist in and contribute to those perceptions. An extensive cross-case analysis follows in Chapter Five.

A Common Context: The District

The overarching context for the cases in this study is the district. It is one of the largest outside of a metropolitan area in the upper Midwest. It serves over 9,200 students in a four county area. Three fourths of the student population is White and fifteen percent is Black. Asian and Hispanic students each make up four percent, with American Indian and an unidentified group each at one percent. In addition, eighteen percent of the student population are using special education services, eleven percent are considered Limited English Proficient, and forty-five percent are in the Free and Reduced Lunch Program. The overall attendance across the district is at ninety-four percent, with the graduation rate at ninety-one percent. Sixty-seven percent of the licensed teachers in the district have advanced degrees. Of the eight elementary schools in the

district, only two are making “adequate yearly progress” (AYP), according to the requirements put forth by federal mandates in No Child Left Behind.

To comprehend how EE is interpreted on a district wide basis, an informal interview was held with Margaret*, the district’s curriculum coordinator, focusing on the question, “How is environmental education taught in the district?” During the conversation, two EE connections in the district were mentioned; collaborations with education facilities outside the district highlighting an EE teacher outreach program, and a focus on science curriculum alignment within the district.

District collaborations.

Because of the size and location of the district, several college teacher preparation programs have established relationships for practicum experiences and student teaching in classrooms at all grade levels and subject areas. One college has a formal yet limited relationship with the district. Their math and science cohort program consists mainly of classroom based practicum experiences for pre-service teachers. Another local college, in addition to maintaining a connection with the district through their teacher education program’s practicum and student teaching experiences, has established a relationship through their Arboretum’s environmental educational outreach program. According to Margaret, the Arboretum programming is considered the focal point for EE in the district in both teacher training and programming for student education.

Through the EE outreach program, all of the teachers have the opportunity to take their students on a fieldtrip to the Arboretum, which, depending on the school, is three to twenty-seven miles from the elementary school building. There is a set curriculum that the teachers can select from that is aligned with the grade level standards in academic areas, such science and language arts, for the state. Busing fees for over four thousand students are covered by Arboretum community outreach grants, and has recently been limited to one trip per year for each student. In

the year of this study, the grant was supplemented by a district grant in order to allow for additional students, as well as for additional visits (one fall and one in spring) for a small group of students.

When speaking with the Arboretum's environmental education coordinator, Jill*, it was noted that each of the elementary schools interacted with the Arboretum in a unique way. One school incorporated Arboretum activities into larger projects, while another made conscious, in-depth connections between the fieldtrips and classroom activities. Additional comparisons were made of two other schools that happened to be the same distance from the Arboretum, where all of the teachers from one school were involved every year, asking questions and actively making links between their curriculum and the Arboretum. The other school was "hit or miss" in their participation depending if they needed to work on a school initiative, like state testing remediation, and tended to include all or none of the teachers from a grade level. Jill believed the overall trend was teacher driven and their individual willingness to incorporate a fieldtrip into their schedule, although a school's traditions were also considered. Curriculum that had been used yearly at particular grade levels seemed to have a strong influence on which teachers brought students to the site for a fieldtrip.

In addition to the fieldtrip opportunities, area teachers enjoy access to grade level curriculum trunks, filled with activities, posters, movies and children's books as well as a lesson plan binder, that elaborate on a particular theme of the program, which teachers can use pre and post visit. There are also teacher workshops on a variety of EE practices, such as the use of phenology, which focuses on a calendar of natural occurrences, like the first snow, mallard eggs hatching, and migration patterns, in the classroom. Teachers from the district are invited to attend a small assortment of workshops year round, and often include receiving continuing education credits for the time attended and occasionally were free of charge to the individual teachers. The fieldtrips, trunks and teacher workshops were mentioned as highlights of the relationship between

the district and Arboretum, by both Margaret and Jill, and continue to be updated and improved with feedback from the district teachers, Arboretum field staff, and participating students.

District curriculum.

When I was conversing with Margaret about what EE was taught in the district, she interchanged the term “environmental education” with “environmental science”, and the science curriculum was her focus when talking about the environment. She stated that teachers throughout the district achieved curriculum alignment using the district-selected science curriculum, Delta Education’s Full Option Science System (FOSS) kits, which is aligned with the state standards in science, as well as other text resources, and activities that occurred on school sites and at the local Arboretum. Two of the elementary sites also had school wide plans that included onsite outdoor activities in the science curriculum (neither of which are the school in this study). Margaret stated because elementary schools in the district have been cited by the federal mandates of No Child Left Behind, the focus on math and reading was heightened, which, in turn, decreased the time spent on outdoor science activities. Because of this, efforts have been made at the district level to integrate science based reading text, such a National Geographic nonfiction book series as the reading text throughout K-6. When probed further about how environmental education fit into this process, she explained that environmental education was now used as a context for other content areas as a way of capturing the science experiences in the activities based in reading and math.

She reiterated that reading, math and science are the top three secure sets of skills the district is aiming for, and showed me the district-wide grade level science program goals on the district website. Each of the grades has one to two major goals under each of the five standard areas of Biology, Chemistry, Earth and Space Systems, Physics, and Environmental Systems. Ongoing efforts have been made to align all of the goals so they are coordinated with the FOSS

kit units and any supplemental material used at each grade level across all of the elementary school sites.

It is the district's science curriculum team's mission to implement a new science text to supplement the FOSS kits that are already placed in all of the grades, and at the time of the study, the sixth, fifth and fourth grades had received books from the Macmillian/McGraw-Hill *Science, A Closer Look* series, with plans for the third grade to receive them in the coming year. There was also a new district relationship with a metropolitan museum, which includes a service where science equipment could be checked out and used in classrooms. Despite a travel distance of over an hour, teachers in several buildings were choosing to actively participate by visiting the site and bringing materials back into their classroom. In providing an overview of the district's stated curricular goals, Margaret did not mention any other curriculum areas beyond the science curriculum and the Arboretum trunks, and the efforts being made in integrating science into math and reading.

The School

Pebble* Community School is located on a main thoroughfare in a neighborhood setting inside the largest city in the district. Within a ten block radius of the school site there are two public botanical gardens, a major river, a fire station, a university, a wildlife park and an extensive city park, as well as an apartment complex, a nursing home, town homes, and a historic housing district. A natural area along the side of the school partitions the bus loading area and playground areas at the back of the school from the parking lot in the front. Various ball fields, tennis courts and the neighborhood fire house ring the other side of the building.

As visitors enter the one level building, they are greeted by vibrantly painted murals that arch up to the ceiling, covered in inspirational quotes and greetings in different languages. Scenes of hand prints, wildlife and outer space settings blend together, almost guiding newcomers down the hall with their flowing energy. Pictures of the school staff, as well as awards, fund raising

collections, and student artwork are displayed in the main area, as to inform guests about the Pebble Community School’s daily inhabitants. The main hallway seems to continue through the media center and out to the back of the building, giving the entrance quite a grand and spacious feel. The media center is the center of the school, with the primary and intermediate grade levels in wings located on the back sides of the building. Two enclosed courtyards on either side of the media center divide the classroom wings from the gymnasium, lunchroom, and the offices of the administration and special education services towards the front of the building. The computer labs, book stacks and student learning areas are busy in the media center at different times of day, including after school when community education classes and school age daycare programs are held around the building. There are music, art, and physical education classes for all of the grades on a weekly basis throughout the school year.

Table 4.1

Demographic Percentages of the School, District and State

	Pebble Community School (K-6 pop of 600+)	District (K-12 pop of 9,000+)	State (K-12 pop of 820,000+)
American Indian	2	1	2
Asian	3	4	6
Black	39	15	10
Hispanic	8	4	6
White	48	75	76
Limited English Proficient	31	11	8
Special Education	16	18	13
Free/ Reduced Price Lunch	74	45	33
Attendance Rate	95	94	95

With a K - 6 population of just over six hundred students, Pebble Community School has the most racially diverse student body when compared to the rest of the elementary schools in the district; forty-eight percent are White, and thirty-nine percent are Black. These percentages are remarkable when compared to the K -12 student population in the district, which has a student majority that are White at seventy-five percent, and fifteen percent are Black. Adding to the diversity at Pebble Community School, almost a full third of the students are considered Limited English Proficient, and three fourths of the total student body are a part of the Free and Reduced Lunch program. Similar to the district as a whole, sixteen percent of the students receive special education services and there is a ninety-five percent attendance rate. The school's normal attendance area is quite large and diverse, including students that walk in from the surrounding neighborhoods and apartments, as well as those who are bused in as far as ten miles away from a rural area in the district.

It is also worth noting the overall demographics of the student population have been shifting at the school. Five years previous to this study, Pebble Community School had about sixty more students, but the diversity was far less. Five years ago, seventy percent of the students were White, and only eighteen percent were Black; marking a shift over time that more than doubled the percentage of Black students. When talking to teachers in the building, the majority of the change is due to an influx of Somali students into the area and the school population. This is also reflected in the change in the percentage of students who were Limited English Proficient, starting at sixteen percent and increasing to thirty-one percent of the student body in five years.

While Pebble Community School was one of the schools that did not make AYP, its students' performance in state academic testing had improved in the year of this study compared to the previous year in Math and Science, while staying about the same in Reading. According to monthly newsletters from the principal to the parents and guardians, in addition to working on a school wide discipline plan through a "Responsive Classroom" social curriculum initiative started

the year before, the teaching staff at the school was focused on three goals during the school year, which included building a stronger school/family partnership, improving student achievement in math, and improving student achievement in reading. Looking at the gains in the percentages of students who were considered “proficient” on the state academic assessments (table 4.2), the students as a whole made tremendous increases, but still remained lower than other schools in the district and the state. For example, the overall percentage of students considered proficient in math in grades three through six increased over five percent, which is a greater increase than the both the district and state had between the two years (+ 2.49% and 1.93% respectively), but the school percentages are still below the district and state levels by over six and twelve percent. Pebble Community School made the greatest gains in the area of science (+12%), as did the district and state to a lesser extent (+7.35% and +5.71% respectively).

Table 4.2

Percentage of Students Considered “Proficient” through State Testing and Amount of Change Between Two Years

	Math 2008	Math 2009	Reading 2008	Reading 2009	Science 2008	Science 2009
Pebble Com School (change in percent)	44.79	50.14 (+ 5.35)	49.46	49.84 (+ 0.38)	16.51	28.73 (+ 12.22)
District	53.67	56.16 (+ 2.49)	61.86	64.00 (+ 2.14)	35.67	43.02 (+7.35)
State	60.36	62.29 (+ 1.93)	70.72	71.95 (+ 1.23)	40.36	46.07 (+ 5.71)

Of the one hundred licensed and non-licensed staff members, just over half are teachers (54) and almost a fourth are paraprofessionals (22). All of the teachers and Title I paraprofessionals in the building meet the federal “Highly Qualified” requirements, and sixty percent of the teachers have a master’s degree, compared to compared to the state average of

fifty-one percent. There was a tremendous amount of change in the staff at the start of the school year in which this study was undertaken. A new principal, assistant principal and about twenty new staff members, including four ELL teachers, a sixth grade, a first grade and an EBD teacher, all began working in the building when school started in the fall, making a fifth of the faculty and staff new to the building.

The Individual Cases

The following section includes the individual case studies of each teacher. Each of the four cases begins with a short summary of the participant's teaching background and personal view of his/her classroom context and experiences. This introduction is followed by a detailed account of each participant's base perceptions of environmental education, including the descriptions of personal experiences and training that has shaped their EE perceptions and the resources they drawn upon as a teacher and for students. Next, the descriptions of what he/she would consider to be the ideal way to be teaching EE are described, along with the goals and measures of success that the teacher expressed should be in place. The narrative ends with the perceived realities of implementing EE in their classrooms, along with the actual goals and measures the teacher is using, and outside influences on their perceptions.

The four cases include Jane, a second grade teacher who has been at Pebble Community School the longest at twenty-two years, Heather, a sixth grade teacher who has taught in the building for twelve years, Paul, a kindergarten teacher who has been at the school for four years and has taught one year in a different state, and Rebecca, a second year art teacher who teaches all of the students in the building.

Jane, second grade teacher.

Background information.

Jane and I have known each other for several years, working on different teaching committees together in the community. I was delighted that she chose to participate in the initial survey, because I knew she was active in promoting EE at Pebble Community School, and had worked with teachers and students on different EE projects, often in conjunction with the Arboretum. When the case study selection process included her, I knew I had someone in my study that fellow teachers looked to for advice and guidance in regards to EE, and I was curious to see how she would respond to my questions.

When I set up the interview, she suggested we should meet in my office since she had a meeting nearby. She offered to come to me because she felt it would be the best scenario for her schedule, so I agreed. Once she arrived on the day of the interview, we both realized we needed to allow for her travel time to her next destination, and the interview would need to be very focused in order to get done on time. Both of us were at ease during the interview, but the awareness of time constraints and the office setting made the conversation the most concise of the four interviews.

Teaching experience and personal classroom description.

As the interview protocol shows in Appendix A, I did not focus on EE at the beginning of the interview with Jane. I started the discussion by explaining the study and how the interview was structured, and then proceeded to ask for her teaching background and information about her classroom to give context to her setting and experiences. I knew from the survey data that she had taught at several different schools in the district. I had also heard she had recently been nominated for and had won a teaching award granted at the national level in science education. Jane concisely explained she teaches second grade, has been in the district for twenty-four years, and

was someone who had cared for the earth and was interested in science since she was a young child, and that attitude was central to who she is. "...everything I do connects to my love of the earth and the environment, and bringing that to my kids and my colleagues" (30028, 2:27) Jane's initial proclamation of her teaching being interconnected with the environment was consistent throughout the interview, regardless of the topic immediately being discussed. As Jane continued and elaborated on the context of her classroom, she also spoke of integrated curriculum, student learning, and her purposeful interactions with the communities around her.

As we continued to talk, it was obvious that Jane perceived the context of her classroom as an intersection of integrated concepts, or themes. She did not attempt to separate her teaching of core subjects, such as math, social studies and science, from each other or additional content areas, like environmental education and social skills. She explained that she used integrated themes that incorporated science, social studies, language arts and health curricula throughout her teaching.

... for example, in the fall our science topic is insects and we raise Monarch butterflies. So then the insects theme is integrated that my literature, be in non-fiction or fiction, is on that theme of insects. My guided reading groups are all connected to insects. I also extend that after a few weeks into different animal groups and survival needs... in math I try to integrate math concepts through that during my math block. A lot of it still needs to be, "OK, this is what we're focusing in on, two digit addition" or whatever. But I try to incorporate what we've been talking about in the theme. (30028, 5:40)

When I talked with Jane about her classroom, she did not focus primarily on classroom operations, but rather on what the students were learning. She reiterated the themes used to incorporate all of the subjects together, as well as looking at how state academic standards have changed and affected what she needs to teach.

...we were taking a look at the alignment of our math curriculum and the standards. After last year we really looked at what actually is expected of a second grader when the math standards had been revisited and redone at the state level.

We have to teach all the other concepts that lead into what is mastery at third grade as well. There's so much that we need to do to get our kids ready for third grade,

with the state tests given then too. Each subject area of the standards is extensive. When you see the reading, the math, the social, the science, the health, the writing, the literature; there's so much to get in that you have to be creative in how you're going to overlap and integrate things. (30028, 15:30)

In addition, Jane informs her teaching by not only keeping well-versed of what the education community at the local and state level was focused on, but also contributing to the discussions and planning occurring at these levels.

I involve myself in a lot of things from the state, in regards to standards and curriculum, and to the community, what is affecting the community, such as the Arboretum and the district work on curriculum and standards. (30028, 2:52)

She went on to explain how integral this involvement in curriculum issues and guidelines was as a way to foster community building and make connections is to her personally as an educator.

I try to network a lot so that I have great connections because I learn better and absorb things better when I feel like I can bring it to others in my district, or with my students' families. I am involved in a lot of different areas that coexist from the state to the district to the school site into different curriculums that all intertwine. (30028, 3:40)

Jane's explanation of who she is as an educator is based in themes highlighting features of the environment. Her classroom descriptions as a veteran teacher are focused on the integration of content areas through the use of themes as she intertwines her subject areas to support each other. While keeping up to date on the state's academic standards was important, she also felt her involvement at the community level, including at the school, district and state levels, was a central part of her role as an educator of both students and adults.

Perceptions of EE.

As Jane talked about her perceptions, EE was not a separate subject or curriculum, but an integral part of her teaching style and philosophy. "It's my overlying theme, the care for the environment and the choices we make ... the overlying responsibility to our school environment and our neighborhood environment" (30028, 7:25) We discussed in-depth what she was doing

and how it worked in her classroom. When I asked Jane specifically about the EE she taught in her classroom, she replied,

One of my topics is environmental education, but I don't see it as a separate entity. It's something that I integrate again and again, all the time. I do a variety of activities, and sometimes they are transitional things. Even the "getting to know you" week has a lot to do with how we are in our environment and being comfortable outside in the woods and appreciating our grounds. (30028, 6:20)

I then asked her what she would tell a new teacher if they asked, "What is Environmental Education?" and she replied,

I think it is seeing our world, our environment, your community, your home. Looking at the detail of it, or using a magnifying glass if you will. How you act, what you say, what you do in your environment to preserve it, to protect it. In a nutshell that's what I see it as.

She focused on EE as a human endeavor of looking at what the environment is, starting with the world as a broad concept, and working down to more personal experiences including examining one's own personal space and the interactions that occur within it. After this statement, without pausing, she continued the EE explanation to the hypothetical new teacher to include her role as an educator in relation to EE, including for her students, as well as the students' families and other teachers.

As an educator, EE includes my actions and what I say to people in how it effects the environment. To the teachers, I say, 'Here are the tools. Here are the workshops, come and watch what I do.' What can I share and what can I show them in a short amount of time? For the students, I am focused on the tools, what they need to do, and pointing out what resources they have. I am teaching families, I try to send things home as well. It is something I feel is a big job, but it is not unattainable. (30028, 33:00)

For Jane, EE is not just a subject to be taught to students and others, but also includes her very actions as an educator and how those actions contribute to the environment. Her effectiveness as an environmental educator is entrenched within what students, teachers, and families are doing in regards to their involvement with the environment.

Jane finds the most effective means of teaching EE to be linking/embedding her curriculum in the lived experiences of her students. She views EE as a vehicle through which she can teach other subjects. She has a personal commitment to EE that she has imbedded into her commitment to the school and the subjects she teaches.

Personal experiences and training shaping EE.

As mentioned before, EE is a central part of Jane's teaching style and philosophy. From the beginning of her interview, when asked to present a general description of her classroom to provide context to the conversation, she incorporated EE into her description. My past professional experiences with Jane support this consistent focus on EE in her classroom and not solely a result of the interview situation. Her involvement with EE outside of the classroom, with various school curricula and standards on the local and state levels, as well as the EE curriculum training she provides her peers, and teaching reflect her passion towards the concept. In addition, decisions that she made regarding the content and skills she taught her students were integrated with her training and the views she held of the world, as well as how teachers could be teaching in their classrooms.

Jane's perceptions of EE are guided by multiple experiences she had throughout her life time, particularly as a young adult beginning to work with young people in both school and non-school based settings. This came out distinctly when talking about why she believed EE was interdisciplinary.

... it was talked about even back when I was in high school. I was fortunate to have some great high school educators. But even as I left there and went to school in the city, and then went to school here at the local university, to what I was taught and now offer in my differing project workshops – that's what I heard about EE. Even when I was probably 19 or 20 years old and I was a camp counselor, 'EE is interdisciplinary'. (30028, 9:46)

Her experiences focusing on EE started when she was in high school, but her interest in science and quality science education contributed to how she got to her position as an elementary teacher.

I went back to work focused on teaching at the secondary level. There weren't a lot of jobs then, and I started exploring younger learners. At first I thought I could teach 10th grade biology and I could work in junior high, but now I want to work with them when they are younger. At the time I didn't feel science was doing that great at the elementary level. I thought, 'I think I could be a big help.' (30028, 29:03)

Jane also mentioned "project workshops" as a source of EE training during her lifetime. The internationally known Project WET, Project WILD, and Project Learning Tree, and their supplementary programs, are EE based pre-kindergarten to high school level curriculums. These "EE Project Curricula" are offered to teachers across the state and the nation only through workshops where teachers participate in a selection of the lessons and discuss the use of them in the classroom. (found at <http://www.projectwild.org/ProjectWILDK-12CurriculumandActivityGuide.htm>) Jane participated in the program the year it started in 1982, and is now a workshop facilitator for the state and uses the lessons extensively in her classroom. When we talked about resources in the classroom, which is discussed in the next section, she also cited the EE Project Curricula as an integral part of her EE teaching. For Jane, a variety of experiences and trainings over her lifetime, including academic, camp, workshops, and online resources all shaped her perception of EE today.

Resources drawn on.

Jane listed a variety of resources that have influenced her perceptions of EE. These range from state issued documents and information from environmental organizations, to materials for the students to use and curricular resources for her lesson planning.

The documents and organizations Jane cited as useful with regards to what she taught as EE in her classroom are a holistic sample of what is available at the state level. She included state documents, including the academic science content standards that all teachers in the state are required to follow, as well as a lesser known document that the government put together on the vision for EE for all of the state citizens. She also included professional organizations, citing a

lesser known, but more specifically EE based association with a better known teacher association based in science.

I look at the standards especially now. There's much more EE in the state's new science standards. ...I think it's also based on what I've learned from the number of workshops I've attended, be it through the state's Naturalist Association, or the state's Science Teachers Association as well as the Project Workshops. I think overlying all of that is the state's EE plan which has said, 'This is what we should look at.' But I also look at environmental issues that are currently out there, and try to work them in. (30028, 8:35)

Notice at the end of her explanation, in addition to the state documents and professional organizations, she grounds these documents by looking at current environmental issues, tying all of the resources back to her perception of what EE is; "a magnifying glass" to our world.

Jane works to actively integrate her EE learning goals with other content areas. She cites a variety of classroom resources that students use to enhance the learning and provide enriched experiences with literature and aspects she refers to as "touchy feely things".

I think even literature is a great EE resource. There is a lot of great children's literature, fiction and non-fiction that are out there. I try to explore authors that have really touched base with that concept. A lot of it can even be picture books that say a lot. Kids love to be read to and really do love to read really good literature. Having that around, including trade books and magazines for children, I think you can have a lot of print around and that's good. I also have a lot of dead things, a lot of touchy feely things. I have this big glass greenhouse. Well now it has dead stuff in it. From wasp nests to snake skins and other things, having a lot of stuff for them to touch and feel and explore. ID books and just having an environment that is full of stuff, so that they can learn by seeing and doing not just by telling them. (30028, 35:15)

Jane also talks about her use of the internet, which happens to be an area she is trying to develop as a resource for herself, as well as her appreciation towards the Arboretum and college staff and their relationship.

I'm trying to explore a lot more on line. I'm not a big Internet person. The state department associated with natural resources has a wonderful website. I try to gather things from the state's natural resource magazine as well, but I really enjoy the fact that we have people in the post secondary end that can do a lot too. With visits to the

Arboretum and using our resources there and the trunks we've developed. (30028, 36:35)

As mentioned before, Jane also uses the EE Project Curricula as a resource for lessons. Note how she not only describes the use of the projects' lessons in her classroom, but also how she uses them to integrate multiple concepts.

...it is integrated. For example if we're talking about the different animals and their survival needs, we have a lot of Project Wild Activities, such as *Oh Deer!* to *Quick-Frozen Critters* to *How Many Bears Can Live in This Forest?*. It talks about having enough food in their environment and what their habitat is like and if there's a drought. A lot of natural things but also what happens if there is some human disturbance to that. In addition, I can make connections to other topics, even with the Civil War. So then I look through my subtopic reference appendix and I find what will connect so I add that in. It is not just my science themes; it is to whatever I am teaching. (30028, 19:43)

As Jane teaches EE, she is drawing from a number of resources while integrating EE into all of her curriculum. The types of resources varies from teaching resources, including state documents and organizations as well as limited but increasing internet use, to classroom resources, such as children literature and hands on materials in the classroom.

Perceptions of ideal EE.

Teaching description.

As I steered the conversation towards what Jane perceived as ideal for EE teaching, our discussion wove between contexts both outside and inside the classroom in which she currently teaches.

When Jane explained what she perceives ideal teaching of EE would be, it was obvious she had given the idea some thought before I asked her about it. I was not surprised when she centered her perception of ideal EE teaching in areas that included interactions with both students and teachers, while focusing more on the adults.

I want to run an Environmental Learning Center. I can also really see myself in our district, like a teacher on assignment, to be the science specialist, the Environmental Ed person. Just like there's a media specialist, I'd like to be a science specialist. Being able

to work in an Environmental Learning Center or to go into higher education, or something where I can focus really well on environmental ed and science. Even in my retired life even if I'm not directly in a district, to be in an ELC. ...My ideal thing would be to be able to specialize more, and to help other educators. I think so many educators want to do well with environmental ed and their science topics but just don't know the best way to go about it. I hear that from my colleagues. I would be giving them more tools and ideas. It's tough to do a lot of that when you're doing everything else as a full time teacher so it would be great to specialize. (30028, 21:28)

I then asked her to put it in the context of her classroom, what would be ideal for teaching EE to her students if she could do anything she would want. Her response was one of surprise at first, and she turned the question back on me, trying to show she makes a continuing effort to think through the best way of teaching EE in the circumstances she is in. After which she started to consider if the circumstances were different, and there were some things she would like to add to her present EE teaching.

How **would** I do anything differently? I know I have to do what I have to do. I know I have standards I have to teach, and I do teach them thematically. (Pausing for a moment...) I know, I think the biggest thing would be to get my kids out of my room more. More field trips. I'd have them out all the time. I already take them outside at our facility, but I would spend more time at the Arboretum, the prairie, the woodlands, and the metropolitan museum; from the zoos to the wherever we could find things to do. A lot of field trips...and a lot of experts. Try to bring other people in. I think that's great. ...To be able to run them to different environmental learning facilities too. It would be great, even out to my house. If I was still within my classroom and my kids, I'd like to run more. (30028, 25:49)

In her perceptions of ideal EE in the classroom, Jane's only changes from her current EE teaching focused on using alternative sites and bringing in others, "experts", into her classroom, both of which could contribute to her curriculum in ways she could not.

Jane's perception of ideal EE was focused on two different contexts. One was elaborately different than what she is presently doing as a second grade teacher, and focused on her actual career in teaching and what she felt it could be, both inside and outside of the district she

currently taught in. The other was focused on enhancing the EE she did with her students, immersing them in new settings and working with experts to improve their learning.

Goals and measuring success.

Jane has a dual focus in her EE perceptions, trying to educate and facilitate learning in adults as well as in children. Throughout our conversation, she had considered both groups fairly equally and consistently. Trying to get at what her focus was for perceived goals and success, I put her on the spot and asked her what her preference would be, classroom EE teaching or beyond with adults. Her response shed light on her perceptions of ideal EE.

I love educating adults, especially teachers. I also think it's huge to grab them (the students) when they're little. To give all this good stuff to go with and hopefully that just sticks right there and they take it through. That's my hope too. I grab them when they're little but then my colleagues continue what I've been doing and continue it through elementary age and then junior high and so on, so that they make good decisions in their life as adults. Now they may not become science teachers or doctors or astronomers or whatever but at least they make great decisions in their lives. To understand science for what it's worth and not base it on myths. To be good thinkers. (30028, 27:15)

For her it was a marriage of teaching EE through experiences and themes to students so they have the knowledge and skills to make good decisions and be good thinkers, while also helping teachers teach EE well in their classrooms, in small part to continue what she started in her classroom. It goes beyond just her students and the life she leads; her goal is to impact the community around her and beyond. This came out later in the conversation, as described below.

After we had talked for a while I asked Jane why she teaches EE. She laughed and said the following.

Because I love my Earth. I do. It's very much a part of who I am. I love the outdoors. It's all we have. It may sound like a cliché, but it is the truth. I'm here and I enjoy being part of a healthy environment. I love the trees and the flowers and the grass and the sky and the dirt and the soil and the water. When all of it is healthy, that feels great. I think it's huge to be able to tell other people and I tell my kids you're on this planet to be kind to others, to live your life in the most healthy and safe manner. You're here to take care of this earth. You are part of this planet. You are here and you have a job. I think it's

something that is our responsibility. I think it's huge to be able to take care of where you live and just be a part of what is natural. It's everything you need to survive. (30028, 37:37)

Jane's perception of ideal EE is focused on the responsibility everyone has for where and how they live, including her own responsibility. This perception has translated her love and responsibility toward the Earth into a tangible part of her job, educating students, all students through EE to see the world around them, that magnifying glass from her definition, and how they interact with it. Her perceptions of ideal EE goals are tied to both the children she teaches and the adults that interact with them. On a larger scale, they are also related to goals of reaching the community and creating a healthy environment.

Perceptions of the realities of teaching EE in classroom.

Teaching description.

As we have seen so far, Jane perceives EE as an integral part of her teaching. Even before the interview, when answering the survey question number one (Appendix A), about the total number of hours during the school year she spent on EE topics and skills, she selected the highest of the choices listed (0-3 hours, 4-7 hours, 8-11 hours, 12-15 hours, more than 15 hours) and submitted an estimate of three hundred hours. She added an additional comment, "I incorporate/integrate env. ed in everything I do. It's hard to calculate the hours!" (SD1, C2) Jane was the most thorough and complex when listing the concepts, skills and issues she taught during those three hundred hours for survey question four, as listed below:

Awareness and appreciation for wildlife 40 hours?
(basic needs, sharing environment, habitats, survival skills, human impact)
Wildlife and Ecological Systems 20 hours
Wildlife conservation 20 hours
Cultural and Social Interaction hours?
Wildlife Issues
Human Responsibilities (SD1, Q4)

In addition, although she did select, “I think I should be teaching slightly more during the school year.” on the survey, she responded she would include the same concepts listed above. (SD1, Q3 & Q5) She is confident in the content of her teaching, but would like to spend more time or delve deeper into the concepts.

With this focus on EE throughout the school year, she is also very aware of what she is hired to do at Pebble Community School, “I know I have to do what I have to do. I know I have standards I have to teach, and I do teach them thematically” (30028, 26:01) The process of teaching in this integrated manner, in part, goes back to her past and current involvement with the EE Project Curricula mentioned as part of her training and as resources she draws upon in her understanding of EE. After providing the list of concepts for survey question four, she added the comment, “I use the Projects WILD, WET, and Learning Tree throughout my school year” (SD1, C4) which list these and other concepts as their learning objectives in the individual lesson plans. At one point of the interview, she says, “EE is part of who I am. I think because I have a lot of experience and I facilitate project workshops, I’m thinking about stuff all the time on how I can integrate it.” (30028, 12:15) While she is integrating it, she is cognizant of what she has taught the students and compared to the variety of issues and contexts that she can use to teach. This is also immediately related to the resources she has put together, including the EE Project Curricula, and feels are extensive.

I try to look at differing facets of the environment too, from the land to the water to the animals to the air. Trying to balance it all. I think the Projects really do that well. I feel I can look at any of my resources and say, ‘Here are some water activities I can draw from, here are the tree and plant activities, here are the critter activities I can draw from’, and with that, ‘Here is the environmental issue I can use.’ I personally have this rounded base to draw from which makes a big difference. (30028, 18:06)

Jane’s perception of the realities of teaching EE in her classroom is intimately related to her perception of EE, and how it is integrated throughout her teaching. She calls on her EE resources, keeps apprised of current environmental issues in the world around herself and her

students, and tries to balance the focus among many different areas and concepts that can be covered in regards to the environment.

Applied goals and measuring success.

Throughout the interview, Jane was confident in her responses and felt a deep familiarity with what EE was and what she was doing with it. When I asked her, “What would you describe as your goals for Environmental Ed in your classroom? Do you have set goals for your students?” she leaned forward, and was quite willing and prepared to answer.

I do. Can I list some of them right now? Over all I want them to be environmental thinkers. Everyday. That’s one of my overlying big goals, when they turn on the lights, when they eat their food, the food choice they make, the packaging they buy. For them to think about it, think about the environment. . . . One of my other goals is that they spread the news. Parents sometimes are really hard to bring around. Some are and some aren’t. So for the students to be teachers; for them to educate their brothers and sisters, their family members. Educate them. For them to say this is what I learned about this in regards to making better choices. And then there is a lot of sub-goals, this is what I want to accomplish this month, this is what I want to accomplish this month. (30028, 17:04)

Jane’s focus was on students being “environmental thinkers” or aware of their actions and thinking about the environment, as well as “teachers” for the people around them, to help those people make better environmental decisions. Because she focused on the thinking aspect, I asked if it went beyond an awareness of the environment, and she replied:

I would think beyond awareness. Because then they’re applying. They’re at that application level. I want them to be out there where it becomes a natural thing for them. They are ‘doing’. It’s innate. (30028, 17:31)

Another goal Jane mentioned several times during the conversation was focused on teachers, and helping them with their EE teaching. “My goal is to help teachers integrate EE. They are asking, ‘How do I do that? How do I bring that in to my curriculum?’” (30028, 11:48) She mentioned the themes she does that incorporates all of the subject areas, and how she will help teachers, especially the ones at the same grade level as her, with gaining some insights on how it might be done. She also mentioned working with fellow teachers to incorporate different

'tools' in the classroom. "OK what can I do to help the other teachers do what I do? Sometimes it's all about your passion and what you're into. I try to get my team the tools to be able to do that as well" (30028, 31:35)

Since EE is not a standardized content area on its own, and therefore does not have formal testing given by the state, I asked Jane to explain how she measures success with her EE teaching.

I think it's primarily with what the students say and do. How do I see that what I've said or what we've done has been successful? What they say when they talk with their friends. What they say and do in the lunchroom. When they're not being instructed or having to do this assessment or this assignment. It's what they do naturally. That's when I think I've made a difference. Or if some things come out that didn't sound right, I better readdress this or redirect them because I realize this didn't come across well.

She continued on to include the feedback she gets from families as an indicator of learning as well.

Often times what my parents say is a measure of success. So when family drop me notes or come in for conference time or just catch me somewhere and say, 'I heard you were doing this and this.' I could send home newsletters but when their kids tell them, that's huge. When the kids talk, I think really sends a strong message.

The last part of her explanation included feedback she receives from her colleagues, in particular the teachers who have her students in following years.

When I hear from my teachers the following year, the kids tell them that they learned this from Ms. Jane. They carry that through to the following grades and I have teachers who tell me that. They compliment me often to say when your kids come through they have this and this and this and this, which is really nice. (30028, 28:39)

Jane does not use a formal assessment, such as a test, to gauge her success with teaching EE with her students, but is listening to what is said by, and aware of the actions by her students, and coupling that with the feedback she gets from both parents and other teachers in her building based on what the students are saying, sharing and doing.

It is worth noting that Jane did not express a direct quote in regards to a measure of success with teachers, but it was implied that she perceives success when her colleagues are working with her to use resources and collaborating to incorporate EE in their teaching on a regular basis. This is explored more in the next section, which looks at the influences on Jane's perceptions of the realities of teaching EE.

Outside influences.

Despite her optimism and confidence, Jane still struggles with aspects of EE. As the interview progressed, there were three main 'outside influences' that emerged that acted on Jane's perceptions of EE. These were situations or entities outside of the context of her teaching and her classroom, but still had an impact on her EE perceptions. These influences were outside of her direct control. They included other teachers, scheduling and expectations related to finances.

As mentioned in the section regarding Jane's measures of EE success, she did not speak directly of how she measured success with teachers. She did talk about some of the influences they had on her perceptions of EE teaching. For instance, when trying to help teachers implement EE as an interdisciplinary part of their teaching, Jane finds it difficult to change their perceptions of when and how EE can be incorporated.

...I demonstrate that it is interdisciplinary. And that's really hard to get that across to other educators because they think they need to have it as a separate class. They say, 'I'm only going to do it during Earth Week.' (30028, 10:40)

Related to her efforts to help teachers, Jane cited a reading grant that provides an opportunity to help teachers look at and purchase literature for their classrooms, which she felt could also support EE in their classrooms. She particularly appreciative of this outside influence, because she felt the access to literature helps her directly answer the teachers' questions of "How do I do that? How do I bring that into my curriculum?" that was mentioned in her goals.

It's easier now because we have a lot of literature. Especially we're fortunate with our reading grant. There's a lot of literature that's environmental based. If you have a low

level reader or a high level reader, they can read about things in Environmental Education as well. So it's not just you telling, it's them reading. (30028, 12:17)

The reading grant also directly affected how the students were learning EE, providing resources for meeting the needs of diverse learners in Jane's classroom while offering an alternative way to deliver information. This is particularly important when looking at the next outside influence on Jane's perception of the realities of teaching EE, the school day.

At times I get frustrated because my day is 90 minutes of this or 120 minutes of reading or 90 minutes of math. There is so much to get in the day. I do a lot of things, so naturally the platter is full. I think what frustrates me the most is that our day is too short. There's not enough time in the day. I give the kids tasks like during your lunchtime or over recess look at this. I find it can be tough to get everything that I would love in effectively. That's why I integrate so much so they have to form some connections. Then it will stick better. There is so much that they have to take in. Not just in a day but in a month or a year. The time that you really have with them is pretty limited. I think it's a natural thing at times but it can be really frustrating because of the demands of the clock. (30028, 12:43)

Jane perceives the school day as 'too short' considering the demands of what she needs to teach.

This is dictated to her by the administration in the building and at the district level, both in structure of the day she spends with her students, as well as the content she teaches to her students. She spoke of it earlier in regards to her teaching in general and the issues of meeting standards and helping students be prepared for state testing. She works on overcoming these influences by using parts of the daily routine, during the times that the second graders are required to be outside. She assigns tasks or short assignments for them to complete while taking a recess time, in order to utilize the opportunities that it provides. She also uses the class day as an underlying influence on her integration of the subjects she teaches.

After she described her teaching situation at the beginning of the interview, I noticed how little Jane mentioned the restrictions and influences on her actual teaching. She mentioned the structure of the school day in the quote above, and then once more, almost fifteen minutes later,

she mentioned money along with time as an outside influence. “And what is tough is we don’t have the money. So if we had the time and the money that would be huge” (30028, 26:15)

It seems that the school schedule and financial situation are underlying influences on Jane’s perceptions, but not necessarily overwhelmingly so. She mentions money and time relatively less than other factors and this may be due to her longevity in the district, but could also be due to her proactive stance in teaching; if she feels there is a need to teach something, Jane will figure out a way to teach it.

Jane’s descriptions of EE indicate that she is a leader in her school as well as a contributor on the state level. Her many years of experience and personal passion have allowed her to gain confidence and skill in the area of EE which benefits her students as well as her colleagues, and the community at large. Even at this level, Jane struggles to find enough time and resources to teach EE to the level she strives for. Constraints such as a scheduling, curricular demands and a lack of financial resources present challenges to Jane’s teaching, but not enough to lose confidence in what she accomplishes in EE. Jane is by all accounts a thoughtful and skilled environmental educator. Her base perceptions of EE are integrated and thoughtfully articulated. Her perceptions of ideal EE is more of a career move to a specific teaching position or location focused on EE, than a major change in her classroom EE. The only difference in her perceived reality compared to her ideal in-class EE teaching is to broaden the sources she uses, such as the internet, guests and alternative learning locations.

After we had our discussion and Jane was preparing to leave for her appointment nearby, she expressed appreciation in being able to talk through what she was doing with EE. She thought it was interesting to talk about what she understood to be EE because she had not been asked to express it before, especially this extensively. She left telling me she looked forward to reading her case. When she was presented with it, she said she was amazed at how much was there, how much she could actually talk about her perceptions of EE.

Heather, sixth grade teacher.

Background Information.

When I spoke with Heather the first time, she was surprised that she had been selected for an interview and wondered if she had anything of value to contribute to the study. I had not met Heather before this study, and I was appreciative of her candid nature and energy throughout the process. We sat down for the interview at a work table in Pebble Community School's media center and made our initial introductions. During the interview, her passion and thoughtfulness came through in the way she attended to each of my questions, often pausing to seriously consider her own perceptions of the concepts we discussed.

Teaching experience and personal classroom description.

Heather has a license in general elementary education, and has been teaching sixth grade at Pebble Community School for the past thirteen years. She was an art teacher and a substitute teacher at the elementary level previous to this position. She had received an art degree before getting into a teaching career, and was able to teach art to first through sixth graders for a year before taking the position she is currently in.

When she started to describe her classroom, she set it in the context of the changes that had happened in the previous year. She was concerned about the changes that had been occurring and the impact of these changes were having on her sixth grade classroom.

Since we are using last year as a frame of reference, everything is reading, writing and math. With *No Child Left Behind*, and with being "dinged" so many times for low student performance on some areas of the state tests, and with changes in administration, the focus has definitely gone to reading, writing and math. ...there are entire curricular areas that are falling by the way side. (30025, 2:21)

According to Heather, changes in the curricular areas were made through school wide discussions and changes in how science and social studies were taught in all of the grades up to

but not including the grade she teaches, sixth grade. The two content areas are no longer taught as separate subjects, but through the reading, writing and math curricula. For the sixth grade though, as of the year of the study, Heather was assigned to teach social studies while her grade partner taught science to their two classes, where the students would switch rooms each day. She also spoke of the homeroom time and how her freedom to use it how she saw fit had diminished each year.

I do have a little bit of homeroom time to work with. It is gotten greatly diminished over the years. With last year's group, with the building focus on responsive classrooms and other initiatives, what I could do with my 25 minute homeroom time was greatly limited. That doesn't go very far. Last year I needed to take attendance, milk and juice count all those other things rolled into there as well. (30025, 3:24)

Heather's description of her classroom setting centers on the impact of standardized testing results and school initiatives. She sees her role possibility changing in the coming year or two if the trends in the other grades are applied to sixth grade. Her depiction of the structure of her classroom is focused on the constraints of what she can teach; the decisions that are being made outside of her control, and an uncertainty when looking towards the future.

Perceptions of EE.

Heather was animated as we discussed her perception of EE, using hand gestures and facial expressions to punctuate her points. I found myself leaning in and engaging in a discussion of how she perceived EE. When we had discussed some of her background and classroom teaching, I asked what EE was in the big picture of education. And she replied, "It's how we live. It's like the guy's shirt, 'Respect Your Mother, It is The Earth.' EE is based on how we get along in our world" (30025, 15:20)

As she verbally explored EE, she expressed what she considered the important elements of EE. Heather included aspects of environmental responsibility, creativity, as well as the students' relationship with areas outside and the bond across subject areas.

...environmental responsibility would be a big piece. That's always been something that's been very important to me. But then other things that are equally important to me, music, and all the creative avenues. ...Just getting them outside, even though we're reading or doing something else we're outside. The wind is still blowing. The sun is still shining. They experience more. To me it's all one big thing. The elements of music are all outside. (The movie) *August Rush* is the perfect scenario of that to me. Listen, there is music. Formal music is good too, they work hand in hand. Art is the same way. Where do we get most of our inspiration for art from? Outside. Look at the colors that we see. That's where our paint colors come from. That's where the components, the minerals come from to make them. You can't separate it all. It's all together, with the social studies standards, art standards, and music standards. (30025, 8:20)

Her perception of EE includes a strong tie to the arts and music coupled with the experiences that students can have while outside. She also takes a holistic view of the parts she listed, in that they are all connected. This created issues when trying to understand how her perception of EE fit within the structure of a standardized curriculum. At one point in the discussion, we were talking about if EE was interdisciplinary, she described how it was also a part of the sciences, but how it related to the current academic structure was problematic because of the way the standards are delineated.

Karen: So what I am hearing is Environmental Ed is very interdisciplinary?

Heather: It could be part of Science strands. You can do your Earth Science strand, your Biology strand, and the others. Get Astronomy in there and Geology in there. There are a lot of separate strands that fit together.

Karen: Is Environmental Ed a separate strand to those others or a combination?

Heather: I guess it probably has separate standards so I'm sure they could call it a separate strand. That's what I don't do well, take everything apart. (30025, 14:03)

As Heather spoke about her classroom and what she wanted students to be able to do, it went much further than a subject they need to learn, but a way of being a part of the world.

How do we be responsible? We have people that consider humans needs, and people that consider earth's needs. Sometimes they can't both go forward on a direct path. So how do we move forward on a path that honors both as much as we can? (30025, 40:00)

This consideration of balance between the different group's needs, and the awareness to teach it was echoed in several spots during the interview, as the resources that Heather calls upon to teach EE will show.

Personal experiences and training shaping EE.

When we were discussing EE, Heather did not offer as many insights to her personal experiences as compared to what was currently happening in her teaching. When I asked her to describe what she based her perceptions of EE on, she rooted them in her experiences and felt it was personal. To Heather, her perceptions of EE have come from a life-long relationship with the outdoors and the course work she has done to learn more about it.

For me it just comes from being outside since I was a little girl. I've always like to spend a lot of time outside. So it's very personal. That's why I've said most of what I've said. It comes from observing, being there. Having it matter to me. But then I loved the geology course I took. I loved studying rocks and minerals. Then you take what is a passion and it is fun to study components of it. Learning about the stars, so when I walk to work at 5 am what constellations do I see up there and how are they rotating? What does the summer sky look like as opposed to the winter sky? Then pieces of just plain observation will come back in again. (30025, 35:31)

In addition, Heather also delineated the foundation of her EE perceptions in the experiences and situations of the world, past and present, and the responsibilities she feels it implies.

Our world is our home. It's dying. In my lifetime are we going to fix this? No. But can we raise the awareness and concern? Yes. Good. Then I will have done what I can do. There will always be the instances of 'the polar bears losing their habitat' or 'the number of rain forests species that are going away' every single day. There are always going to be those issues. That doesn't mean we just accept it and it's always there. Just like the civil rights movement. Did people say so fine it's just always going to be that way? Well, no. Are you going to step up to the plate and help it change? (30025, 34:19)

Interestingly, on the survey, Heather had written that she had not had any formal training in teaching EE. (SD4, 8e) When I inquired during the interview to confirm this, she replied, "Just the small classes for teachers that I've taken out at the Arboretum" (30025, 36:38).

According to Heather, her perceptions of EE have been formed from her outdoor experiences since childhood, and college courses on topics pertaining to the science behind components of it. Her perceptions may also be informed by EE workshops for teachers held by the Arboretum, but she does not necessarily consider it a major influence on how she perceives EE for her classroom. Her grounding is influenced by the situations and interests she has in components of the outdoors. An exploration of the resources that she calls upon to further her understanding of EE, as well as teaching it to her students shed further light of her perceptions.

Resources drawn on.

Heather enhances her perceptions of EE teaching by doing her own research to inform her understanding, as well as for resources to use in her classroom. She gathers information from reading books and magazines, and being involved with national environmental groups, often through the internet. She spoke several times of reading about particular topics, such as the polar bears and the rainforests, as well as a syndrome coined by Richard Louv, author of the popular book, “Last Child in the Woods” (2008), where he provides a description of what happens to children as they spend less time in natural settings. Heather mentioned her belief and distress in regards to these topics, such as, “...I was reading about ‘nature deprived syndrome’. That’s a very real thing” (30025, 8:40) and bases some of her EE goals on them, as will be seen in her perceptions of ideal EE teaching.

Heather is also involved with a variety of environmental groups, such as the World Wildlife Fund. While she feels they are worthwhile organizations, she is also concerned they may not provide a well rounded picture of the issues that confront society, and need to be viewed locally when teaching her students.

I have to be really careful when I use the internet. I would love to send them to places like the World Wildlife Fund, and a lot of environmental groups that I’m a member of and have been for a long time. I’d love to just send the students to those places. But I also know that they are going to get a one sided picture. ... there are times when I have to

remind myself to remind them that there is another side to this story. That is important with EE, it is always important in any issue. I wouldn't teach politics with only one side either. While I think preserving the rainforest, and staying closer to home - preserving prairies are greatly important, there is a trade off in any issue. (30025, 38:51)

Heather looks for and draws upon these resources on which to base her perceptions and teaching of EE. While admittedly biased in their presentations of EE, she attempts to hold herself accountable to the bias of the resources when she is using them. She is concerned about providing information about multiple viewpoints on issues the students are studying in her class. Heather did not provide an explanation of what resources provide additional viewpoints on issues regarding the environment, and did not suggest a process she uses to go about gathering them.

Perceptions of ideal EE.

Teaching description.

When Heather was asked on the initial survey what EE concepts, skills and issues she teaches in the classroom, she wrote in the blank “the conservation of resources, environmental awareness, and current global issues”. When asked what she would like to be teaching, her written reply was, “I would prefer to address these same topics at a more in-depth level rather than the awareness level” (SD2, Q4 & C5) During the interview, the extent and ambition underlying her second survey response was evident. Heather's perceptions of ideal EE in the classroom continued on the theme of holistic teaching that came out when she described her definitions of EE, where all of the subject areas are integrated to a “big picture”.

If I could redesign things, I'd teach at a charter school where the arts and environment are completely woven together and that's what we do. A framework for how things are taught, where that's our focus and the curricular areas are woven into that instead of the other way around. If we can put things into a whole big picture kids get them better, and their responsibility.

Heather perceives her ideal EE in a charter school setting that offers more curriculum design freedom and focus than she perceives she currently has. She continued on to explain how she felt

her perceptions of ideal EE could be carried out in the school she is in now.

... And I think it's very feasible here, at Pebble Community School. When you look at the simple fact that one of the other elementary schools in the district started with a green school piece, I've wondered at the same time they would be a perfect place to start with an environmental theme and then weave the other way. With integrated education there's not an arrow only going one direction. It could go the other way too. Use your math unit to chart and plot river things and plant things. (30025, 6:40)

In these statements, Heather focuses in on "weaving" the curricular areas together in a multidirectional way, where no single subject area stands out. She also centers in on the focus of teaching, suggesting that EE can offer a framework for planning and teaching, but is neither the starting point nor the end goal. The different subject areas enhance each other. In order to get at what that might look like in practice, I asked Heather to "paint a picture" of how Pebble Community School could put this approach into action.

"We take Jane (from the first case study), there's a Science guru! And we take the music people and the art people; if we look at just plain our world. If we put all our minds together and brainstorm, 'How do we present learning as a single package rather than strands of things that have to be isolated? How could we build together?' Look at these beautiful courtyard spaces. Why can't we use those as learning space more? Have them be more integrated and used." (30025, 11:50)

Heather's vision reflects a commitment to integrating subject areas when teaching. Her perceptions of ideal EE is to be working in a school where teachers of all subject areas find areas of overlap, and reinforce EE concepts throughout the curriculum to make an integrated learning experience for the students. It is also a collaborative effort, using colleagues' expertise while based in the context of the place they are teaching and learning.

Goals and measuring success.

While she has a vision of ideal EE in a "single package", Heather acknowledges that a lot of effort would be needed to bring together the teachers at Pebble to systematically implement a

comprehensive EE framework, but believes it would make the vision stronger and have a longer lasting impact on her students.

... I feel like it's something that a group of people would have to come together to brainstorm. ...I feel like it could be more than just me. It could have more of an impact on the kids. It would become part of how they lived. How they view things. Rather than just what happens in one classroom. ...If it has to be isolated to just a classroom then it's out of context. (30025, 13:02)

For her, the strength of a school wide effort to make EE incorporated in the entire curriculum would provide context to what the students are learning and have a more lasting impact, and become a part of how her students lived. I then asked her to describe examples of this ideal EE in the school. While Heather's vision of what ideal EE looked like was based on a school wide effort and holistic curriculum, her descriptions of success started very specifically and are built upon in her personal experiences and connections. The first of these examples call upon her current role as the Student Council advisor, and looked at the relationship of the students and the school grounds.

I work with Student Council and we've had and off and on discussion about putting in a walking course. As I look at needing to be physically fit; the amount of nature deprived syndrome and how that is exponentially increasing in our children, and the fact that there are recess issues, maybe it's time to see if we can get the administration to give us some money. Use up the entire Student Council money, and maybe there's some district fund or building improvement money? Somehow, if we could put in a paved trail, so that all year long the kids could go out and walk the circuit. Not only would they be able to socialize as they walk, it would get them outside so that would feel the sunlight. You get to be outside and soak up nature and breath. Just be. They can be more physically active. Maybe it could work a lot of things together? It would be one piece. That would help. (30025, 24:23)

She based her reasoning for the school walking path on the current problems occurring during recess time, but also on the previously mentioned concept she had read about, what she calls, "nature deprived syndrome". The goals she perceives as important include helping students be

physically fit, interact with other students and be outside. Heather also grounds her measures of success in the interconnections between groups, such as the students, staff, parents and the administration, when sharing what could be done for EE in the school.

It is interrelated. I know the more I can link a simple walking path, it's Phy Ed, they should back it. Our monitors should back it. It gets the kids doing something. There are some good social components to that because they are visiting with their friends and it keeps them out of trouble. Parents should like it. They're doing something. It does get the kids outside to breathe. The more avenues I can link to something the more support it can have. It is important for Environmental Ed to have all these groups working together; I think it always makes it stronger. It makes it harder for it to go away. It's hard as a single person to keep a lot of things going. The more we can integrate it the better. (30025, 27:45)

In this description, Heather also voices a concern and a goal of establishing EE as a part of the curriculum, that it is supported so it is "harder for it to go away". She also cites practices she feels students should be doing, or doing better, and more deliberately. Both in how they interact with others and the environment, like going for walks as well as in recycling, as she mentions in her second example below.

Looking at breakfast, I know how many plastic cups they go through. Can we get a group of kids that would volunteer and stand at the front of the line to remind the others to pull them off their trays so that we get even stronger with recycling? (30025, 26:55)

The goals and measures of success Heather used to describe her ideal EE were built on her experiences and context around her. Her perceptions of ideal EE were very integrated, and holistic, which was much farther reaching than the measures she would use to see if the ideal was met. In the next section, Heather describes her reality of teaching EE, which gives further insight on why the perceptions and the measures were not more closely linked.

Perceptions of the realities of teaching EE in classroom.

Teaching description.

Heather started her description of how she is incorporating EE into her classroom based in her dissatisfaction of how things are compared to what she used to be able to do with her students. She provided rich descriptions of what she had done in the past twelve years of teaching, and continues to try to incorporate, with the goals she is trying to accomplish.

I've only managed to keep little scraps of Environmental Ed. I tried to take 5 minute field trips over lunch and go outside. So we'd walk around. And have simple conversations about recycling and reusing. OK so rinse out your juice cups. The responsibility piece of taking care of our earth. For current events I'd try to find articles that fit with environmental issues and I'd work them in there. But it's become very hard to do. I used to be able to take my homeroom time to focus on the environment. I took a theme of raptors for a couple years and we researched them all year long. So I used to be able to take big ideas with environmental ed, and now I look for little scraps of things and tuck them in in different places. Not my preferred way of doing it. Do we need all the lights on? No. So the kids know in my room there is only one bank of lights that will be on; another way to reduce what we use and what we conserve. It's simple little things like that. I feel terrible that I can't do more. That's not how I think it should be done. (30025, 4:25)

In her description, she includes teaching the topics of responsibility to the earth, current events and reducing consumption. She also mentioned using a theme throughout the year in the past for teaching EE concepts, but no longer has time. Her answer for the survey question regarding the number of hours spent on EE concepts and skills during the school year, she selected the choice, "0 – 3 hours". (SD2, Q2) She choose the highest amount of change desired when considering her satisfaction level, checking "I think I should be teaching significantly more EE during the school year" and selected "12 – 15 hours" for the amount of EE she would like to be teaching. (SD2, Q3 & Q2)

As mentioned in her description of the reality of teaching EE, Heather perceives her own EE teaching as "scraps" of ideas that are worked into the school day, a perception she describes in

more depth in outside influences section. She is not happy with the way that she is doing it, but feels she needs to fit EE anyway she can. Heather gave several examples of ways she works EE into her teaching, including the materials the students are using, revisiting concepts throughout the year, telling the students why they are doing particular activities, and using the outdoors as a teaching setting.

When I asked her about EE materials she uses with her students, she focused on the type of books and the internet.

Kids love non-fiction texts. So I try to find as many non-fiction texts as I can find that appear to be quality written. And the Internet, there are a lot resources there. (30025, 37:38)

She did not qualify how she decides if the books are quality written, nor the specific topics that she looks for in books or for internet resources. She did include details in the descriptions of how she taught EE.

As Heather described how she teaches EE, planning for Earth Day was mentioned, but then, without prompting or taking pause, she delved into multiple aspects of how she approaches EE with her students on a daily basis. She first described the process of setting up the importance of EE topics at the beginning of the school year and revisiting them as new discussions unfold.

It's planning ahead for things like Earth Day. How can I do some things that are cool? And also the first week of school when I lay out how important it is to take care of our Earth's resources. I revisit that multiple times throughout the year. (Her hand moving in a spiraling motion.) Looping. For example, in our geography, we spend a day discussing earth facts and ocean facts. I always make sure we get in water facts. It'll be consciously presented and then it's revisited multiple times throughout the year.

Heather focused on the care of Earth resources at the beginning of the year, and uses it as an EE theme as she teaches various subject matter, connecting it to the lessons that are related, such as the above example of water and geography. She continued on to talk about the importance of telling the students why they are doing different activities.

Telling kids why we take 5 minute field trips. Because I want you to think about the world. I want you to notice spring and winter. What birds do you see out here today. What are you hearing? I want you to pay attention to that. To pay attention to the fact we have 5 minutes and we can take a little field trip. Taking advantage of the few minutes that you get. Celebrating it.

Coupled with explaining the why, Heather is passionate about asking students what they are experiencing, and being aware. She also ties her knowledge and interests into what she is teaching, such as rocks and eagles, as ways of creating discussions about the natural occurrences around them and strengthening observational skills.

I love to collect rocks. I bring the kids rocks at the beginning of the year. Off and on they will always bring me rocks. So then I ask them what do you notice about this one? What do you see with this crystalline structure? What are its distinguishing features? How hard is it? Trying to work in pieces of what I know. If someone happens to notice the eagle, YES! I talk about the eagles a lot. I like to go running down there by the islands and see where they are. I talk about is a juvenile eagle because of its markings. They will respond and we'll take a minute and talk about it. (30025, 15:50)

While Heather is frustrated with constraints in her school and curriculum, and she feels there is not enough time to teach or collaborate, she is working at trying to fit EE where she can. When I inquired if she dealt with the challenges by keep rethinking how EE will fit into her daily teaching and she said yes. (30025, 27:28) She is focused on communicating to the students the reasons why they are doing what they do outside, mainly to observe and interact, as well as celebrating the discoveries and connections they make. She does not have set framework of topics, but adds pieces where she sees environmental connections, trying to carry them throughout the year. With this piecemeal approach, her measures of success are focused on her teaching and student behavior rather than formal assessments of the students.

Applied goals and measuring success.

When talking about how she measures success with her EE teaching, she started off by pointing out it was not formally assessed in her classroom, but instead her focus was on how well she presented it in her teaching.

Obviously it's not something I test ever. Not in a formal sense. Current events I test. It's an assignment but I grade it from a written level. It is not something for me that has been part of a grade. I look at if the EE has been successful from my standpoint. How well rounded did I get? Was I able to work in some Science thinking, some Science facts. Was I able to work in my heart and passion of it with students? Did I connect with some? Was there that lasting mark with students? Where did those lasting marks come from?

When I asked her to describe what she meant by 'lasting marks', she continued with an example.

My kids will then become obsessed with bringing in rocks. Suddenly now they are starting to use the vocabulary. They talk about the color and the luster. Cool! You're going away with something. You're going away with something that you can continue because it doesn't take me. I don't want it to take me. I want it to be something that is exciting to them. (30025, 30:51)

Heather looks at how well she presents a topic and if students are using the information she presents, such as the vocabulary. She also includes her passion and the students' excitement towards a as a way of assessing her EE teaching. She also described how the students' passions for a topic, such as a particular animal or outdoor activity, can be used as a way of teaching other skills.

Sometimes I have a kid who can come in and their experiential understanding is at a level already where they can research and find something about what we're looking at. I tell them to go look it up and see what you can find on that. You may know a ton about the red fox. Go find out more. I've had a couple of hunters. Then can rattle off everything they know about the deer. Fine. Good. Go learn more now it's time to take something that's a passion for you and add in some more structured research.

But she continued to explain that it is usually her trying to heighten their awareness and passion so that learning can take place in and about places.

But for a lot of my 11 and 12 year olds they are simply at a stage of getting outside to enjoy it. So that it becomes something that is important to them; so that they want to learn more about it. I try to heighten the passion first. If I can do that then taking it to a place where there can be more formal learning. I think there is a lot of formal learning that can be done in informal settings. (30025, 38:15)

It is the learning experiences in the outdoor settings that Heather would use as the basis of her EE teaching. Within those experiences, she uses the goals of teaching science, art and music as the focus of observing and being aware of the details around them. Then, she uses the outdoor experiences as a measure of understanding in students, when they refer to them in their descriptions and when they use the details of their outdoor experiences to give more meaning to their indoor learning.

Beyond science, it goes back to the arts and music. Do they come in and have they heard the different sounds? What are they seeing in the color? I like to stop in the art room and see what they're doing. When they describe colors how are they describing them. What are they seeing? Do they refer back to outside? Or is it still that coloring book scenario. Which is so different, the world doesn't look like that. How are you seeing those things? ...what kind of interest do the kids have? What are we seeing? What will they do on their own? That's my biggest goal. What will they continue without me? (30025, 32:44)

As she focuses in on the observational and awareness skills, she states that her biggest goal is having them 'continue without her' in their connections and observations. Heather also focused on her personal hopes that the students carry on what she is passionate about as a way to carry on an interest of the environment in her students.

It's that blending of presenting information; sharing things that are important, things that are important to me and are a passion in my life, and hoping that they pick up on it. Celebrating it impromptu when they do pick it up, because that continues the cycle. (30025, 18:45)

As we discussed Heather's goals for her EE teaching, she touched on how she continuously makes an effort to assess how she is incorporating the environment into her teaching. As she works with the students throughout the year, she is trying to incorporate where she can, with the goals of integrating and adding more, even when it feels like she is not as

successful as she would like to be.

One of my goals always every year is that I am consciously aware of what do I do with the environment, and not letting it go entirely. Sometimes I have to realize I can't do this piece this year. But then what part can I do? Always making sure I do honor it as much as I can. Ideally I want to work forward, which is always hard because the last couple of years it's gone backwards. That doesn't mean I haven't tried to keep moving forward. Trying to add more and integrating it better. Getting better pieces put together. This year if it's not working so well in my classroom, how can I make it be a school-wide thing? Maybe I can put together enough or get enough people to help me get the money get a walking path put in. Like anything else – trying to look at something a little differently. What worked, what didn't work last year; how can I look at it differently and make it work better for this year. (30025, 29:00)

In her efforts of improving the amount and integration of EE, she chooses to expand her EE context from her students to her school, as a way to compensate for some of the losses in EE teaching time in her classroom. She is also reworking her EE teaching, or 'looking at it differently', to improve it the following year. With the goal of continuous improvement, I was interested in when she would feel she had reached a satisfactory level in the setting she was in. It was at this point in the conversation that Heather's demeanor changed; her animation ceased, and she was very subdued and concise, without further explanation or example.

Karen: How do you ascertain that you're doing enough?

Heather: I'll never be doing enough.

Karen: Even if it was in that 'perfect Charter School' scenario you described?

Heather: I don't think it will ever be enough. (30025, 33:58)

As Heather focuses on integrating EE, revisiting and reworking how art, music, science and physical education can be enhanced and taught to students through the outdoors, she perceives EE as an unattainable goal, where she ultimately will be unable to do what she needs to do for her students.

At the end of the interview, I asked if Heather had any other comments she would like to add. She thoughtfully paused and made a comment focusing on how her goals may be met in a

way that was different than she would prefer, but might be more effective.

As much as I hate it, some specified strand would be good because then more people would have to be on board. That is important in today's world. It doesn't work with my line of thinking, but it does work with how the thinking of our world is; with the structure of the educational world right now. That's how it is working. If there's a standard for it it'll be taught. (30025, 42:05)

Heather's perceptions of how to get EE into teaching, both in her classroom and beyond, is to use the standards structure that was in place, even though it does not work with her "line of thinking". Her concern for making EE "hard to go away" is voiced again in suggesting curricular changes to the school.

Her perceived goals and measures for success are based in her teaching, and how the students are incorporating the skills and vocabulary that she introduces. She also looks for the connections students make with the concepts she teaches in class. Her concerns about not doing enough and the changing school requirements underlie the level of success she perceives in her EE teaching.

Outside influences.

Throughout the conversation, Heather described her EE teaching within the constraints and opportunities of outside influences, mainly the dictations of her job coupled with the school grounds. These two sets of influences shape the way she perceives her EE teaching.

As previously mentioned, Heather described her EE teaching as pieces tucked in where she can. She refers to having to cut back on the amount of EE in her classroom. She used to have more freedom in what she taught and when she taught it, but feels she cannot anymore because of the constraints put on her by the district.

The biggest challenge for me is simply the fact that there are so many dictations on every minute of the class time, and it's coming from the district level. There used to be a little

bit more flexibility from school to school. . . .the district is now saying in September everyone will teach this, and you will teach this in October. (30025, 21:30)

The loss of flexibility in how she uses her time is coupled with the way the district and state breaks down the learning objectives that she is required to teach.

They've taken and pulled everything apart into standards. It doesn't fit anymore and that's why to me a teaching setting where it's all put together makes more sense – it is how life is. (30025, 10:15)

Heather focused on the pieces, the standards, that she is required to teach, and how difficult that makes it for her to teach in a way “it's all put together” or integrated for herself and the students.

She feels her job requires her to teach what the school administration and the district says to teach at the expense of environmental education.

I know that I have to work with the standards and I have to work with what administration and the district says I have to do in order to keep my job. All I feel I can do is look for the little pieces of how I can pull environmental things in. When I look for the elements of what I want to teach, I look at how I can fit them in with the required parts. (30025, 7:57)

Further evidence of her perception of how EE should look in the curriculum comes in her comments about her own ability to contribute to discussions on curriculum within her school.

In this building in this setting with this year I can't go with an integrated curriculum with a group of teachers. I don't have that much administrative freedom. So I'm doing a lot of biting my tongue and biding my time. And I do a lot of looking for opportunities to tuck EE in, because I can't leave it out. (30025, 10:58)

She perceives her goals in opposition to the current school and administrative directives, and feels the need to do what she can, the majority of which is in the confines of her classroom.

Another of Heather's influences is in the classroom, it is the students themselves.

You run a huge gamut in the classroom, including from our kids who are new to the country. They are so taken by American culture that getting outside isn't as important. And noticing the environment isn't something that they're inclined to do due to disadvantages in their lives. And there are kids who just aren't interested. With any subject you've got that whole range from “the haves” to “the have nots”. As far as

different backgrounds, different interest levels, different abilities. Not only do we have language diversity we've got socio economic diversity. We have ability diversity. There is a whole spectrum of things exist with kids, which can sometimes make it harder to tap into some kids and get them hooked on it. I know I'm not going to hook everyone. (30025, 19:20)

The diversity of the students in her classroom, such as in language and socio economic status, as well as a range of diverse abilities, influence how successful Heather perceives her EE teaching to be. In addition, she feels the sixth grade students have not had enough experiences outdoors.

Mostly, it's just getting outside to see. That's one of my big resources is just getting them outside to see because a lot of 11 and 12 year olds don't have the experience. (30025, 38:30)

Coupled with offering students experiences outdoors is the availability of wooded areas on the school's campus, situated among the city limits.

On this site we've got a beautiful woods on the southeast side. I know that there is some poison ivy in there so I can't just tell them to go explore. But those kinds of things are going to exist anywhere. So I feel fortunate that we have the woods and we can talk about it. We have some busy roads. It changes what you can see. The river is close although it takes longer than 5 minutes to walk out there so you have to ask. You have to have lot of time to get that far. There will always be different challenges that come with making the best of the place that you have. (30025, 22:25)

The opportunity provided by the available woods are limited by challenges that Heather perceives in what she can do with her students, such as the poison ivy and the distance to the river. While a great resource is available, there are practical challenges that color her ability to take advantage of them in a meaningful way.

Heather describes broad, advanced goals for EE based on her personal connections and experiences. She would like to redesign curriculum, making it interwoven and holistically based in the environment and the arts. Her ideal EE teaching scenario would be to work in a charter school, where there would be more freedom to focus on EE. Her reality of EE is shaped by her perceptions of a school context that is not conducive to teaching EE, and she must find places to

create EE connections to what she is required to teach. She used many examples of what she does with students that she perceives to be EE, but did not provide a firm EE framework around goals she has for students, or how she will meet them and measure them.

As we were talking, Heather was concerned about being clear when trying to explain the context of EE in a larger sense. She would qualify statements, and then continue on, trying to reiterate what she said in a different way. For instance, in her explanation of what could be possible at Pebble Community School, where she would be asking students, “Can you turn off your TV and would you do that?” she paused and said, “I know I’m not explaining well, and I’m totally not answering your question.” (30025, 13:00) and continued on. While I reassured her she was doing fine, it was a concern for her throughout the interview process. From her descriptions, it seems her views on integrating EE into the curriculum are continually developing, and she is at a stage where she is having trouble envisioning exactly how it all should look in order to make it into a cohesive, systematic plan.

Paul, kindergarten teacher.

Background information.

I met Paul at a local coffee shop after he finished a day of working with children in an early summer program. I was interested in meeting him because he was a fairly new teacher who, according to his survey response, had formal environmental studies courses in college. Once we sat down, he was very genuine and at ease with the interview process. He would ask questions about the purpose of particular questions, and was upfront about how he was approaching the interview. He even mentioned as we began he had thought about looking up definitions of EE before we met, but he didn't think that would help me with my study if he gave me answers based from a book or website. He was willing to answer questions without trying to please me, and I felt we both enjoyed a very interesting conversation.

Teaching experience and personal classroom description.

When Paul introduced himself to me, he described himself as someone who has a passion to teach and loves kids. "Any chance I can get to have kids experience (events) that they normally wouldn't..." (30023, 1:56). Paul has been a kindergarten teacher for three years at Pebble Community School. Previous to this position, he taught fifth grade for a year in a different state. He volunteers at his church working with the youth programs, and works during the summer teaching children. Paul's teaching license specialty area is in Communication Arts and Literature, and he uses reading and writing as a venue for learning in other content areas.

When Paul describes his classroom, his first concern is to create a safe, comfortable environment for his students.

Since it is Kindergarten, sometimes it's their first schooling, so I like to set up safe environment right away. What I find is that kids come from all over... Traditional two parent families are not as common. Some of the rules that wouldn't maybe be set for kids at home they have to experience at school. That way everybody is on the same page, everybody is comfortable, we know the boundaries. 'I know what my teacher is going to

do if this happens and I know what he's not going to do.' I set that up right away. (30023, 2:01)

His focus is on the diverse backgrounds of the students coupled with it being their first experience in school. He deliberately teaches rules to set boundaries and to let the kindergartners know how he, as a teacher, will respond to different situations.

As Paul focuses in on what he teaches in his classroom, he expressed that his teaching is guided by two sources, the district and his passion, writing.

I teach what the district sets down as well as my passion. I do a lot of teaching through writing, especially in Kindergarten, because the focus is on math and language arts. I tend to integrate social studies and science right along with it. There are definitely science units that I hit hard, because they've been set down by the district. In the long run my passion is writing so I teach a lot of things through writing. Kids get to act out and do things through writing. (30023, 2:50)

He uses writing as a venue for learning other subject areas, and depends on the district to define the content he focuses on with his students. As we continued to discuss his teaching, Paul also voiced his concerns about student understanding over the long term.

I find that I can nail a subject area perfectly and the students will master it. The whole class could get an A on the test and I'd review that same subject matter 4 or 5 months later and it's gone, or at least most of it. And so I find the best way to teach is to have some review of a topic, and more frequently with primary age children. (30023, 11:46)

Paul comes back to main topics throughout the year as a way to review and help students remember beyond his class. He is also concerned about being clear with his students, and he works on that by finding and using resources that will enhance his teaching.

It's always important to use resources and as I grow more in my teaching using what I find from other teachers and also on the Internet. That's a great resource. Journals help to add to my repertoire of teaching too. I'm always making sure that what I'm teaching is clear to my students. Whether it's the most in depth or not I want to make sure they understand it. Otherwise it's a waste of my time and theirs. (30023, 12:22)

In addition, Paul mentioned his colleagues who also teach kindergarten, and how they make a working team that helps him with his teaching.

Generally when I teach, I talk to other Kindergarten teachers. We have a really close Kindergarten team at Pebble. It's unique in a good way. We talk a lot. I might teach a lesson and feel like I'm missing something, so I will talk to my neighbor down the hall. She has more experience than I have. I will discuss a lesson with her and see if there are ways that she does things differently that I might use to improve. I'd like to say that I do that daily but that would be a lie. I do talk to them weekly about things.

He interacts with his kindergarten colleagues to improve his teaching on a regular basis. He went on to include how he personally looks at his teaching in a systematic way.

So most days I try to set apart that time to look back and reflect on each lesson. And make sure the lesson I did teach was useful and then how could I change it for next year or should I just get rid of it. And then what else can I bring in. (30023, 22:29)

He reflects on the effectiveness of his teaching by looking at the lessons he has just taught and how they could be changed in order to ensure that they are both effective and meaningful to students.

In his classroom, Paul works at creating a safe and inviting environment, basing his teaching on the district and state subject standards. He enhances his teaching by using writing techniques, reviewing topics throughout the year, and finding new resources from fellow teachers, the internet and journals. He systematically discusses lessons with his colleagues and takes time to reflect on his lessons daily basis.

Perceptions of EE.

When I asked Paul to describe EE, he asked me to clarify what I wanted from him and I explained I wanted to know what came to mind for him. He then worked through his description verbally.

Good question. I guess that's part of your study. If I had to define environmental education a couple things come to mind. I think of environment of school and I think of environment of the planet. I think of earth right away naturally. We just passed Earth Day and we talked about how we went out and cleaned up the earth. I'm passionate about teaching kids to take care of things in general, whether it's inside or outside. Respecting, not only peers and each other, but also property. That's how I answer the question. (30023, 4:02)

Paul focused on both the school and the planet as part of EE, teaching students to take care of and respect people and property. When I asked him to describe EE further, he linked it to other subject areas he was required to teach.

When I think of EE, I think of science. The environment is part of our science, as well as the Kindergarten social behavior standards. Science and social behaviors. (30023, 7:54)

He described EE as part of science and social behaviors. When I asked him if he would consider it more one than the other, he spoke of his inexperience with the term and choose one.

I guess only having taught for a few years I haven't talked too much about environmental education. Maybe I'm just not used to that term. If I had to pick one or the other, I would have to say science. That's how I think of it. (30023, 8:28)

He then started linking his EE teaching to the standards he was required to teach. In order to look further at his perceptions of EE, I asked if it was simply part of science or broader, such as an interdisciplinary subject, and he explained where he felt it fit.

If we are looking at classifying it as a science or as an interdisciplinary subject, I like the idea of calling it environmental science. If it is specifically about the environment, that makes sense. If it is the environment of the school or the community, I'd say environmental education under the umbrella of science would fit. If it was environmental education alone it would need to be described a little bit more. (20023, 8:51)

In this description, Paul again voiced the concern about the phrase 'environmental education' if was considered a separate entity in his teaching, and seemed more comfortable with 'environmental science' basing it on teaching about the environment. When I asked Paul to further explain his use of the term community in this definition, he seemed to make a realization and broadened his description again to include social studies and beyond.

The community, that brings in social studies too. That's why I think it's important to integrate social studies, science, writing, language arts, math all together especially in units and throughout the day. Yes, community first as developmentally appropriate... When I say community it would be the classroom community. (30023, 10:18)

Paul goes so far as to state that all of the subject areas should be integrated into units and make it developmentally appropriate, in this case at the level of the classroom community for the Kindergarteners.

Later, when I asked Paul about why he would want to be teaching something called environmental education, we started again to banter back and forth about what EE might mean, and how he perceives it, and this is where Paul's focus on the social skills as part of EE and his own teaching in general came out.

Why teach environmental education? I can answer that 2 different ways. First, I teach the social aspect. I try to see everyone the same as they come in to our learning environment, giving them a chance to succeed. Whether I hear of a child's behavior or based on who they are. I try not to judge that. I want to give them a fair chance. And then, second, that goes with science content, the same thing, giving them a chance. (30023, 42:48)

Paul perceives EE as a way to "give students a chance to succeed" in the learning environment by using social skills and gaining science content knowledge. He shifts his perception of EE to include how sets up the classroom for all of his students to learn.

Personal experiences and training shaping EE.

As mentioned before, Paul had answered on his survey that he had formal training in EE. When he was getting his undergraduate degree in his elementary education program, he had taken environmental studies courses. He had also taken EE teaching workshops through the Project WET program at the Arboretum. (SD3, Q8e) Paul did not refer to either of these experiences when talking about his perceptions, either as a way to give background or as a resource, except to say that he would like to continue taking summer courses to broaden his perspective of being a teacher and learn more about EE. (30023, 28:10)

A major influencing theme throughout the interview was Paul's focus on helping students function successfully as part of a community in order to help them be successful learners in kindergarten and beyond.

If the kids are not able to function socially, then they're not going to learn anything I have to teach them. If I don't have the classroom environment and community under control they are not going to be learning what it looks like to add or subtract, to read or to write. So that's number one, if behaviors aren't in place then (pause) learning comes later. Learning what they don't know that will come later but teaching a student how to behave – if that's not a reality, if I'm not teaching that they're not going to learn much themselves and they're also going to turn others away from learning. And I would say it applies to all ages, for sure, youth, senior high, college, to anyone, even as adults. (30023, 44:05)

By linking students' success in schools to social behaviors, Paul perceives EE, with its social skills qualities, as a way to help his students be successful learners.

Resources drawn on.

Paul did not cite a specific resource that he called upon for centering his base EE perceptions. He did, however focus on the success of his students in their social skills and in science, and he uses several resources to base his EE teaching decisions on. The three main pieces he mentioned as resources are academic standards, the curriculum the district lays out for kindergarten, and informational text.

Throughout the interview, Paul referred to academic standards as a foundation to what he teaches, specifically within his EE teaching and beyond.

When I'm making those decisions I always look at the state standards and I look district wide. What does the state want me to do? How would they want me to teach environmental education? (30023, 7:26)

Paul centers his teaching on what he feels the district and state want him to teach, including any EE he would teach. He uses the state standards as well as the district standards that are specific to kindergarten, explaining, "I look at state standards first and I look at district standards. The district binder for Kindergarten is around a hundred pages, I go based off that. (30023, 8:16) Paul perceives standards as a guide in everything that he teaches. The district has guidelines for what should be taught in Kindergarten in each of the subject areas based on the state standards.

Because of the developmental level of five and six year olds, the Kindergarten standards are unique, which Paul pointed out.

To be fair all Kindergarten standards have social aspects of the behaviors as part of them, which is kind of unique. Upper secondary and high school don't have that. It's unique to Kindergarten. (30023, 25:45)

The district's curricular choice for science, the FOSS kits, was also considered a foundational resource by Paul. He even narrowed in on the particular units he taught.

In the survey, I talk about the FOSS kits and some of the things the district has set down based on science. The FOSS kits include the tree unit, the wood unit and animal unit as well. I tend to add a bit more of my own supplement material. (30023, 4:50)

At the end of his science curriculum description, he states he adds some of his own material, calling on his language arts background and passion to bring in informational texts that relate to living things.

I teach using a lot of the animals. I'm an animal lover. I've never brought too many in to the classroom, but I use a lot of informational texts, of non-fiction. They have not had a chance to look at informational texts much, due to their interest in fiction books. So often when kids come into the library the first thing they grab is a Clifford book, Franklin books, or Curious George. They have to have a chance to look at informational texts, or the knowledge they can get from just a quick fun book about monkeys or something that they are excited about. (30023, 5:51)

With a focus on non-fiction books, Paul hopes to have students add to their understanding about real creatures while broadening their use of informational text.

Perceptions of ideal EE.

Teaching description.

While Paul was talking, there was a sense of imbalance, where he could provide what he perceived to be ideal teaching in regards to EE topics but yet was unsure of what EE was. On the survey, Paul selected, "I think I should be teaching slightly more EE during the school year" and chose to submit a total beyond fifteen hours, typing in "30 hours" as the amount of time he would

like to be spending on EE in a year which was double what he had put for the amount he was currently doing in a year, at “12 – 15 hours”. He also added the comment, “I think I should do more integrating with language arts” (SD3, Q3, Q2 & C2) When asked what concepts, skills and issues he would like to add, he wrote, “I would teach what is set down by the district, because I trust their judgment. However, I would also add more supplemental material as I work through units” (SD3, Q4) During the interview, he explained the academic standards that he felt would fit under EE, and he mentioned the science curriculum, and how ideally, he supplements the lessons provided through FOSS to make them better.

For instance, if there’s a lesson that the FOSS kit tells me to try: We did a wood unit and it talks about sanding down wood on sand paper and looking at it. But it doesn’t go into too much depth. I see like a hole there and I ask what am I teaching these kids? We take a piece of sandpaper and yes it’s experience and hands on but what if I don’t connect that back to the tree unit that I taught in the fall? Such as, where does wood come from? How does it get into the shape they have in their hands? What are they doing when they’re sanding it off? What does that become? What can we use this for? Applying it to them. If we don’t make it real to them the value is lost. What are they going to learn? Maybe they’ll remember in a year that they used a piece of wood on sand paper and that’s all that the lesson teaches you to teach them. As well as a little bit of vocabulary. My passion is that is to make sure that it’s real to them. (30023, 17:40)

His passion was to make the learning activities have a long lasting impact, connected throughout the year and grounded how it applied to the students. He also perceived many of the uniquely kindergarten standards to be ideal for EE, and listed some of them.

They can solve their own problems. They can follow multi step directions. Listening skills. Talking environment and education, environmental education, I would say social behaviors are a big part of that. (30023, 26:20)

He felt that the social behavior standards were a major part of the EE students needed. Later in the interview, when Paul was asked if he would know if he was doing enough EE in his classroom, a realization in his perception of EE occurred that he was honest about, and was at ease with, laughing while he said it.

No, I don't know! I could be doing none! How do I know? I think I could be doing more. I could research more. After this interview I'm sure I'll look things up. I want to be honest. I don't know what the term means. I'm not the only teacher out there like that; I hope I am representing more than just me. I don't know if I am doing enough. I am a hard worker and I'm willing to improve in any area of my life. So whether or not I can answer if I'm teaching environmental education to the best of my ability, hopefully I'm going to add more and learn more about it to improve. (30023, 40:25)

Paul was unsure if any of the teaching he was describing fit under EE, which he thought might be because he did not know what the term meant or he was also not teaching it. He was sure he was not the only teacher in this situation, and was very willing to learn, which was the focus of his EE goals for the future.

Goals and measuring success.

When asked about his EE goals for the future, and making his EE teaching more ideal, he based most of his answers on his own understanding. His immediate goal was to learn more about EE, basing the effort in standards.

Only the goal for me personally is to learn more. As teachers we should be looking into EE. So yes, I continue to learn more. It comes back to what the standard is. So for me I apply what I need to teach and then I learn more about that subject. There are other standards in other grades that I don't know more about but if I taught that grade I would need to study up on that. And learn more and I'd probably get more excited about it. (30023, 20:32)

He was also concerned that he made a conscious effort to improve as an educator.

If you want to become a better teacher or if you want to become better at anything you need to continue on learning. If I don't set aside time for that the time doesn't just magically appear. Because you juggle family and church and activities you have to make time for learning. (30023, 21:14)

When ask what measure would show that there was improvement, he quickly answered.

Hopefully I would have a clear definition of environmental education! That would be something I would take and continue. And hopefully there would be changes in the classroom that would improve environmental ed., whatever changes those may be I don't know. (30023, 27:53)

He would have a clearer explanation of EE, and impact the quality of the EE teaching he was doing in the classroom. He continued on to describe goals for his future regarding EE.

I continue to seek out peers and colleagues and do workshops throughout the summer. The goals I've set aren't just for me because I'll use that knowledge and share it with other colleagues and maybe use it in my teaching. I'll incorporate it in my lesson planning. (30023, 28:21)

Paul brings in his colleagues and increasing their understanding of EE, as well as improving his lesson planning as goals for ideal EE. Later, when talking about how to measure success ten years from now, his reply was focused on his perception of being an educator, and the enthusiasm of his students and himself.

As I go back for my Masters Degree I hope to widen my perspective of what being an educator means. Just continue to add to my repertoire. I can be doing it in a different way but as long as my students are enjoying school and learning and I'm still passionate about what I'm doing. And I'm enthusiastic. Whatever I'm teaching whether it's Kindergarten or any other grade as long as the kids are getting that and learning more from me then I'm successful. I suppose it could be measured by a state standardized test. I don't always think that's the best way. That's just a glimpse of one day. Ideally if we could pause time in a child's life from the beginning to the end then we'd have a full view. (30023, 34:58)

During this description of success, Paul pondered whether a state standardized test would be a measure of success, and decided it was not. Even though his teaching is based on the standards, he perceives the students' lives as they live them a better measure of success than a standardized assessment.

Perceptions of the realities of teaching EE in classroom.

Teaching description.

As we discussed Paul's perceptions of EE, he consistently cited the academic standards, the science curriculum and the social skills aspect of kindergarten in relationship to EE. As mentioned earlier, he selected the "12 – 15 hours option" on the survey for the amount of time he spends on EE topics and skills during the year (SD3, Q3), and listed the FOSS units kindergarten is assigned as well as recycling as the EE topics in his classroom.

Trees & wood unit- 8-10 hours

Reduce & Recycle & how to Reuse items- 2 hours

Animal unit (Habitats and keeping them safe)- 2-3 hours (SD3, Q4)

During the interview, he again expressed his focus on science as given by the district to cover standards. He also goes into greater detail about how he supplements the units.

I start by looking at what I have as a resource, my curriculum. For environmental ed I would look at the science curriculum. When someone says environmental education I think of the environment. I naturally think my science curriculum. Does what I'm teaching them hit state standards? And I look at the district.

I would take a lesson of the tree unit. I'd map it out and plan it out. Usually I teach that unit about 2 weeks. There's 10 lessons listed in the FOSS kit for me to follow. I make sure that it's matching directly, because curriculums don't always match the states standards. I would look through the lessons and map it out daily. I'd decide what I'd want to teach and where. I fill in the blanks a little bit. They do a tree walk. We learn about the roots and the trunk and the bark and all the different parts of the tree. If you're not doing more hands on I try to add a little bit more. We'll go out and do with things leaves and bark.

I try to make it a little bit richer for them with hands on experience. Vocabulary is also big for me. Making sure we understand what we're talking about. Making sure they remember it too, so I do some kind of assessment to make sure they retain it to some degree. (30023, 13:35)

He integrates vocabulary and assessment, as well as hands on portions to enrich the students' learning experience. He also explained the language arts connection with the science units further, as well as creating mini units.

So generally in Kindergarten we do little themes in the form of units. In the tree unit, wood unit and animal unit we fit non-fiction books in because they are pretty structured. And throughout the year I'm throwing in weekly different units. I could do a unit on monkeys and what it would look like and we do activities on monkeys. We do little monkey games and things I like to plan. (30023, 6:23)

At another point in the discussion, he brought in his social studies teaching as a part of his EE reality, and his concerns about portraying the topic of community at an appropriate level for kindergarteners.

Community as developmentally appropriate, especially in Kindergarten, or they can't understand it. The concept is way too big otherwise. You first look at the individual

student and who they are, and then you go from there to families. And you go from there to neighborhoods, schools and our community, the towns, the cities, states, countries, continents and world. I try to, even in Kindergarten. Some of the kids are ready for a little bit of that. They kind of get the bigger perspective. When I say community it would be the classroom community. Often I would talk about (the city where Pebble is) and this where we live. This is a city and making sure it wasn't too hard. I wouldn't want to overwhelm them and teach them material that they just aren't ready for. (30023, 10:31)

He centers the topic of community on the classroom, providing the students with connections to the levels of community that they will understand like family and classroom, while introducing broader perspectives of countries and continents for students that are ready for it.

Beyond the science and social studies content, Paul also talked about the social skills he was teaching, as a way to measure success in his efforts to teach EE, which is described in the next section. The three themes of science, social studies and social skills were the main focus of his EE teaching perceptions.

Applied goals and measuring success.

As a major goal for actual EE teaching, Paul was concerned about the EE learning to be real to the students. The following comment was referring to how he treats the science activities, such as the wood unit.

I need to be applying the lessons to the students' lives. If we don't make it real to them the value is lost. What are they going to learn? Maybe they'll remember in a year that they did a hands-on activity and that's all that the lesson tells you to teach them, as well as a little bit of vocabulary. My passion is that, is to make sure that it's real to them. And that is part of the environmental ed piece, where they can connect to something. (30023, 18:50)

He goes beyond the hands on aspect of the lesson experience, to having the students understand what it is that they are learning, how it connects to them.

Later, when Paul was asked specifically how he perceives success with his EE teaching, he focused on the kids and their development throughout the year. He spoke in general terms about the response of the students and their vocabulary use.

One is the smiles on their faces. If kids enjoy what they're learning, that does it for me. If they are able to take grasp it. If I see them using what I've taught them, like with vocabulary. If a student is gone one day and one of the other students help him to catch up. I'm not expecting that. I didn't tell them to do that they just learn those behaviors. When I see vocabulary that I use and see them start to use it that's how I see success.

He continued on to describe the before mentioned social skills, and how the students develop and use them throughout the year.

Socially I see progress throughout the year. In the beginning of the year I see kids coming from all different places. Then in the middle of the year we're cruising and then at the end of the year – I don't like to use cruise control because that sounds negative but it's working smoothly. Everything is fully functioning. It's a well-oiled machine. There are times when kids over step their boundaries. And if I have to ask someone to leave the classroom if they have hit someone else or something like that; I make sure when they come back it's a chance for them to apologize and they can once again join the classroom community, to repair that relationship when that occurred. So that way the student is being held accountable. They know not to do it again. And the rest of the class sees that I take care of it and it's not going to happen again and that it's a safe place. I see success when at the end of the year someone will say "that's not appropriate to do – I think you should apologize" and I see them talk to each other in that way I see success. (30023, 32:10)

When Paul sees his students using the social skills and language he has taught and used within his classroom, he sees that as a measure of successful EE teaching. The classroom community is running well and students feel secure.

Paul had several measures of success that bridged the two images he had described for EE, the science and social studies content, as well as the environment in which the students are learning. He has the ongoing goal to make real connections for the students, while watching for the use of the vocabulary and skills that he teaches and uses in the classroom.

Outside influences.

Paul was able to describe several outside influences and challenges specific to his EE teaching. When asked what the biggest influence is on EE in his classroom now and into the future, he centered again on academic standards, from the local level in the district all the way to

the national level with the federal mandates of “No Child Left Behind”, and how that makes his teaching focused towards a goal.

Making sure the district has clear objectives and is following what’s been set down by the state. It would be interesting to see what education will look like. With “No Child Left Behind” if some things will change. I love the idea of “No Child Left Behind” I love the idea of always looking towards a goal but in ten years who knows what’s going to be seen as appropriate for children. There may be something out there environmentally that will impact us so much that we won’t even be able to teach the way we are teaching now. (30023, 36:43)

In this description, he also brought in the idea that environmental occurrences change the way students are taught over time, and the goals of teaching will be modified as advances are made in education. Paul reiterated that concept of change over time when he spoke about his own teaching and how that influences how he can use resources that are available, such as materials left behind by a retired teacher.

As I opened up my cupboards when I started at Pebble Community School, I had a retired teacher that left a lot of things. I’ve looked through the things before but every now and then I’ll pull something out that makes more sense to me than it did before. I’m finding more of those things that I can use.

He went on to explain that he understands and uses new teaching tools more effectively the longer he has been teaching, and he hopes to continue that into the future.

I hope to continue to use tools. One nice thing is I’m getting a Smart Board this next year. I hope to incorporate technology and use technology more than I have in the past. I love technology. I love using data to drive my instruction, and I think that it would enrich my environmental education instruction. To be looking at Smart Board technology to improve how I teach, because I can use colleagues information and how they teach environmental education and use their lessons and incorporate them in mine using Smart Board technology. Hopefully I’m still teaching with passion not just using a tool because it’s fun to use. (30023, 38:19)

Along with Paul’s broader perception of the influences on his EE teaching, the challenges he mentions are also broader, starting with the time and energy spent on finding resources, as he is in the process of developing his own teaching.

There are challenges when trying to add environmental education to my classroom, one is finding material. It takes time and energy. As I get along in my years of teaching I'll get better at making sure what I am teaching is the best. If I see something better than what I'm doing I'll try it that way and see how it goes. (30023, 17:15)

At one point in the discussion, Paul stopped to make a statement to clarify his understanding of EE, and how he planned to proceed. He had already said he wanted to learn more about what EE is, but had not yet said that he may not be teaching it. He had been discussing how he might use the internet as a resource, and he made a realization that shifted the conversation.

I might type in environmental education. I'm sure I'd get a broad perspective. Not that I'm not well rounded. I can honestly say I don't hear that term often. ... With language in general if you throw a term out there I might know a whole lot about that term. If I didn't know the language and someone were to say the word teacher and I didn't know what that word was in that language that doesn't mean I don't know a lot about teaching. It just means that I didn't know the reference of the word. Hopefully I will continue to research more and always grow more in science and socially. Behaviors are a big thing for me. Responsive classrooms are our mantra. We try to build that sense of community. Based on science we need a lot more curriculum wise. Foss kits are great but I think if there's more that I had in my toolbox to pull out how much more my students could benefit. How can I be teaching my students about the environment? (30023, 30:06)

He delineated the difference between knowing the specific definition of a term, like environmental education, and still being able to teach effectively in regards to that term. He then cited each of the pieces he felt fit under his base perception of EE, including science, student behaviors, community in the classroom, and enhancing the curriculum.

Rebecca, kindergarten to sixth grades, art teacher.

Background Information.

When I met Rebecca for the first time at a local coffee shop, I was struck by her energy and positive outlook. From the beginning of the study, she had always been one of the first to respond to emails and inquiries, and was thoughtful in her responses. While the interview progressed, her detailed descriptions shed light on what she was trying to achieve in her classroom.

Teaching Experience and Personal Classroom Description.

As Pebble Community School's art teacher, Rebecca knows all of the students in the building, kindergarten through sixth grade, a situation she is very pleased with – she is the only teacher in the building that has every student. She sees individual classes of students for a fifty minute period once a week. She started her teaching career in the building two years before I met her.

Rebecca described her classroom as a place where she is teaching art to students, not just as a skill but as a subject that has a history and relationship to us as humans. She focuses on what she called discipline based art education.

I believe a lot in discipline based art education, which includes the four concepts of art production, art making, art criticism and art history. Making sure that all four of those are a part of every lesson, it helps them get a better understanding of why we're making this art and why it is important. In talking with other art teachers they don't include all those pieces. For my students they love hearing if this artist is alive. Did they have a wife? It's helpful to include not only art history but also in world history. If you can bring those little pieces... what happened in the world's history at the time of the art history piece? What was being invented at that time? Just small little pieces, that's enough for them to relate to the number, the year that we're talking about. I'm excited about that. (30022b, 1:00)

Even though other art teachers in the district are not using the same framework to teach art, Rebecca feels strongly in a discipline based approach to teach art. She works on contextualizing

the art for her students by including historical and personal information about the artists and the art style.

Rebecca also voiced that she wanted to be teaching subjects and concepts beyond just art. “I love bringing in something other than art. I don’t want them to think of me as just art and that’s it” (30022, 6:00). This included parts of language arts, math, and history, and she goes about this tapping into what other teachers are teaching, talking to them and collaborating.

Perceptions of EE.

As the conversation transitioned from Rebecca’s general art teaching into her perceptions of EE, she stated, “The environment should always be considered in anything that they’re making” (30022, 3:50). As the school’s art teacher, she did not have the scope of curricular standards to call on like other teachers, but instead grounded her perception in the art that the students were creating. She consistently referenced the concepts of recycling and considering the environment when creating art. Her response to the survey’s question regarding the EE concepts she taught were concise as well.

Recycled Art (3 hours per class, 4 classes)

Bridge Design - environment needs to be considered in the design (10 minutes per class, 4 classes) (SD4, Q4)

The four classes she refers to are two classes each of second and fourth grades. When Heather explained her classroom, there was an additional effort to connect the students’ creativity to the world around them, taking it beyond the history and location she would have normally taught in art. She had added these topics into her curriculum during her second year of teaching after being inspired by a personal experience.

Personal experiences and training shaping EE.

As the interview was nearing the end, Rebecca made a statement regarding EE that had not been prompted, but it added to the depth of her perceptions of EE. When asked for more

information, she explained a pivotal moment for how she perceived EE in her art classroom. For her, one event started a chain of thought that inspired her to make connections and think about EE in her classroom in several different ways.

I've never had anybody tell me I have to do it. It's never been pushed.

(Karen – So why are you doing it?)

It all started because I went to the Festival of Nations. There was a stand, from Uganda I think, and they had magazine bracelets. It was a beautiful bracelet. This is something my students could make. Then I can pull in the piece about another culture and another country because this is how they make money for their family. This would be so easy. So I started with that. Then I realized this is recycling. That this year, when I needed to fill that time, we could recycle. I should just push this recycling piece a little more.

...I saw how neat it was that they were made out of magazines, something everyone has. And two, it was making money for a family. Reusing what was around them was important and they didn't have anything else. They can make these bracelets and make money for their family. I thought that was so neat. That's how they do it and my kids should know about this. We could make this, this is easy. They didn't look like the ones at the festival but they were so proud of what they created. They were more proud of the recycled ones than the ones where they got to use the paints. It's something out of the ordinary, they don't expect it. They expect crayon and paints and markers, this was something so different for them. And they know that they are helping the earth, because we kept talking about how we could have just thrown these away. Instead look what we can do. (30022, 27:14)

Within this explanation, she also started to connect other experiences to the recycling piece, which inspired her to do more with her students.

Then you came and made me more aware of it. Jane came and talked about the standards changing, and randomly I had that thought of environmental engineering with the bridge project. I've always wanted some part for myself, but I never thought about expressing that to my students. Like recycling and being aware of the environment and helping the environment. (30022, 28:05)

She had thought about the concepts of recycling and environmental engineering in her personal life, but had not thought to bring them into her teaching. Her personal experiences were not only

instrumental in inspiring her EE perceptions, but also are the foundational resources she draws on.

Resources drawn on.

Related to Rebecca's background in art, she has an interest in architecture, and happens to be married to an engineer. She uses this background as a spring board to focus on the new science standards based in engineering as a resource to direct her EE perceptions.

My husband's an engineer. I love architecture. That is a meeting point of the art. So I understand it a little bit too. So I love throwing some talk about sky scrapers and the bridges, my personal experiences. Also, I know that the science standards have changed this year include more engineering and thinking in that way. I also now believe pushing more girls towards the sciences is very important. I think that is an excellent addition to the standards. I think so many more kids will be able to relate to the sciences in that way, just to have the interdisciplinary piece again.

She sees the engineering focus as a way to include girls in the sciences while making art more interdisciplinary in the process of creating. She then continued on to include the personal experiences students have in recycling and how that relates to art.

So many kids are practicing recycling at home that maybe they don't realize what that means. I think it's important to recycle. There are so many things we can reuse, especially in their art. They can paint over it and it changes that thing entirely. (30022, 4:40)

With the focus on recycling, she draws on the students' understanding and experiences as a basis of what she perceives as EE.

Rebecca's interests and personal experiences, coupled with the complimentary new science standards and the student experiences, are the touchstones Rebecca uses for her base perceptions of EE.

Perceptions of ideal EE.

Teaching description.

Rebecca was open about not knowing what to teach for EE and she had not experienced any formal training in EE, which she felt made it more difficult to describe her perceptions of ideal EE teaching. In the survey, she wrote a comment regarding what EE she would like to teach, “I’m not sure what else I could teach but I do believe it is important and I would like to research other areas that could be taught in the art curriculum” (SD4, C5). As a second year teacher, Rebecca was actively looking for new curriculum and possible connections for all subject areas, including EE, and she was very energetic and positive about possible additions, which she demonstrates in her goals for her future teaching. According to her survey answers, she wanted to increase the hours of EE teaching in her classroom, from 0 – 3 hours to 12 – 15 hours, selecting the satisfaction level of “I think I should be teaching slightly more EE during the school year” (SD4, Q1, Q2 & Q3) .

Goals and measuring success.

When talking about what her goals would be for EE in her classroom, Rebecca spoke of systematic steps she was taking as a developing teacher to improve her EE teaching. Her first description focused on the recycling topic and how she would like to include a unit for each grade level.

I have a checklist of all the topics I want to cover throughout my whole year and one is recycled art. I’m trying to come up with a unit for each grade, so I can include the recycled art piece. (30022, 4:00)

She reiterated the sentiment when asked later about ideal EE goals in general.

Definitely having some piece of it in every grade level. Right now I have two grades for sure that have a project going. So that’s more than I had last year. Definitely, every grade.

She then continued on to include improving her own understanding of EE, as well as bringing her students to a higher level by interacting with artists that exemplify the ideas they are studying.

Understanding more myself about EE, so I could speak more easily about it. My students need to be at a different level than we're at right now; to go to an art museum would be wonderful, to talk to an artist that recycles and how do they think of, "I can do this with whatever I have found." I think that would be amazing. We can look at millions of pictures but we don't know how they came up with the idea or how they even started." (30022, 14:40)

Rebecca wants her students to understand and interact with the individuals that are creating the art that is being studied, to offer context and inspiration. In order to understand how Rebecca would measure success in an ideal situation, she was asked what she would expect from the kindergarteners she had just taught when they are sixth graders.

I'll be able to expand further on it. If I gave them the same lesson that I gave my second graders they maybe wouldn't have to have that paint, they'd figure out some other way because I've taught them to think abstractly. And they don't have to have that concrete image in front of them. That would be more the art part of it. They would already talk about the recycle piece and what it takes to make it look like something else; if they're able to do that in 6th grade. I've already taught them about the symbol and reduce, reuse and recycle then maybe we can expand more on that. Building on what I know they've already had and know; so they can demonstrate it to me. (30022, 25:24)

She centered her goals on having them expand on the concepts she had been teaching and think more abstractly. She also wants the students to demonstrate that they understood, but did not go into how that could be done. The recycling symbol was brought up earlier in the conversation, where Rebecca was centered on expanding her second graders' understanding of recycling as a goal for the next teaching year.

I'm also going to add in my second grade lesson next year we're going to look at the recycle symbol and talk about what does that mean. We see it on things it tells us to recycle but what does that mean? People talk about reduce, reuse, recycle but the reduce piece is kind of the biggest one. We can reuse and we can recycle and that's good but to reduce what we're using would be so much better, and so much easier. So what do all those things mean? We hear them, we see them but why are they there? (30022, 13:20)

She focused on the why and the complexity of what the symbol actually means. Rebecca also wants EE to be more than just a topic covered in her own classroom. Ideally she wanted all of the teachers touching on the same aspects of it.

The more classes the students hear it in and the more people they hear it from, the more they realize this is important and it is something we should do. And maybe they'll teach their parents something that the parents didn't know. (30022, 11:40)

And her final measures of success would be that the students consider aspects of EE important and they bring the concepts home.

Although Rebecca does not have a formal background in EE, she has a systematic plan for adding EE to all of the grades, and would like to have her students interacting with artists that are demonstrating some of the qualities she is teaching. She hopes that her students will get to the level that they can think abstractly and be able to expand further in the skills that she teaches. She also perceives ideal EE teaching to go beyond her, in other classrooms to create a unified understanding that students can take home.

Perceptions of the realities of teaching EE in classroom.

Teaching description.

As Rebecca started to describe the realities of teaching EE, she focused on several aspects, networking with other teachers as she works at creating new EE connections and lessons. As a starting point, she describes putting in pieces of EE as opportunities arise, even though it is not specifically part of a lesson.

I just use whatever chance I can. Little things I might throw out. For example in 3rd, 4th, 5th and 6th grade we were going outside and drawing trees. And I could say "While you're out there you could also pick up a little bit of trash and put that in the garbage instead of letting it lay around." Stuff that just kind of comes to me and I might not be able to easily put it in to my lessons.

She continued on to share how she is learning and focused on creating whole EE lessons through this process, and connecting with other teachers.

I know I need to do more of it and how can I incorporate it into other classes and other lessons. Throwing in little pieces until I figure out what lesson I can do. Another is talking with other teachers. What do they talk about with the students?

(Karen – So kind of a networking approach?)

Yes. One of the second grade classes I was doing it with. One of their teachers (Jane) was huge on the environment, really big into the environment. She loved that we were doing the sculptures. And they couldn't wait to show her and they were so proud because they knew it was something she felt so passionate about. That was fun. I know I have her as a really good resource for what other ideas I do have. Where can I go for ideas? (30022, 16:40)

She describes the process of adding pieces until she can create a whole lesson, calling on fellow teachers, such as Jane, as resources to make connections from EE and the art curriculum. Rebecca is using the process of adding pieces to not only explore how to be adding EE, but to also strengthen the students' familiarity and understanding of EE terms and concepts.

With any art topic, like the horizon line, I might teach it in one lesson and really focus on it but then there are some days where I think this is a perfect point to bring it up. I won't dwell on it but just so the terminology is out there. They're hearing the word. The more little times I throw it out there the more they will pick it up. It is the same thing with the Environmental Ed concepts. And when I have those ideas I have every lesson written out in a file folder and as I'm using them, currently I have them right by my desk. If I think this the perfect time to throw in a piece about Environmental Ed I'll write myself a post-it-note and I'll put it on the lesson. So then the next year I have that available. That's kind of been my system. (30022, 18:30)

She perceives her EE teaching as a process of learning for herself and opportunities to develop curriculum in the process. She purposely mentions adding what she considers EE topics, such as environmental engineering, to her teaching to build real world connections for her students.

Also in 4th grade we did a bridge design and that was a painting. I included a very small piece but now I realize I need to include more about the different people that would be on that job. There'd be the architect, the civil engineer and the environmental engineer who would have to consider the environment around that bridge. They would have to make sure they weren't harming any of the wildlife and habitats around that bridge. I did throw in that word like one time but I didn't say it enough I don't think. To just make them aware that is a career that they could choose if they are passionate about that. (30022, 3:10)

As she adds EE connections, she is reflecting on how they fit and what to do next time. During this process, Rebecca is also aware she does not have the background she would like to have to teach EE.

I try to incorporate it, but I don't know a ton about it. I don't know the language that all the teachers are using. So to make it interdisciplinary where they are hearing about it more than one way, I want to use the same language. So that's a little bit of a challenge. (30022, 5:40)

She is concerned about using the same language as the other teachers and making EE interdisciplinary, and does not know what they are doing, or even how much she can do.

How far can it go? Recycling is only a small piece. To me it seems like it would only be a small piece. And knowing there's probably more I could bring in and I don't even realize it. (30022, 8:20)

She is aware of her own understanding as she methodically works at adding EE ideas to her art teaching, by reflecting and recording her efforts in order to build off of them in the future. She is focused on incorporating real world connections between the art curriculum, various content areas such as science, and the lives of the students.

Applied goals and measuring success.

As Rebecca works on building EE into her teaching, she has several goals that she perceives as important. She has two main EE goals for the students throughout the year.

For the students to realize the interdisciplinary thing, they can learn about several subjects within one class. Or they can all relate together. That taking care of the environment is important and there are simple things that we can do. Those would be my big ones.

She wants the students to understand there are connections between the content areas they are learning about, as well as care for the environment. She then went on to focus on one of the two main EE themes she added into her curriculum.

And then depending on what area, like if I was talking about the environmental engineer or recycling. For recycling; that there's art all around us. This could be turned into who

knows what. In the objects around us we could turn into something else without just throwing it away. (30022, 12:30)

Her goals are focused on the interconnectedness of art, the environment and the students' lives.

As she measures the success of the EE in her classroom, Rebecca looks for students making connections and working on it at home.

I was able to show them what they could do with things they have at home. And then there's some interaction between the parents and the student. They're creating something together which I think is huge. Instead of watching TV and having that separation, they're doing something together. So family communication has become huge, I think it makes big impact on the child's education. It just makes them more aware of what they can do with those recycled objects. The kids are so proud when they can bring something in to share. So even if it's not making something at home, collecting stuff together I think is an important piece. (30022, 10:30)

She brings in idea of families working together, having interactions they may not have had in the past, and that strengthening the understanding of the students. She also uses informal assessment to gauge the success of her EE teaching, as well as in the pieces that they created.

I knew that they were getting it. They were able to take anything and turn it into what their imagination was seeing. Knowing they did it at home, listening to them, watching them work and then when I ask that question at the beginning of every class. The kids are giving me input from the question. (30022, 24:15)

She was observing her students take the information from the EE and art lessons that she had taught them, and create art that required a high level of understanding.

Outside influences.

Rebecca's EE teaching has been affected by several influences, including the interactions she has with her students.

When I was teaching about recycling I asked my 2nd graders, 'what are the things we can do to help the earth?' I always start our big class with a question that relates to what we're going to cover that day or we did the last time. The kids were saying like shut off the light and don't leave the water running when you brush your teeth. Things like that they told me their Grandparents or their parents are telling them. So when I'm at home I'm thinking shut the light off. It's good for myself to realize for myself. Or even in my

classroom when they see me just toss something out. ‘What’s something else I can do with that?’ The kids will watch everything I do. And if I say one thing and then tell them we should do this they’re not going to trust what I’m saying. (30022, 7:30)

She not only wants to teach her students about recycling and other concepts, but because of their actions, she finds herself trying to be authentic in the classroom as well, using and practicing what she is teaching.

Another influence Rebecca cited was the number of responsibilities she had and where the development of her EE teaching fit in priority.

For filling out a survey we could get a copy of a free magazine, which I knew would be a good resource but I knew that I had such a huge list of things I needed to do over the summer and I wouldn’t look at it. And then I would be getting all this paper that I didn’t really need at the time. I know that it is out there, I just wasn’t able to use it the way I wanted to teach it at this time.

Even though she knows resources are there available to use, and are even offered to her, she is not using them because of the priorities of other lesson planning and preparation. With this in mind, I asked if time was part of her consideration, and she replied, “Yes. I do pretty much all my planning at home until about 10 o’clock at night. Unless I have the summer time. That’s a huge part of it” (30022, 20:10). For Rebecca, EE teaching is something she is aware of, but because she cannot put the effort she would like to teach at the quality level she wants, she would rather put her planning efforts elsewhere.

As Rebecca described her struggles with trying to expand on her own understanding of EE, she was looking for information from the internet and other teachers.

Internet. Searching on the Internet. I use Crayola.com a lot. That has great lessons for science and for math, for reading, for literature, for art. And it gives good lessons that combine them. So even if I don’t find a lesson there I learn something. And I know I can go further from that. Talking with other art teachers, artists typically are more re-user friendly than other people. (30022, 9:00)

She comments that she learns from sites on the internet, and not particularly ones on EE but more as an interdisciplinary resource. When asked why she uses the internet, she replied.

It has so many directions to go. I might find a book on there that I can then go to Barnes and Noble and buy or find at the Library. Or I might find a location right on line that I can read or websites that I can use. It is quick and very easy. It's right there. She uses the internet as a hub to find resources quickly. She went on to describe the methods that she uses, including how she is using it to develop her EE understanding.

For the recycled art I typed in 'Recycled Art'. I didn't find a whole lot from my Google search but from that first page I found other terms to use to search.

(Karen – So in some ways you're using it to learn the terminology?)

Yes. It's just Googling things and making notes of what I might need. And then in "favorites" I have my resources file. I might entitle one Environmental Ed then I know when I want to throw a piece in about that I'll have it. It's just clicking around on lots of different sites. (30022, 22:00)

The terms and websites she finds on the internet are incorporated into her systematic development of lessons on EE and subject connections in relationship to her art curriculum. She is also influenced by the teacher organizations she holds memberships with.

I'm a member of Art Educators for this state and the National chapter. And the state's Teacher's Association. – I'm part of that one. So I get publications from them. Every once in a while they'll have articles in there on recycling around Earth Day, to have those available.(30022, 21:00)

While not EE specific organizations, Rebecca finds teaching resources from them that help her EE teaching in the classroom.

As mentioned in Rebecca's personal experiences described at the beginning of this case, participating in this study played a part in how she perceived EE. Towards the end of our discussion, Rebecca commented on the experience and what it did for her, "I'm glad that you came to talk and made me more aware of what I did, it was good; but I need to go further with it" (30022, 26:28). The process of exploring what her perceptions were brought her to the conclusion that she wanted to do more with EE in her classroom. Rebecca would like to be adding more units to all of the grades, working on her own understanding of EE and how it is related to art in the

disciplinary way she teaches it, and collaborating beyond her classroom with other teachers and professionals outside of the school.

Chapter V: Analysis and Discussion

In this chapter, an analysis of the four cases of Jane, Heather, Paul and Rebecca is presented. A cross-case analysis technique (Yin, 2003) is used in order to look at the perceptions elementary teachers have of EE. As a reminder, the following are the purpose and questions framing this study, followed by an explanation of the analysis process.

The purpose of the study is to develop rich descriptions, within and across a sample of teachers from one school, of elementary teachers' perceptions of environmental education in the context of their classrooms, while examining the misalignments that exist for individual teachers.

The research questions framing this study are:

1. What are the participating elementary teachers' perceptions of EE?
2. What are the participating elementary teachers' perceptions of ideal EE?
3. What are the participating elementary teachers' perceptions of the reality of teaching EE?
4. How do the individual participating teachers' three types of EE perceptions misalign?

It should also be reiterated, the intent of this study is not to generalize to all teachers, but to visit the multiplicity in EE perception, and to facilitate understanding of where that multiplicity might be commonly grounded. At the same time, after comparing these four cases, the study aims to also illustrate areas of misalignment that can occur within an individual's perceptions of EE.

After the data from the four participants was individually analyzed and synthesized into the four case descriptions presented in chapter four, the cases were then compared for themes that carried across the cases for each of the first three questions. The analysis of the cases focused on delineating the themes that were found within each of the three types of perceptions. To start the process, the case descriptions found in chapter four were used to create a list of themes mentioned by each participant. This created four theme lists, one for each participant. These were then

compared to each other to highlight the common themes. This created a list of twenty-one themes across either three or all four of the cases.

The next step was to organize the themes by the type of perception to which they most relevant. Because of the open ended nature of the interview and the study's approach to allow each participant to freely describe what each type of perception included, the majority of the themes were mentioned by the participants in reference to several or all three perceptions at different points in their interviews, and that the themes were not under the same type of perceptions for all of the participants. This made organizational efforts for reporting difficult. The decision was made to place each theme specifically under a type of perception when reported in the analysis, in order to ground the analysis for the first three questions. The original transcripts and survey answers were searched to capture the nuances of what the participants were saying and the context detail and reasoning the participants used was noted. Particular care was given to place the theme under the type of perception where the theme was most commonly used across all of the four participants.

By placing each theme under one perception, the ensuing analysis had a starting point for comparing between participants. Furthermore, the detailed notes from the transcripts and survey checks were then used for the analysis of question four, as the participants' use of theme during one perception was compared to the other types of perceptions for that individual.

After the themes were developed, and exemplar comments from each individual were compiled for each theme, the themes were described in two ways. First was in terms of the **strength** of the theme in the participant's perception. Marked as one of three strengths, it could be a **significant** theme where it was a major part of the EE perception description, an **occurring** theme but not central to the participant's EE perception, or an **incidental** theme to the EE

perception being mentioned as an aspect of general teaching or implied in the participant's descriptions.

When comparing the strength of themes across cases, the richness of the participants' perceptions was not represented. Two participants may have described the theme at the same level of strength in reference to their perceptions, but how it was incorporated into their perception could be completely different. A second descriptor of the themes was then used to give insight to the participants' integration of the individual themes into their EE perception, regardless of how significant the theme was to their perception. This descriptor was the level of **development** of the theme in the participant's EE perception descriptions. If the theme was mentioned but was not expanded upon, or not expressed as important to the EE perception, it was labeled as **existing**. Themes being explored by the participant for meaning within their EE perception were labeled as **exploring**. If the theme was said to be understood by the participant and integrated within the perception, with further plans to expand in the EE perception, it was an **establishing** theme. Lastly, if the participant had expressed a theme as fully integrated and expanded in the EE perception, it is labeled as **embedding**. This last level of development may include continual enhancement of the theme by the participant to stay current in their teaching or understanding, but was fully incorporated into their EE perception. It is hoped that by using these two sets of descriptors in a complementary manner, the reader is given more insight into the complexity of the participants' perceptions.

The themes that emerged are listed in Table 5.0.1 below and each theme is described in detail at the beginning of each question's findings in this chapter.

Table 5.0.1

Themes Found for Each Type of EE Perception

EE Perception	Ideal EE Perception	Reality of Teaching EE Perception
1. Integrated	1. Enriched experiences for students	1. Standards
2. Interdisciplinary	2. Connections for students	2. Science
3. Planetary View	3. Collaboration with colleagues	3. Students applying
4. Responsibility	4. Change in EE teaching context	4. Time
5. Inspired by personal experience		5. Informal assessment
6. Passion		6. Making pieces fit
		7. Family and Parents
		8. Literature for students

Note: Additional Themes: Internet Resources, Improve personal EE understanding, Overall EE success

The following sections are an analysis of these themes and their strength and development for each participant. These two qualities characterize the nature of the themes for each participant. The strength of the theme is based on the participant’s use of the theme in their descriptions as it relates to their EE perceptions, and the status of the theme development considers how the theme functions in the EE perception. As a reminder from chapter three, the levels used to describe each theme are as follows:

Categorizing Themes of EE Perception:

Strength of theme in participant’s EE perception

Incidental: The theme was included in the descriptions of the participant’s general teaching role or was implied in reasoning associated with EE perceptions, but not directly related to the EE perception. The theme may or may not provide context to a portion of the EE descriptions.

Occurring: The theme was mentioned in relationship to the participant's EE perception, but not a major focus. The theme may also provide context to a portion of the EE descriptions.

Significant: The theme was mentioned as a major focus of the participant's EE perception, having a foundational or pivotal relationship to their EE descriptions.

Level of theme development in participant's EE perception

Existing: The theme was mentioned by the participant while describing their EE perception, but was not expanded upon, or expressed as important to the EE perception.

Exploring: The theme was expressed by the participant as an aspect they were investigating for meaning or function within their EE perception description.

Establishing: The theme was understood and incorporated in the participant's EE perception with further plans to expand on the theme.

Embedding: The theme was fully incorporated and expanded in the participant's EE perception, and may include continual enhancement.

Question 1 Findings: What are the participating elementary teachers' perceptions of EE?

As a reminder, the overall "three types of perceptions" framework was used in this study because the meaning of EE in the current context of the ensuing standardization and formalization trends in EE can be confusing or unknown to teachers, and they may view EE through such lenses as content, pedagogy, process or mind set. The first question attempts to parse out the participants' perception, or intellectual cognizance, of EE as a "something" without a set context, thus simplifying constraints on how they understand EE. The interview questions were structured so the participant could say anything they feel they need to about EE without qualifying or quantifying their answer according to a setting, which may or may not have included their teaching, beliefs, experiences, or understandings that lead to the description of their

EE perception. This openness to their interpretation was to avoid funneling their answer into a process, curriculum, or stance that they are not familiar with, disagree with, or are confused by when considering their perceptions of EE.

When the four participants' cases were compared, six themes emerged across participants' perception of EE. The themes found and their descriptions are as follows. Note the first four themes are definitions, giving insight to how the participants' perceive what EE is, where as the last two themes are teaching oriented or how the participants perceive their relationship to EE.

- **EE is integrated into teaching** – the participant's perception of EE includes descriptions of EE as incorporated into the teaching of other subjects throughout the school day. This could include incorporating additional EE vocabulary during a lesson, or using an EE based scenario to teach a different subject.
- **EE is interdisciplinary** – the participant's perception of EE includes EE as made of several subject areas, such as science, social studies or art.
- **EE takes a planetary view** – the participant uses the planet or natural world as a frame of reference when describing their EE perceptions. They may have used an example of a global environmental issue or referred to the Earth as a part of their explanation.
- **EE is centered on responsibility** – the participant's perception of EE focusing on the responsibility humans have for the environment, and the roles students can take in that responsibility. This can include specific actions students can take, to a general focus on caring for the environment.
- **EE is inspired by the participant's personal experience** – the participant's perceptions of EE was based on and inspired by, in part, experiences outside of the school that they felt contributed to their understanding of EE.

- **EE is linked to the participants’ passion** – the participant mentions having passion associated with teaching EE when talking about their EE perceptions. The participant focuses on an emotional connection to the EE topics.

Table 5.1.1

Question One, Theme One: EE is integrated in teaching

Theme	Participants	Strength/Development of Theme
1. Integrated in teaching	Jane	Significant, Embedding
	Heather	Significant, Establishing
	Paul	Incidental, Exploring
	Rebecca	Incidental, Existing

The first theme, “EE is integrated into teaching”, focuses on the participants’ perception of EE as integrated into their teaching of other subjects throughout the school day. Jane consistently referred to EE as integrated into her teaching, making EE integration a foundational part of her perception and significantly embedded, as shown by her statements, “One of my topics is environmental education, but I don’t see it as a separate entity,” (30028, 6:20) and a minute later, she describes, “It’s my overlying theme” (30028, 7:25). As a significant theme that she is establishing in her EE perception, Heather also refers to integrating EE into teaching, to show how subjects interrelate to each other, such as music and art, within the context of the outdoors. She also uses EE integration as a tool to keep EE established in the curriculum, “The more we can integrate it [EE] the better” (30025, 27:45).

For Paul, the EE integration theme was incidental as he was exploring his own perceptions of EE. He was struggling with how to describe EE in the context of his classroom; he had come to the realization that both science and social studies could be parts of EE, and used

that to generalize that all teaching should be integrated stating, “That’s why I think it’s important to integrate social studies, science, writing, language arts, math all together especially in units and throughout the day” (30023, 10:18). He did not relate it directly to his EE perception, but was trying to formulate connections between his teaching and EE. For Rebecca, the theme of EE integration incidentally existed in her EE perception. She did not speak specifically about EE as integrated, but rather how she integrates all of the other subjects, including EE, into her art teaching. She stated, “I love bringing in something other than art. I don’t want them to think of me as just art and that’s it” (30022, 6:00).

Table 5.1.2

Question One, Theme Two: EE is interdisciplinary

Theme	Participants	Strength/Development of Theme
2. Interdisciplinary	Jane	Occurring, Embedding
	Heather	Occurring, Exploring
	Paul	Occurring, Exploring
	Rebecca	Significant, Establishing

The second theme, “EE is interdisciplinary,” while not entirely unrelated to the integration theme, has a distinct focus on EE being made of several different disciplines in the curriculum, such as science and social studies, rather than a method or approach to teaching it. While Jane concentrates on integrating EE into her teaching, she does not focus as strongly on it being interdisciplinary in her perception of EE. She does mention specifically that from the beginning of her experiences, EE has been described as interdisciplinary, “(Since I was a teenager) that’s what I heard about EE... ‘EE is interdisciplinary’” (30028, 9:46). As Jane described her approach to using EE curriculum in her teaching, she makes reference to the

interdisciplinary nature of EE as it is embedded in her EE perception, “In addition, I can make connections to other topics, even with the Civil War” (30028, 19:43).

For both Heather and Paul’s EE perceptions, they were exploring how EE related to the other subjects as they were talking. They both referred to EE as a part of science, but had additional comments indicating they were not sure the extent of how interdisciplinary it could be, making the interdisciplinary theme ‘occurring, exploring’ for both. Even though Heather focused on EE as a part of what is taught to students, adamantly stating, “You can’t separate it all. It’s all together, with the social studies standards, art standards, and music standards” (30025, 8:51), when she was then asked specifically if EE was interdisciplinary, she hesitantly placed it with the science content, “It could be part of Science strands. ... That’s what I don’t do well, take everything apart” (30025, 14:03). Paul started with a statement that placed his EE perception as a science strand, but then gave consideration to more disciplines as he continued to talk, “If we are looking at classifying it as a science or as an interdisciplinary subject, I like the idea of calling it environmental science... (But) if it was environmental education alone it would need to be described a little bit more” (30023, 8:51). and went on to reflect on social studies as a part of EE when considering how community was related (30023, 10:18).

Rebecca was the opposite of Jane in regards to the emphasis she put on EE being interdisciplinary compared to the theme of integrated EE. While Rebecca made indications that she perceived EE as integrated, she used the interdisciplinary theme significantly to establish her own understanding of EE teaching. She stated, “So to make it [EE] interdisciplinary, where they are hearing about it more than one way, I want to use the same language” (30022, 5:40). She frames her EE perception using an interdisciplinary theme several more times during the interview.

Table 5.1.3

Question One, Theme Three: EE takes a planetary view

Theme	Participants	Strength/Development of Theme
3. Planetary View	Jane	Significant, Embedding
	Heather	Significant, Establishing
	Paul	Occurring, Exploring
	Rebecca	Incidental, Existing

“EE takes a planetary view” is the third theme found across the participants’ EE perceptions, where the participants use the planet or natural world as a frame of reference when describing their base EE perceptions. For Jane it was an embedded significant theme, demonstrated by her reasoning, “I think it is seeing our world, our environment, your community, your home. Looking at the detail of it, or using a magnifying glass if you will” (30028, 33:00). For Heather, it was also a significant theme, but used as a basis to establish her understanding of EE teaching and why to continue teaching it. She reasoned, “Our world is our home” (30025, 34:19). For Paul, the planetary theme occurred in his exploration of EE, where he would refer to the planet as a context of EE, but not as a foundational piece of his EE descriptions. When asked what EE was, he stated, “I think of environment of school and I think of environment of the planet. I think of earth right away naturally” (30023, 4:02). For Rebecca, the theme was incidental. As she verbally explored how EE was present in her classroom, she mentioned the planet in relationship to what the students are learning. For example, when speaking specifically about a recycled object art project, she said, “And they know that they are helping the earth, because we kept talking about how we could have just thrown these away. Instead look what we can do” (30022, 27:14).

Table 5.1.4

Question One, Theme Four: EE is centered on responsibility

Theme	Participants	Strength/Development of Theme
4. Responsibility	Jane	Significant, Embedding
	Heather	Significant, Embedding
	Paul	Significant, Exploring
	Rebecca	Significant, Establishing

Fourth was the theme “EE is centered on responsibility”, focusing on the responsibility humans have for the environment, and the roles students can take in that responsibility. This was a significant theme across all four cases. When each was asked directly how they perceive EE, they all described an aspect of teaching students about responsibility. Jane and Heather both had the responsibility theme deeply embedded into their perceptions. Jane called it, “my overlying theme, the care for the environment and the choices we make ... the overlying responsibility to our school environment and our neighborhood environment” (30028, 7:25). Heather mentioned it throughout the interview, stating as she began describing her perceptions, “Environmental responsibility would be a big piece” (30025, 8:20). and delved into how responsibility was a complex topic, saying, “How do we be responsible? We have people that consider humans needs, and people that consider earth’s needs. Sometimes they can’t both go forward on a direct path. So how do we move forward on a path that honors both as much as we can?” (30025, 40:00)

Paul used his dedication to teaching students responsibility as a way to explore how he felt EE was in his teaching, saying. “We just passed Earth Day and we talked about how we went out and cleaned up the earth. I’m passionate about teaching kids to take care of things in general, whether it’s inside or outside. Respecting, not only peers and each other, but also property”

(30023, 4:02). For Rebecca responsibility was a theme she was establishing in her perception. She cited responsibility as a main goal she had for her students, “That taking care of the environment is important and there are simple things that we can do” (30022, 12:30). While this was a goal, she was concerned she did not have the background to recognize the scope that could be taught in the classroom, as she asked minutes before, “How far can it go? Recycling is only a small piece. To me it seems like it would only be a small piece. And knowing there’s probably more I could bring in and I don’t even realize it” (30022, 8:20).

Table 5.1.5

Question One, Theme Five: EE is inspired by the participant’s personal experience

Theme	Participants	Strength/Development of Theme
5. Inspired by Personal Experience	Jane	Significant, Embedding
	Heather	Significant, Embedding
	Paul	Not Present
	Rebecca	Significant, Exploring

The fifth theme was found was “EE is inspired by the participant’s personal experience”, where the participant’s perceptions of EE was inspired, in part, by experiences that they felt were connected to their understanding of EE. When a participant mentioned this theme, it was significant to their EE perception. Jane’s personal experience was embedded in EE perceptions, and arose several times in the interview. Her perceptions are shaped by her earliest experiences she had in school associated with EE, “It was talked about even back when I was I high school. I was fortunate to have some great high school educators. ...Even when I was probably 19 or 20 years old and I was a camp counselor” (30028, 9:46).

For Heather, there is a personal connection embedded in her EE perceptions and what she feels she needs to teach, which she also expressed several times. At one point, she explained it as, “For me it just comes from being outside since I was a little girl. I’ve always like to spend a lot of time outside. So it’s very personal. That’s why I’ve said most of what I’ve said. It comes from observing, being there. Having it matter to me” (30025, 35:31). Rebecca’s interest in EE was inspired by a single event that brought to light connections to her art teaching, and has had her exploring how EE fit in to her teaching ever since. She expressed her experience by stating, “I’ve never had anybody tell me I have to do it. It’s never been pushed,” and going on to explain how it evolved,

It all started because I went to the Festival of Nations. There was a stand, from Uganda I think, and they had magazine bracelets. It was a beautiful bracelet. This is something my students could make. Then I can pull in the piece about another culture and another country because this is how they make money for their family. This would be so easy. So I started with that. Then I realized this is recycling. That this year, when I needed to fill that time, we could recycle. I should just push this recycling piece a little more. (30022, 27:14)

She explained that this chain of events, from noticing the product and the connections to culture and recycling, was a catalyst for thinking about EE in her classroom. She was starting to explore EE and was appreciative of a group of coinciding events, including the survey and interview for this study, that helped her focus on learning what it means to be teaching EE in her classroom. (30022, 28:05) Paul did not make a statement that would fall under the theme of a personal connection. There had been some thought to explore EE before he participated in this study, answering on the survey that he had taken Environmental Studies courses in college and had voluntarily participated in a Project WET workshop, but did not refer to them at all during the interview, nor any other personal experiences. (Q8e)

Table 5.1.6

Question One, Theme Six: The participant links their passion to EE

Theme	Participants	Strength/Development of Theme
6. Passion	Jane	Significant, Embedding
	Heather	Significant, Embedding
	Paul	Incidental, Establishing
	Rebecca	Occurring, Exploring

The sixth theme was “the participant links their passion to EE”, where each of the participant’s mentions having passion associated with teaching EE. Jane used passion significantly throughout her EE perceptions, citing it as reason to go through the efforts of incorporating EE into her teaching, “Sometimes it’s all about your passion and what you’re into” (30028, 31:35). Heather’s passion was also significant, in particular using it to assess how she was teaching EE, “Was I able to work in my heart and passion of it with students?” (30025, 30:51) For Paul and Rebecca, the passion theme was not as significant in their EE perceptions. For Paul, he incidentally mentioned passion when tying EE to his general teaching, in this case, for making connections for students throughout all of his teaching. He stated, “My passion is that is to make sure that it (the lesson) is real to them. And that is part of the environmental ed piece, where they can connect to something” (30023, 18:50). He was passionate about making connections, and he used the idea of connections to establish his understanding of teaching EE.

For Rebecca, her realization of her own interest and the interest and passion of other teachers toward EE had her exploring how EE could fit into her teaching of art. She expressed, “I’ve always wanted some part (of EE) for myself, but I never thought about expressing that to my students (until recent events)” (30022, 28:05). One of those events was inspired by Jane’s

passion, and Rebecca stated, “She loved that we were doing the (recycling) sculptures. And they couldn’t wait to show her and they were so proud because they knew it was something she felt so passionate about” (30022, 16:40).

Question 2 Findings: What are the participating elementary teachers' perceptions of ideal EE?

The second question attempts to parse out the participants' perception, or intellectual cognizance, of EE as a "something" in an "ideal context". This perception description now adds what the participant uses as an ideal context, where they choose how to constrain or possibly enhance their descriptions of EE by grounding it in whatever they perceive to be the ideal. It does tend to become more operational (teaching oriented), because they are centering EE in a place or with a purpose or with a goal or with whatever they feel is going to make the EE ideal, but the questions were open ended and the teachers still used definitional language with the operational and relational language within the themes.

As the four participants' descriptions were compared, four themes emerged across participants' perceptions of ideal EE teaching. The first two are teaching oriented in nature, the following one is the participant's connections with EE, and the last focuses on the context. The themes and their descriptions are as follows:

- **EE includes enriched experiences for students** – the participant's perception of EE includes providing the students with opportunities to experience local places and events, or interact with individuals associated with the environment beyond what would normally be available in the classroom.
- **EE includes connections for students** – the participant's perception of EE focuses on a goal of students creating stronger personal connections to the environment.
- **EE includes collaboration with colleagues in regards to teaching EE** – the participant's perception of EE incorporates reaching out to fellow teachers in the building to collaborate and exchange ideas.

- **Changing the EE teaching context** – the participant’s perception of EE focused on a change in venue, teaching context or teaching role by the participants when they were considering their ideal EE scenario.

Table 5.2.1

Question Two, Theme One: EE should include enriched experiences for students

Theme	Participants	Strength/Development of Theme
1. Enriched experiences for students	Jane	Significant, Embedding
	Heather	Occurring, Embedding
	Paul	Incidental, Embedding
	Rebecca	Incidental, Exploring

The first theme was “enriched experiences for students should be included in ideal EE”, where the students have opportunities to experience local places and events, or interact with individuals associated with the environment. As Jane considered her ideal image of EE in the classroom, the only changes she could think to make from what she was currently doing was to add more enriched experiences to the school year, taking students places and visiting with experts, “I already take them outside at our facility, but I would spend more time at the Arboretum, the prairie, the woodlands, and the metropolitan museum; from the zoos to the wherever we could find things to do. A lot of field trips...and a lot of experts” (30028, 25:49). Experiencing different settings and speaking with people who specialize in topics the students are studying was a significant theme for Jane’s ideal EE perception, and was already embedded in her teaching reality.

For Heather, the theme of experiences for students was embedded throughout the interview, but was not as significantly tied to her ideal EE perception, in that it was just the students being outside that mattered. She stated, “Just getting them outside, even though we’re reading or doing something else we’re outside. The wind is still blowing. The sun is still shining. They experience more” (30025, 8:20). There was not a direct connection between what the students were learning and the context they were learning it in, it was the being outside that was the focus. For Heather, the theme was occurring stemming from her concern for the students who had not had the opportunity to have structured time outside, “Mostly, it’s just getting outside to see. That’s one of my big resources is just getting them outside to see because a lot of 11 and 12 year olds don’t have the experience” (30025, 38:30). Again, Heather embedded the outdoor experiences into her explanation of ideal EE, but the theme only occurred, there was not significance to what they were learning, because they were outside to be outside, in her words, “just getting them outside to see”

Paul’s descriptions of ideal EE perceptions had the enriched experiences for students theme incidentally, like many of the other themes throughout the interview, in part because it was a salient theme embedded in his general teaching of kindergarteners. One of the first descriptions he had about working with youth was, “Any chance I can get to have kids experience (events) that they normally wouldn’t...” (30023, 1:56). Even as he described how he approached lessons he associated with EE, it is hard to tell if he is talking about EE specific lessons or science lessons in general. For example, when talking about teaching EE in the classroom, he started with, “I start by looking at what I have as a resource, my curriculum. For environmental ed I would look at the science curriculum.” and he continued on, focusing on the science curriculum itself, saying “I would take a lesson of the tree unit. I’d map it out and plan it out.” and went into some detail of the process. In that description, he included the theme of enriched experiences, as he commented, “I try to make it a little bit richer for them with hands on experience” (30023, 13:35). but did not

refer again to EE, only mentioning it in the beginning of the description. This theme was coded embedded, because it was very well developed and was used to in reference to EE, but the reference was incidental, in that EE was associated to theme through the science curriculum, not to the theme itself.

Rebecca explored the theme as a way to change her students' learning, saying, "Understanding more myself about EE, so I could speak more easily about it. My students need to be at a different level than we're at right now; to go to an art museum would be wonderful, to talk to an artist that recycles..." (30022, 14:40). She went on to explain that they can look at pictures of recycled art, but it would be better to have interactions with the real art present and communicating with the artist to understand the process and decisions that made it that way. She perceived her ideal EE would include occasions where students could have experiences that tap into the artist's understanding of the EE related art topic they were studying. In addition to the connections of making the recycled art, she did make incidental EE connections for kids in an interesting way. In one example, she was explaining how she makes EE connections in her teaching by adding it wherever she could, and she said, "I just use whatever chance I can. Little things I might throw out. For example in 3rd, 4th, 5th and 6th grade we were going outside and drawing trees. And I could say, "While you're out there you could also pick up a little bit of trash and put that in the garbage instead of letting it lay around." Stuff that just kind of comes to me and I might not be able to easily put it in to my lessons." In her example, she focused on picking up garbage outside, and not on the trees they were drawing.

Table 5.2.2

Question Two, Theme Two: EE teaching should create connections for students

Theme	Participants	Strength/Development of Theme
2. Connections for students	Jane	Occurring, Embedding
	Heather	Significant, Embedding
	Paul	Occurring, Establishing
	Rebecca	Occurring, Exploring

The second theme found associated with the participants’ perceptions was “ideal EE teaching should create connections for students”, the participant’s perception of EE focuses on a goal of students creating stronger personal connections to the environment. Often related to the previous theme of enriched experiences, the participants each expressed the connections theme differently. In Jane’s descriptions, the theme occurred as a result of the ideal EE teaching. She works at integrating EE in throughout the day and adding enriching experiences for the students, and the resulting student connections were embedded in the EE. She stated, “That’s why I integrate so much so they have to form some connections. Then (the lessons) will stick better” (30028, 12:43). Heather’s perception of ideal EE had a significantly embedded theme of student connections, where it was the reason for doing EE, “But for a lot of my 11 and 12 year olds they are simply at a stage of ‘getting outside to enjoy it’ so that it becomes something that is important to them; so that they want to learn more about it” (30025, 38:15). Her end goal was the connections, articulated as, “If we can put things into a whole big picture kids get them better, and their responsibility” (30025, 6:40).

For Paul, the theme of student connections occurred in his general teaching, something he was working at exploring when creating experiences for his students. He articulated, “We take a

piece of sandpaper and yes it's experience and hands on but what if I don't connect that back to the tree unit that I taught in the fall? Applying it to them. If we don't make it real to them the value is lost. What are they going to learn?" (30023, 17:40) He then went on to use the theme to connect EE to his current practice, "My passion is that, is to make sure that it's real to them. And that is part of the environmental ed piece, where they can connect to something" (30023, 18:50).

Rebecca used the connections theme to explore portions of her perceptions and why she needs to improve her own understanding and her teaching. She had done so with the recycled art in several places, and also included a bridge project she did with one grade, that she had included on the survey as an EE topic, writing in "Bridge Design - environment needs to be considered in the design" (SD4, Q4). As she processed what her EE perception was in the interview, she started relating 'making connections' as a necessary part of teaching EE. She stated, "Also in 4th grade we did a bridge design and that was a painting. I included a very small piece [of EE] but now I realize I need to include more about the different people that would be on that job. There'd be the architect, the civil engineer and the environmental engineer who would have to consider the environment around that bridge. They would have to make sure they weren't harming any of the wildlife and habitats around that bridge" (30022, 3:10). and went on to explain students would then know about the names of the jobs available if they were interested in those aspects of building things.

Table 5.2.3

Question Two, Theme Three: EE should emphasize collaboration with colleagues

Theme	Participants	Strength/Development of Theme
4. Collaboration with colleagues	Jane	Significant, Embedding
	Heather	Significant, Establishing
	Paul	Occurring, Establishing
	Rebecca	Significant, Embedding

“Ideal EE should emphasize collaboration with colleagues” was the third theme found in the participants’ perceptions of ideal EE, focusing on reaching out to fellow teachers in the building to collaborate and exchange ideas as a part of the ideal EE perception. This theme was a well developed theme, as all four participants were establishing or embedding the theme when describing their perceptions. A salient theme for Jane, significantly embedded in her ideal EE, where she wanted to be a catalyst for that collaboration, “My ideal thing would be to be able to specialize more, and to help other educators” (30028, 21:28). Heather’s perceived ideal EE was grounded in the theme in order for it to work. One example of how she was establishing into how important collaboration with colleagues was to her ideal EE was, “I feel like it’s something that a group of people would have to come together to brainstorm” (30025, 13:02).

For Paul, collaboration was a theme that occurred for his teaching of all subject areas, which he established to his ideal EE perception and learning more about EE when saying, “I continue to seek out peers and colleagues and do workshops throughout the summer. The goals I’ve set aren’t just for me because I’ll use that knowledge and share it with other colleagues and maybe use it in my teaching” (30023, 28:21). Rebecca cited collaboration as significant for her development in understanding EE, “Another is talking with other teachers. What do they talk

about with the students?” (30022, 16:40), and she embedded the theme into her ideal EE teaching, saying, “The more classes the students hear it in and the more people they hear it from, the more they realize this is important and it is something we should do” (30022, 11:40).

Table 5.2.4

Question Two, Theme Four: EE teaching includes a change in teaching context

Theme	Participants	Strength/Development of Theme
5. Change in EE teaching context	Jane	Significant, Embedding
	Heather	Significant, Establishing
	Paul	Incidental, Existing
	Rebecca	Not present

The fourth theme, “ideal EE teaching includes a change in EE teaching context”, was found as well, focusing on a change in venue, teaching context or teaching role by the participants when they were considering their ideal EE scenario. This theme was significantly embedded in Jane’s perception, and the focus was on her interest in EE. She stated, “I want to run an Environmental Learning Center. I can also really see myself in our district, like a teacher on assignment, to be the science specialist, the Environmental Ed person” (30028, 21:28). She would like to take a new role and leave her classroom to teach EE with a range of people, children, adults, and teaching colleagues. Heather also had the theme of a change in EE teaching context come up significantly in her perception, but it was expressed as a way to improve her EE teaching context, “If I could redesign things, I’d teach at a charter school where the arts and environment are completely woven together and that’s what we do” (30025, 6:40). She established the change in context theme as a way to accommodate what she perceived a better system of teaching. For Paul, the change in context theme was incidental, as a way to show a relationship between him

learning more about EE and how that may affect the classroom. He mentioned he was going to take courses and workshops and ended with, “And hopefully there would be changes in the classroom that would improve environmental ed., whatever changes those may be I don’t know” (30023, 27:53). Rebecca did not cite the theme as part of her EE perception. It should be noted that as a new teacher she has been in her classroom for only two years, and could be considered still adjusting to her current teaching context.

Question 3 Findings: What are the participating elementary teachers' perceptions of the reality of teaching EE?

The third question attempts to parse out the participants' perception, or intellectual cognizance, of EE as a "something" in a "context that is real". There are now three layers within this perception. The EE itself, the context of where they teaching, and how they perceive themselves in that context. The context of where they are teaching is factual information about their setting; they do not get to choose the context for their perceptions as they did for research question number two. This third question focuses on how they perceive their EE within the framework of their particular context. It is important to note this type of perception includes the understanding they are also perceiving their context, "seeing what they believe they will see" of the school in which they work. For example, Jane and Heather both are required to teach content that is included in the state's academic standards. We will see, in the first theme focused on academic standards, Jane speaks of standards as something she teaches with EE and even references in relation to EE. Heather, on the other hand, perceives standards as detrimental to her teaching, breaking down the connections between subject areas and EE. Granted, we need to consider that they are in two different grades with different curriculum, but the context is similar, they are in the same building with the same principal and so forth.

As the four participants' descriptions were compared, eight themes emerged across participants' perceptions of the reality of teaching EE. The first five focus on the operations of teaching EE, and the last three touch on how the participants relate to EE. The themes and their descriptions are as follows:

- **EE incorporates academic standards** – the participant's perception of EE has a relationship with academic standards.

- **The science curriculum is related to teaching EE**– the participant’s perception of EE is associated with the existing science curriculum.
- **EE focuses on students applying their learning** – the participant’s perception of EE teaching includes students participating in lessons that teach environmentally associated skills or actions the students should be applying after they learn them.
- **Informal assessment is part of teaching EE** – the participant’s perception of EE focuses on assess their EE teaching success through informal means.
- **The use of literature when teaching EE** – the participant’s perception of EE includes using books with children when teaching EE.
- **Time is an issue when teaching EE** – the participant’s perception of EE includes a reference to time as a factor when teaching EE.
- **Teaching EE relies on a ‘making pieces fit’ implementation strategy**– the participant’s perception of EE includes a description of making EE fit into their teaching, often using the term ‘pieces’.
- **Family and parents are a consideration when teaching EE**– the participant’s perception of EE mentions the students’ parents as a part of teaching EE.

Table 5.3.1

Question Three, Theme One: Teaching EE incorporates academic standards

Theme	Participants	Strength/Development of Theme
1. Standards	Jane	Occurring, Embedding
	Heather	Significant, Embedding
	Paul	Significant, Embedding
	Rebecca	Incidental, Exploring

The first theme, “the reality of teaching EE incorporates academic standards”, focuses on participants perceiving EE in relationship to academic standards in their descriptions. The four teachers each incorporated standards into their perception of the reality of teaching EE, but in different ways. When Jane spoke of standards, they occurred as a point of reference in her general teaching, embedded in all of the subjects as well as EE. She commented on the role she has to teach them, “I know I have standards I have to teach, and I do teach them thematically” (30028, 26:01), as well as how they had recently changed to include EE, “I look at the standards especially now. There’s much more EE in the state’s new science standards” (30028, 8:35). Additionally, when setting the context of her teaching overall, the standards was a primary force in her decision making, saying, “Each subject area of the standards is extensive. When you see the reading, the math, the social, the science, the health, the writing, the literature; there’s so much to get in that you have to be creative in how you’re going to overlap and integrate things” (30028, 15:30). Her reference to themes and integration when considering standards laid out a context for teaching EE.

For Heather, the standards theme was a significantly embedded part of her perceived reality of EE. When describing EE and how what she taught her students was tied to EE, she

remarked, “You can’t separate it all. It’s all together, with the social studies standards, art standards, and music standards” (30025, 8:20). Standards were a central theme that set the context for her perspectives, often in a negative way. She stated, “I know that I have to work with the standards” (30025, 7:57), and that was a source of frustration for her EE teaching efforts. The angst she had with trying to teach EE within the confines of a standards-based school setting is captured by her statement, “They’ve taken and pulled everything apart into standards. It doesn’t fit anymore” (30025, 10:15). There was one point, however, that Heather used standards as a possible way to bolster EE in the classroom, and that was to standardize it too,

As much as I hate it, some specified strand would be good because then more people would have to be on board. That is important in today’s world. It doesn’t work with my line of thinking, but it does work with how the thinking of our world is; with the structure of the educational world right now. That’s how it is working. If there’s a standard for it it’ll be taught. (30025, 42:05)

In addition, Heather’s perception of standards in relationship to EE was not clear, as she struggled to explain how they were related, as we saw in the interdisciplinary theme under research question number one when she decided EE would be under the science strand of standards (30025, 14:03).

Paul’s perception of EE also had the standards theme significantly embedded, but he perceived them very differently than Heather. While she found them as a constraint, Paul used the standards as a basis to know what to teach. He explained, “Does what I’m teaching them hit state standards?” (30023, 13:35) and his descriptions of how he is teaching EE start with the standards, saying ““When I’m making those decisions I always look at the state standards and I look district wide. What does the state want me to do? How would they want me to teach environmental education?” (30023, 7:26) He also considered the specific standards, including district level ones, to describe how he thinks of EE, “When I think of EE, I think of science. The environment is part

of our science, as well as the Kindergarten social behavior standards. Science and social behaviors” (30023, 7:54).

As an art teacher, Rebecca does not have the same teaching responsibility to the state’s academic standards as the other three participants, but there were still incidental comments she made as she explored her EE perception. When she spoke about a group of events that influenced her interest in EE, she mentioned, “Jane came and talked about the standards changing” (30022, 28:05), and also used the standards as point of reference in the curriculum changes that have been occurring because of the standards, “I know that the science standards have changed this year to include more engineering and thinking in that way” (30022, 4:40), and Rebecca perceived the standard changes as related to EE teaching in the building.

Table 5.3.2

Question Three, Theme Two: Science curriculum is related to teaching EE

Theme	Participants	Strength/Development of Theme
2. Science	Jane	Occurring, Embedding
	Heather	Significant, Embedding
	Paul	Significant, Embedding
	Rebecca	Occurring, Exploring

“Science curriculum is related to the reality of teaching EE” is the second theme, focusing on the perception of EE being associated with the science curriculum. Jane’s focus on science curriculum during the interview was noteworthy, as she is the science specialist for the building and has won a national science teaching award. More strikingly, her perceptions of EE are embedding science curriculum, but not at a significant level. The science curriculum is consistently cited along with the other content areas, occurring as a part of the whole EE teaching

perception. She shows a comfort level with science curriculum as a part of her EE teaching, but it is not central to how she teaches it, demonstrated by the comment she made when working with the EE curriculum Project WILD, “I find what will connect so I add that in. It is not just my science themes; it is to whatever I am teaching” (30028, 19:43).

As Heather described her EE perceptions, the science curriculum theme was significantly embedded, particularly with the assessment of her EE teaching, “I look at if the EE has been successful from my standpoint. How well rounded did I get? Was I able to work in some Science thinking, some Science facts” (30025, 30:51). As seen in the interdisciplinary and standards themes, Heather also uses the district guidelines and state academic standards for science to describe her EE perceptions. She also used the science curriculum as the starting point when discussing her EE perceptions, such as when she states, “Beyond science, it goes back to the arts and music” (30025, 32:44).

For Paul, the science curriculum theme is significantly embedded in his EE perceptions. Consistently referring to the school’s science curriculum, the FOSS kits, he explains his EE teaching in the context of the science subjects he teaches, “For environmental ed I would look at the science curriculum” (30023, 13:35). While he adds the kindergarten based social skills instruction, he grounding for his EE perceptions is in science, saying, “When I think of EE, I think of science” (30023, 7:54)..

Rebecca’s use of the science curriculum theme in her EE perception shows an exploration occurring, tying science subject matter to her interdisciplinary view of EE. Her art curriculum does not have an immediate tie to science content, but she does use science curriculum and standards to explore the relationship between art and EE. Her internet searches for new curriculum are focused on several subject areas, including science, “I use Crayola.com a lot. That has great lessons for science and for math, for reading, for literature, for art. And it gives good lessons that combine them” (30022, 9:00). Rebecca also uses the new science standards to

make ties between EE and art in her classroom, particularly with engineering and “the bridges”, the project her students complete that she previously had cited as an EE topic in her classroom, stating,

My husband’s an engineer. I love architecture. That is a meeting point of the art. So I understand it a little bit too. So I love throwing some talk about sky scrapers and the bridges, my personal experiences. Also, I know that the science standards have changed this year include more engineering and thinking in that way. (30022, 4:40)

She does not focus on science as a main theme of her EE, but there is definitely a relationship between science and art, and how she perceives EE.

Table 5.3.3

Question Three, Theme Three: Teaching EE focuses on students applying learning

Theme	Participants	Strength/Development of Theme
3. Students applying	Jane	Significant, Embedding
	Heather	Significant, Existing
	Paul	Occurring, Embedding
	Rebecca	Occurring, Exploring

Third, “the reality of teaching EE focuses on students applying their learning”, where the perception of EE teaching reality includes students participating in lessons that teach EE associated skills or actions the students should be applying after they learn them. Jane’s perception of EE teaching reality has the students applying theme significantly embedded, commenting where her students should be after being in her class, “They’re at that application level. I want them to be out there where it becomes a natural thing for them. They are ‘doing’. It’s innate” (30028, 17:31). She has goals associated with this application, to make the students into

“environmental thinkers” (30028, 17:04) by incorporating skills she feels are necessary for EE, “For the students, I am focused on the tools, what they need to do, and pointing out what resources they have” (30028, 33:00).

Heather was interested in making sure she taught students lessons they would carry on without her, saying, “That’s my biggest goal. What will they continue without me?” (30025, 32:44). While her concern for her students was a significant application goal that existed in her perception, she had not developed the theme in her perception beyond awareness skills. She did give some insight when describing why she was teaching EE, “Our world is our home. It’s dying. In my lifetime are we going to fix this? No. But can we raise the awareness and concern? Yes. Good. Then I will have done what I can do.” She perceives her role as a teacher of EE as raising awareness and concern, with which her students will be able to promote change, as she ended her explanation with, “There are always going to be those issues. That doesn’t mean we just accept it and it’s always there. ... Are you going to step up to the plate and help it change?” (30025, 34:19) These comments relate to the awareness building activities she does with her students when they go outside, “Telling kids why we take 5 minute field trips. Because I want you to think about the world....I want you to pay attention.” (30025, 15:50). She does not mention if or how she takes the students from the “raise the awareness and concern” stage to the “step up to the plate and help it change” stage, making this theme significant, but only existing.

The student application theme for Paul was embedded in his kindergarten curriculum, focusing on teaching students social skills that they can apply in the real world, “They can solve their own problems. They can follow multi step directions. Listening skills. Talking environment and education, environmental education, I would say social behaviors are a big part of that” (30023, 26:20). He then used the social skills example, like many other of his practices, as a theme to delineate his EE perceptions, so it was placed as occurring, and embedded in his perceived EE reality.

For Rebecca, the students applying their learning theme fits well into her classroom, where she is teaching students art skills. Her exploration of the theme occurred as she focused on why she would add EE to her art curriculum, stating the goal she would like to meet, “That taking care of the environment is important and there are simple things that we can do” (30022, 12:30). Her focus on students “doing” was primarily in a recycling unit, as she was exploring what more she could do with EE. She measured her EE success by the students’ application of what she taught the students as well, saying, “They were able to take anything and turn it into what their imagination was seeing” (30022, 24:15).

Table 5.3.4

Question Three, Theme Four: Informal assessment is part of teaching EE

Theme	Participants	Strength/Development of Theme
4. Informal Assessment	Jane	Significant, Embedding
	Heather	Significant, Embedding
	Paul	Significant, Embedding
	Rebecca	Significant, Embedding

“Informal assessment is part of the reality of teaching EE” is the fourth theme, where the participants assess their EE teaching success through informal means. All four participants significantly embedded this theme into their perception of EE teaching. Jane made a distinction between the formal and informal measures when talking about her success, saying, “When they’re not being instructed or having to do this assessment or this assignment. It’s what they do naturally. That’s when I think I’ve made a difference” (30028, 28:39). She looks at what the students are doing naturally. She also spoke extensively about the feedback she receives from parents and teachers who have her students after they leave second grade. For Heather, the focus

on informally checking her performance as well as the students, “Obviously it’s not something I test ever. Not in a formal sense. . . . I look at if the EE has been successful from my standpoint. How well rounded did I get? Was I able to work in some Science thinking, some Science facts. Was I able to work in my heart and passion of it with students? Did I connect with some? Was there that lasting mark with students? Where did those lasting marks come from?” (30025, 30:51)

Paul, who based his teaching decisions on the standards, focused on how the students were both applying the skills he taught them and their enjoyment while learning it, saying, “One is the smiles on their faces. If kids enjoy what they’re learning, that does it for me. If they are able to take grasp it. If I see them using what I’ve taught them, like with vocabulary. . . . Socially I see progress throughout the year” (30023, 32:10). He did mention testing how well the students remember vocabulary (30023, 13:35), and considered the idea of standardized testing for EE, but decided against it, “I suppose it could be measured by a state standardized test. I don’t always think that’s the best way. That’s just a glimpse of one day” (30023, 34:58). Rebecca also considered informal assessment as a part of her perception of the reality of teaching EE, basing it in the interactions she had with her students, saying, “I knew that they were getting it. They were able to take anything and turn it into what their imagination was seeing. Knowing they did it at home, listening to them, watching them work and then when I ask that question at the beginning of every class. The kids are giving me input from the question” (30022, 24:15).

Table 5.3.5

Question Three, Theme Five: The use of literature when teaching EE

Theme	Participants	Strength/Development of Theme
5. Literature for students	Jane	Significant, Embedding
	Heather	Occurring, Existing
	Paul	Significant, Embedding
	Rebecca	Not Present

The fifth theme is “the use of literature when teaching EE”, focusing on the participant mentioning using books with children when describing their perception of the reality of teaching EE. The theme was significantly embedded in Jane’s EE teaching perception, citing books as a positive addition to her teaching, “It’s easier now because we have a lot of literature. Especially we’re fortunate with our reading grant. There’s a lot of literature that’s environmental based. If you have a low level reader or a high level reader, they can read about things in Environmental Education as well. So it’s not just you telling, it’s them reading” (30028, 12:17). For Jane, the literature offers opportunities for students of all learning abilities to read about EE.

For Heather, the literature theme occurred once in her EE perceptions, when talking about the resources she uses with students, “Kids love non-fiction texts. So I try to find as many non-fiction texts as I can find that appear to be quality written” (30025, 37:38). Focusing on finding non-fiction texts, the theme simply exists in her description of teaching EE, without elaboration.

Paul’s inclusion of the theme is significantly embedded in his EE teaching perception, in part because of his language arts background. He went into great detail the reasons why and how the literature is used in his classroom, focusing in on informational texts as a part of EE learning

opportunities, at one point stating, “They have to have a chance to look at informational texts, or the knowledge they can get from just a quick fun book about monkeys or something that they are excited about” (30023, 5:51). Rebecca made no references to using literature with her students when describing her perception of EE teaching realities.

Table 5.3.6

Question Three, Theme Six: Time is an issue in the reality of teaching EE

Theme	Participants	Strength/Development of Theme
6. Time	Jane	Occurring, Embedding
	Heather	Significant, Embedding
	Paul	Occurring, Establishing
	Rebecca	Occurring, Establishing

The sixth theme is “time is an issue in the reality of teaching EE”, where the participants refer to time as a factor when teaching EE. This theme was significant for one participant, Heather, who perceived time constraints having a significant impact in her EE teaching. She stated, “The biggest challenge for me is simply the fact that there are so many dictations on every minute of the class time...”(30025, 21:30) and it was embedded in her reasoning for not doing as much EE as she had in the past. The time theme occurred in the other three participants EE teaching reality perceptions, where it was commented on, but not significantly incorporated into their perceptions. Jane was mindful of the amount of time she had with students daily and throughout the year, stating, “The time that you really have with them is pretty limited. I think it’s a natural thing at times but it can be really frustrating because of the demands of the clock” (30028, 12:43). She embedded the time demands into how she perceived to teach EE, and did not elaborate further.

Paul and Rebecca spoke of time differently, referring to the time it takes to prepare outside of the classroom. Paul spoke of time as a challenge for adding EE curriculum, “There are challenges when trying to add environmental education to my classroom – one is finding material. It takes time and energy” (30023, 17:15). He also established the theme in relation to EE, saying he needed to plan for time to gather materials to bring it into his classroom, “If I don’t set aside time for that the time doesn’t just magically appear. Because you juggle family and church and activities you have to make time for learning” (30023, 21:14). Rebecca mentioned the time theme when talking about EE, also referring to how much time it takes to prepare, “I do pretty much all my planning at home until about 10 o’clock at night, unless I have the summer time. That’s a huge part of it” (30022, 20:10).

Table 5.3.7: Question Three, Theme Seven: Teaching EE relies on a ‘making pieces fit’ implementation strategy

Theme	Participants	Strength/Development of Theme
6. Making Pieces Fit	Jane	Occurring, Embedding
	Heather	Significant, Embedding
	Paul	Incidental, Exploring
	Rebecca	Significant, Establishing

The sixth theme is “the reality of teaching EE relies on a ‘making pieces fit’ implementation strategy”, where the participant describes a way of making EE fit into their teaching, often using the term ‘pieces’. Jane’s perception of her EE teaching shows an embedded occurrence of the theme, as she has an extremely well developed and implemented EE curriculum, but it was not a significant theme in her descriptions as she looked at her EE teaching holistically. She says of her EE teaching, “I think because I have a lot of experience and I

facilitate project workshops, I'm thinking about stuff all the time on how I can integrate it" (30028, 12:15). She approaches the implementation by fitting in EE lessons that complement other subject areas, with an effort to balance the activities and topics she focuses on with the EE issues that are pertinent. She listed several different categories she can choose from, and considers herself fortunate when she describes her process, "I personally have this rounded base to draw from which makes a big difference" (30028, 18:06), and focuses on making EE integrated.

Heather's perception of her EE teaching reality was significantly embedded with the implementation theme. She describes her implementation as, "All I feel I can do is look for the little pieces of how I can pull environmental things in. When I look for the elements of what I want to teach, I look at how I can fit them in with the required parts" (30025, 7:57). As her teaching context changes due to district and school initiatives, she focuses on the EE parts she can still teach. "Sometimes I have to realize I can't do this piece this year. But then what part can I do? Always making sure I do honor it as much as I can" (30025, 29:00). Throughout the interview, Heather used the term pieces and how to put them into her teaching.

For Paul, the theme of 'making pieces fit' was incidental in his EE perception, because he focused on the state academic standards and the district's choice for science curriculum when considering what to teach, saying, "How would they want me to teach environmental education?" (30023, 7:26) but as he spoke of his actual EE teaching, Paul felt the need to add to the curriculum to fill in holes that would occur for students. In order for students to make connections with the lessons, Paul was exploring how to make the pieces of EE fit, admitting, "I tend to add a bit more of my own supplement material" (30023, 4:50).

When Rebecca talked about the process of implementing EE in her classes, the theme was significant, stating one of her goals to "Definitely having some piece of it in every grade level" (30022, 14:40). Even as she searches for ways to add more EE into her teaching, she

established the theme by using it as a building process to create lessons, saying, “I know I need to do more of it and how can I incorporate it into other classes and other lessons. Throwing in little pieces until I figure out what lesson I can do” (30022, 16:40). For her, ‘making pieces fit’ is Rebecca’s theme as she grows in understanding of how it will be incorporated into her teaching.

Table 5.3.8

Question Three, Theme Eight: Students’ family and parents a consideration when teaching EE

Theme	Participants	Strength/Development of Theme
8. Family/Parents	Jane	Significant, Embedding
	Heather	Occurring, Existing
	Paul	Not Present
	Rebecca	Occurring, Exploring

The eighth theme of “family and parents as a consideration when teaching EE” also was found, where the participant mentions the students’ parents as a portion of the reality of teaching EE. Each of the participants who mentioned parents and family did so in different ways. This theme was significantly embedded in how Jane perceives teaching EE. She mentioned families and parents several times and that she, and her students, are teaching them EE. She stated as a goal, “I am teaching families, I try to send things home as well” (30028, 33:00). Along with her students and her colleagues, Jane focuses on reaching the relatives of the students as part of her EE teaching.

Heather did not view the parents the same way, and the theme occurred while talking about EE activities she was doing and wanted to do, when she said, “Parents should like it. They’re doing something. It does get the kids outside to breathe” (30025, 27:45). The parents and family theme existed in Heather’s EE teaching perception as an entity that may approve, and even

support, her EE teaching efforts. Rebecca's perception also had the parents and family theme occur when she focused on the students' understanding of the EE concepts she teaches. She explored the theme as a possible result of the EE lessons, "And maybe they'll teach their parents something that the parents didn't know" (30022, 11:40). Paul did not mention parents or family in the context of his EE perceptions, except as a way to develop the students' understanding of what community is, building from self, family, neighborhood and beyond (30023, 10:31).

Additional Themes

In addition to the themes found and analyzed in relation to the three types of perceptions, with their strengths and development, there were two themes that could not be placed neatly under one perception, and an additional theme that did not fit the categorizing scheme. These themes were significant to the participants' EE perceptions, so they are placed here at the end of question three.

- **EE is researched through the internet** – the use of the internet is cited by the participants in their EE perception descriptions as way to understand EE and gather curriculum resources.
- **Improvements in personal EE understanding** – the participant's perception description included the individual's desire to learn more about EE, and may included the strategies for increasing their own understanding.
- **Overall perception of EE success** – the participant's perception of judgment about their own EE work.

Table 5.A.1

Additional Theme One: The participant uses the internet to research EE

Theme	Participants	Strength/Development of Theme
7. Internet Resources	Jane	Occurring, Exploring
	Heather	Significant, Embedding
	Paul	Occurring, Exploring
	Rebecca	Significant, Establishing

The first additional theme for the participants' EE perceptions is "the participant uses the internet to research EE". The use of the internet is cited by the participants as way to understand EE in addition to gather curriculum resources. Under this theme, Jane and Paul mentioned the internet, but it was not significant to their EE perceptions. Jane explained her internet use as something that she was starting to explore to enhance her EE understanding, especially current issues concerning the environment, saying, "I'm trying to explore a lot more on line. I'm not a big Internet person" (30028, 36:35). She had not perceived the internet to be a major resource compared to the Project curricula and activities she used to structure and incorporate her EE teaching, or the work that she had done in committees at the state level. Paul mentioned the use of the internet as a resource in his general teaching, stating, "It's always important to use resources and as I grow more in my teaching using what I find from other teachers and also on the Internet. That's a great resource" (30023, 12:22), but he too perceived the internet as a place he might use to explore his perception of EE, "I might type in environmental education. I'm sure I'd get a broad perspective" (30023, 30:06).

Heather and Rebecca both cited the internet as a significant resource in their perception and subsequent teaching of EE. When Heather spoke about the internet, it was embedded in her

perceptions, She used the sites to gather information about current issues in EE and what can be done about them. She went so far to talk about possible bias they might have, “I have to be really careful when I use the internet. I would love to send them to places like the World Wildlife Fund, and a lot of environmental groups” (30025, 38:51). She, like the others, also mentioned the internet as a place to get additional resources for EE teaching, “And the Internet, there are a lot resources there” (30025, 37:38).

When Rebecca was asked how she overcomes not knowing a lot about EE, she stated, “Internet, searching on the Internet. ...” (30022, 9:00). When asked how she used the internet, she explained it was a tool to expand her EE vocabulary and awareness, “For the recycled art I typed in ‘Recycled Art’. I didn’t find a whole lot from my Google search but from that first page I found other terms to use to search” (30022, 22:00). With those new terms, she was actively searching for ways to expand her understanding of EE. She too, used the internet to gather EE materials, along with other materials for teaching art.

Table 5.A.2

Additional Theme Two: EE includes improvements in personal EE understanding

Theme	Participants	Strength/Development of Theme
3. Improve personal EE understanding	Jane	Incidental, Embedding
	Heather	Incidental, Exploring
	Paul	Significant, Establishing
	Rebecca	Significant, Establishing

“EE includes improvements in personal EE understanding” is the second additional theme in the participants’ perceptions. This theme centers on the individual’s desire to learn more

about EE. Jane did not focus on this theme outright. As she spoke about her involvement in with the state and community, she was trying to stay current on what was affecting her teaching context, saying “I involve myself in a lot of things from the state, in regards to standards and curriculum, and to the community, what is affecting the community, such as the Arboretum and the district work on curriculum and standards.” (30028, 2:52) She was making an effort to stay involved at several levels, and included EE and non – EE related issues. Overall the theme was incidental but embedded in the activities that she does.

Heather examined her own EE teaching on a yearly basis, and mentioned exploring improvements, “Like anything else – trying to look at something a little differently. What worked, what didn’t work last year; how can I look at it differently and make it work better for this year” (30025, 29:00). Her approach was focused on improving EE teaching, occurring as a part of her job as a teaching professional, but was incidental when considering the theme of improved personal EE understanding. As described in her case. She did not state that she was actively trying to improve her personal EE understanding in her ideal EE perception, but she did elude to reading books and magazines to keep up to date on EE, as described in the *Resources drawn on* section of her case, including her citation of Richard Louv’s term, “nature deprived syndrome”.

Paul and Rebecca both spoke extensively about improving their personal EE understanding. Paul, while he admitted he did not know how to describe EE, went a step further to make it an objective for both himself and all teachers, “Only the goal for me personally is to learn more. As teachers we should be looking into EE” (30023, 20:32). To Rebecca, her perceptions of EE made her feel as if there was more she could be teaching, but she did not know what that would be because she did not understand it. When talking about her ideal EE, she state one of her goals for reaching that ideal to be, “Understanding more myself about EE, so I could speak more easily about it” (30022, 14:40).

Table 5.A.3

Additional Theme Three: Participant perception of EE success

Participant	EE Success	Exemplars
Jane	Positive, realistic, proactive	“It is something I feel is a big job, but it is not unattainable” (30028, 33:00)
Heather	Shifting: feasible to frustrated	“And I think it’s very feasible here, at Pebble Community School” (30025, 6:40) to “I’ll never be doing enough” (33:58)
Paul	Unknown but still doing it	“I don’t know what the term means”(30023, 40:25) to “It just means that I didn’t know the reference of the word” (30023, 30:06)
Rebecca	Learning, goal oriented	“I would like to research other areas that could be taught in the art curriculum” (SD4, C5)

The theme ran throughout all of the cases, focusing on “an overall perception of EE success”, looking at how the participants perceive their EE teaching success. This theme does not fit the others in that it was a perception of judgment about their own EE work, and it did not fit to categorize it by strength and development. The theme was significant in that the participants were concerned about their EE teaching success, and gave insight to some participant’s misalignments in the three types of EE perceptions.

As Jane was talking about her perceptions of EE, her comments were based in the successes she had with her students, and the extensive work and effort she had put into her EE teaching, working with colleagues, parents, and other interest groups. As she explained the future she would like to make a new EE role, and how she perceived her classroom teaching EE and the goals she had, she portrayed herself as a purposeful environmental educator. She had a positive outlook, with plans and questions to answer, and she seemed to focus on being realistic, but proactive in her EE teaching and plans. She said at one point about her EE teaching goals, “It is

something I feel is a big job, but it is not unattainable” (30028, 33:00). Her positive perception of success carried throughout the interview, consistently based on how she could bring EE to students, families and colleagues.

Heather’s perception of success in regards to her EE teaching shifted during the interview. She explained her ideal EE teaching scenario of an EE based charter school where all of the subject matter was integrated with a EE focus, she expressed she thought her current teaching situation could be modified to fit that model, “And I think it’s very feasible here, at Pebble Community School” (30025, 6:40). She was hopeful and perceived her ideal EE as possible in her present teaching setting, even though she felt badly about how it was currently going, “I’ve only managed to keep little scraps of Environmental Ed. ...I feel terrible that I can’t do more. That’s not how I think it should be done” (30025, 4:25). Heather also explained that her efforts to move towards her ideal EE had been thwarted because of changes in the school setting, ending “Ideally I want to work forward, which is always hard because the last couple of years it’s gone backwards” (30025, 29:00). While frustrated, Heather seemed positive and working towards an image of ideal EE teaching, although she was concerned about keeping EE going in the school setting she was teaching in. A shift occurred when she was asked how she would ascertain she was doing enough EE teaching in her classroom, and she stoically replied, “I’ll never be doing enough.” To see if this was contrary to her image of the ideal EE setting, she was asked if that applied in her scenario of the EE charter school and she remained adamant, “I don’t think it will ever be enough” (30025, 33:58).

Paul’s perception of EE success during the interview was very positive, where he was citing what he was doing with his students and how he assessed their understanding pertaining to EE. He did, however, maintain that he did not know what EE was. As he was sitting down to be interviewed, he mentioned that he went out of his way not to look up how EE was defined, thinking that would change the results of the study. As part of his EE perception, Paul focused on

not knowing how to explain what EE was, repeating in several ways during the interview, “I want to be honest. I don’t know what the term means. I’m not the only teacher out there like that; I hope I am representing more than just me. I don’t know if I am doing enough” (30023, 40:25). He also stated he has not heard the term ‘environmental education’ very often, and went on to explain how he dealt with not knowing how to describe meaning of the term. “If I didn’t know the language and someone were to say the word ‘teacher’ and I didn’t know what that word was in that language that doesn’t mean I don’t know a lot about teaching. It just means that I didn’t know the reference of the word” (30023, 30:06). Even though he was adamant that he did not know what EE was, he was equally able to explain how he thought he was teaching and assessing it. His ideal was focused on learning more about it and he was dedicated to doing so. He thought other teachers should be learning about it as well, saying, “As teachers we should be looking into EE. So yes, I continue to learn more” (30023, 20:32).

Rebecca’s view of EE success was grounded by her wanting to teach it and not that she was told to, coupled with learning what EE was in relationship to her art class. She showed her uncertain yet focused view of EE when stating, “I’m not sure what else I could teach but I do believe it is important and I would like to research other areas that could be taught in the art curriculum” (SD4, C5). One of her markers for EE success was her perception of where students were in their knowledge, and how she wanted to improve to accommodate their understanding, saying she has a goal of “Understanding more myself about EE, so I could speak more easily about it. My students need to be at a different level than we’re at right now” (30022, 14:40). She also has the perception that other teachers are teaching EE, and that it is somewhat difficult to bring her knowledge level to match theirs, saying, “I try to incorporate it, but I don’t know a ton about it. I don’t know the language that all the teachers are using. So to make it interdisciplinary where they are hearing about it more than one way, I want to use the same language. So that’s a little bit of a challenge” (30022, 5:40).

Question 4 Findings: How do the individual participating teachers’ three types of EE perceptions align?

Question four’s analysis is based on the descriptions cited for each individual participant made in reference to the twenty themes found in the three types of EE perceptions in this study. Misalignments within the perceptions are indicated when descriptions of a theme are conflicting, have changed in strength, or inferred a shift in understanding between the types of perceptions held by the individual. If descriptions were consistent throughout the study, they were considered aligned and not reported for this research question.

After this analysis was completed in the four cases, the findings were as following, organized by participant and then theme.

Table 5.4

Misalignment occurring within themes for each participant

Participant	Theme	Misalignment of perceptions
Jane	Interdisciplinary	EE vs. Reality of teaching EE
Heather	Integrated	EE/Ideal EE vs. Reality of teaching EE
	Interdisciplinary	Within EE vs. Reality of teaching EE
	Collaboration with colleagues	Ideal EE vs. Reality of teaching EE
	EE Success	Ideal EE vs. Reality of teaching EE
Paul	Interdisciplinary	Within EE vs. Reality of teaching EE
Rebecca	None	

Jane’s perceptions of EE were very well aligned. Her comments throughout the conversation built on one another and the themes were consistent in their strength and development across the three types of perceptions, except for a subtle one, the theme of ‘EE is interdisciplinary’. In her EE perception, the strength of theme was occurring and was embedded

in perception, but it was not a significant theme. Her EE perception was much more focused on integrating EE into her teaching and making connections between subjects, than EE being interdisciplinary, where EE is made up of the different subjects.

The shift in her presentation of the “EE is interdisciplinary” theme occurred as she was talking about the reality of teaching EE, and dealing with other teachers and their understanding. Her focus on EE being interdisciplinary took on a greater significance for strength, as she said, “...I demonstrate that it is interdisciplinary. And that’s really hard to get that across to other educators because they think they need to have it as a separate class” (30028, 10:40).

While more subtle than others found in this study, Jane’s misalignment brings to light how complex perceptions of EE can be in an individual. In comparison, the “EE is integrated into teaching” was a very significant theme to Jane’s perceptions throughout the interview, and there may have been an inadvertent omission on her part concerning the strength of the “EE is interdisciplinary” theme, or there could be a blending of the integrated and interdisciplinary themes relating to her EE perception. Through an examination of her explanations of EE teaching, there are indications Jane blends the two themes, as she speaks of teaching a combination of subject area standards by using units in her classroom (30028, 26:01). Even using the above quote, it can be interpreted that she is talking about integration as well when she is referring to other teachers and how “they think they need a separate class” when teaching EE.

Heather had five misalignments of themes across the types of EE perceptions. The themes of integration and interdisciplinary EE, as well as collaboration with colleagues, students applying their learning, and EE success each shifted when she was talking about them in different perceptions. These misalignments may illustrate that Heather is developing an understanding of operational EE.

“EE is integrated into teaching” is a theme that was significant to all Heather’s EE perceptions. As she described the integration, the development level changed across the types of

perceptions. Her descriptions of her perceptions had EE integration as a theme that was well established and extending. Her statements, such as, “The more we can integrate it the better” (30025, 27:45), showed an active intention to extend EE integration into as many areas as possibly. The theme then built in developmental strength when her ideal EE was analyzed, where it was embedded into the perception, as shown by, “If I could redesign things, I’d teach at a charter school where the arts and environment are completely woven together and that’s what we do.” (30025, 6:40). This theme misalignment between the EE and ideal EE perceptions is subtle, and would not have been mentioned until looking at Heather’s perception of EE reality. The shift in developmental strength was noticeable, the descriptions were at the exploring level, as she described the struggles to integrate EE into the everyday curriculum, “Trying to add more and integrating it better. Getting better pieces put together” (30025, 29:00). In addition to this shift in how she spoke about EE integration was a shift in demeanor. Heather physically became more agitated, exhibiting a mood of frustration when it came to the reality of integrating EE. In addition, she found it difficult to find examples that demonstrated the theme was developed beyond an exploring level.

The theme of “EE is interdisciplinary” had misalignments occurring both within and between the types of perceptions. Heather started with a significant description of EE being integrated, stating, “You can’t separate it all. It’s all together, with the social studies standards, art standards, and music standards” (30025, 8:20), but as we delved deeper, when she continued to related EE to content standards she was unsure how EE should be perceived, saying at one point, “It could be part of Science strands” (30025, 14:03), which made it difficult to delineate the strength of the theme overall in the perception. When looking through the comments beyond the EE perception, the strength fluctuations were again noticeably different. Where she described her perceived reality of EE as something she used her homeroom time in the past to teach, not

together with other subjects (30025, 4:25), she also referred to geography, art and music activities as part of her EE teaching.

The third misalignment in a theme across perception types for Heather was in the “collaboration with colleagues”, where it had significant strength in her perceived ideal, at one point she states, “I feel like it’s something that a group of people would have to come together to brainstorm” (30025, 13:02) and she described how it might work in the school, with different teachers collaborating (30025, 11:50). But as she described her perceived reality of EE in the classroom, she felt she could not collaborate, causing visible stress when she spoke, “In this building in this setting with this year I can’t go with an integrated curriculum with a group of teachers. I don’t have that much administrative freedom. So I’m doing a lot of biting my tongue and biding my time” (30025, 10:58). To her, the context of the school and its administrative mandates were removing the theme of collaboration as an option. This is unique to Heather, as the other participants did not voice an inability to collaborate with other teachers in the school. While not a misalignment of the EE perception, Heather’s perception of her context in the reality of EE is causing constraints that she cannot reconcile with her ideal EE, and incongruence in her perception of collaboration has occurred.

Heather’s fourth area of misalignment, which may be better called a gap, within themes is that of the “students applying their learning” theme within the reality of EE. While her concern for her students was a significant goal that existed in her perception, she had not developed the theme in her perception beyond awareness skills. Stating as a goal, “... can we raise the awareness and concern? Yes. Good. Then I will have done what I can do,” she then goes on to focus on an action oriented goal, “There are always going to be those issues. That doesn’t mean we just accept it and it’s always there. ... Are you going to step up to the plate and help it change?” (30025, 34:19) She does not connect the two, staying with the awareness goal in her explanation of the theme, using her teaching of observation and “just seeing”.

The last theme that Heather had misalignment is 'EE success.' By its nature, this theme goes across the themes and is not categorized like the other themes. It is worth mentioning in the misalignments for Heather, because her perceived success level did change so dramatically, as mentioned at the end of question three's analysis. She seemed very open to the possibilities of successful EE in the classroom describing it as such on several occasions including, "And I think it's very feasible here, at Pebble Community School" (30025, 6:40), until she was asked how she would be able to tell she was doing enough EE. She then unequivocally stated that it would never be enough, changing the tone of her interview.

These five misalignments for Heather were noticeable not only in the transcripts, but as she spoke as well. Her body language would change, and frustration or confusion would be present. As mentioned at the beginning of Heather's description, these misalignments may illustrate that Heather is working to reconcile her understanding of operational EE in the context that she is in, and the interview process brought her struggles to the surface.

While analyzing Paul's comments for misalignments, his were noticeably different because there were a number of themes that were mentioned only once. These themes were described at level that would be considered significant in strength within the type of EE perception, yet those themes were not mentioned again throughout the conversation. These themes included "collaboration with colleagues", "EE is centered on responsibility", and "improving personal EE understanding". While these are not necessarily misalignments, due to the chance he may have just overlooked mentioning them more than once during the open ended interview, the consistency of the themes' single occurrences and the way he presented them inferred that was trying to construct a perception of EE as he talked during the interview, by presenting his general best practices and deciding if they were a part of EE. When looking at the actual statements, Paul had a habit of explaining a best practice in a general way, and then

qualifying it as EE after it was stated. For example, when talking about goals, referring to the wood unit he taught the students, he said,

I need to be applying the lessons to the students' lives. If we don't make it real to them the value is lost. What are they going to learn? Maybe they'll remember in a year that they did a hands-on activity and that's all that the lesson tells you to teach them, as well as a little bit of vocabulary. My passion is that, is to make sure that it's real to them. And that is part of the environmental ed piece, where they can connect to something. (30023, 18:50)

Paul's descriptions also tended not to be as EE specific as the other participants. He did state he could not describe what EE was, and that he had a goal to learn more about it. During the interview, Paul re-established he did not know what EE was; say at one point, "I could be doing none! How do I know? I think I could be doing more. I could research more. After this interview I'm sure I'll look things up. I want to be honest. I don't know what the term means" (30023, 40:25). Paul's self proclaimed limited understanding of EE did not prevent him from providing detailed descriptions of teaching and reasoning, by using his best general teaching practices and trying to qualify them as EE.

He was able to answer the interview questions with ease for most of the interview, and his themes tended to stay consistent in strength and development if they were mentioned across more than one type of perception. The misalignment that did occur happened within a type of perception. The theme, "EE as interdisciplinary," was misaligned within his EE perception. Similar to Heather, Paul had difficulty being consistent on how he perceived EE, stating, "If we are looking at classifying it as a science or as an interdisciplinary subject, I like the idea of calling it environmental science. ...(but) If it was environmental education alone it would need to be described a little bit more" (30023, 8:51), showing a shifting perception of how interdisciplinary EE was. As we talked more, he brought up connections up to his social studies content in relationship to EE, saying, "The community; that brings in social studies too" (30023, 10:18). When giving examples in the classroom, however, he did tend to stay with the science curriculum

and how that demonstrated his perceptions of EE, which ran through the interview as a whole. Paul's perception of EE was misaligned when talking about EE as an interdisciplinary subject, showing a struggle between describing it using science based examples, whether he should be adding in social studies or social skills.

Paul's comments infer he was clearly aware of how he was describing his perceptions, while still wanting to show he very well could be teaching EE because he understood teaching in general. Rebecca's case was different; although her descriptions were not as complex as the other participants, the themes she used carried throughout the interview at the same strength and developmental level across all three types of EE perceptions. As a second year teacher with little background in EE, it is understandable that her descriptions were not fully developed, but the alignment of how she perceives EE was notably consistent across the three types. Rebecca's demeanor was also very positive and upbeat while talking about her perceptions, even though she came to the conclusion she need to do more with EE at the end of the interview, saying, "I'm glad that you came to talk and made me more aware of what I did, it was good; but I need to go further with it" (30022, 26:28).

Rebecca's case sheds light on the process that may be involved in developing a perception of EE. The complexities exhibited by the other three cases show they take a more nuanced approach to thinking about education and teaching, whereas Rebecca is not at that stage in her development as a teacher. Jane, who has extensive training and application of EE in her teaching, has a consistency across her types of EE perceptions, with a minor exception can be used to highlight the complexity of her perceptions. Heather, on the other hand, may be considered still developing in her operational EE, because several of the themes across her three types of perceptions were misalign, possibly showing how her beliefs about EE were not coinciding with how she was apprehending or perceiving EE in the context of the school and classroom. Paul was demonstrating his awareness of EE as an area he could be addressing with

his students, but the qualifying ending statements and lack of depth to his descriptions confirm his perceptions are not developed. Rebecca, who was actively trying to develop what EE was for herself, gave simple explanations of her perceptions that pointed to a need and desire to expand how she perceives EE to be. Whereas Paul tried to make a case that he taught EE, without the ability to give a description of it and no solid evidence for it, Rebecca laid out what she thought it was, and how she was building from that set perceptions. The variety of perceptions across and within the cases, across and within the types of perceptions, and across and within the themes exhibits just how complex this issue of teachers' EE perceptions is.

Summary of Cases

When the themes are viewed as a whole under each of the participants, the level of consistency of the themes in both strength and development in the participants' descriptions brings to light some of the complexities that are occurring in the participants' perceptions. Jane talks about the themes at the most developed level when comparing the four cases, all but one are thoroughly embedded in her EE perceptions. She is also the most consistent in the categorization of themes, both in strength and development. Some of the themes used to refer to EE in practice, such as "time" and "standards" were not as significant in strength in the perceptions, but were all at the embedded level of development. This may allude to an alignment of Jane's perception of her reality of teaching in relationship to her perceptions of EE, where that alignment creates a higher comfort level and themes of practice may not seem as significant to the discussion.

Heather, who was found to have some misalignments in the themes across her perceptions, also has more variability in the level of development, ranging from themes that simply exist in her perception descriptions to those that are thoroughly embedded. This variability is most noticeable when Heather is asked to talk about her perceptions of EE within a context, either her ideal or her reality. In contrast, the overall strength of her themes tended to be at the significant level, regardless of the type of EE perception.

Both Paul and Rebecca, who are developing their perceptions of EE, have very little consistency in either of their themes' strength or development. Note that Paul's use of some themes, especially in the reality of EE perception, were embedded due to his consistent use of general best practices as examples of EE. This could be that his best practices are a part of his reality of teaching, offering a consistent context for his perceptions. Those same themes were also highly variable in strength, showing his lack of a defined perception of EE. Rebecca, who was working on both her perception of context and perception of EE as a new teacher, had high variability throughout the strength and development of the themes. Interestingly, when looking at each specific theme, her use was the most consistent throughout the interview, showing no misalignments, as found in the analysis of research question four.

Closing

In the closing of this chapter, it is the hope that the analysis of the cases of Jane, Heather, Paul and Rebecca has provided some insight into the complexity of teachers' EE perceptions. The richness of these cases are not meant to be imposed on the analysis of other individuals, but meant to shed light on the complexity of teachers' understanding that needs to inform the EE research and EE implementation communities. The final key findings and conclusions, as well as recommendations for further study can be found in chapter six.

Chapter VI: Findings and Implications

The goal of this study is to provide a window into how elementary classroom teachers perceive environmental education in the classroom. A richer understanding of teachers' EE perceptions is warranted in order to support and inspire the implementation of EE in the classroom. As the literature review revealed, contemporary EE has evolved from a multifaceted history, coming from the four precursory educational movements of nature study, outdoor education, conservation education and progressive education. From this landscape, international, national and state level guidelines for EE in the classroom have been created. International movements have established the foundations of contemporary EE, through goals, objectives and principles developed in the 1970's and still cited today. National guidelines were developed and published in 2004 as a coherent view of EE, providing recommendations for pre K – 12 learner outcomes, teaching materials, teacher preparation and professional development, as well as non-formal EE programs. These guiding documents include goals and outcomes that all focus on the learner's environmental awareness, skills for investigation, decision making, and citizenship, as well as active participation including civic responsibility and lifelong learning. In 1990, the National EE Act established that states are required to develop their own EE initiatives to which the state of Minnesota responded to by passing an EE based statute and developed aspects of a state wide EE initiative.

For this study, the Tbilisi Declaration (UNESCO, 1978), the national NAAEE guidelines for excellence (NAAEE, 2004a, b, c, d), and the state's GreenPrint for Minnesota (Kennedy & Stromme, 2008) set the reference points. The national and state documents both center on understanding earth systems, the interrelationship of humans and the environment, and supporting local connections for learners. The international Tbilisi document also includes an explicit focus on an interdisciplinary approach to EE, whereas the state standards focuses on EE as integrated

across other subject area curriculum. Both Tbilisi and the state guidelines include a focus on learner attitudes towards the environment and society, and the state documents also include a set of benchmarks and key concept vocabulary lists for learners.

The national dialogue around EE indicates a lack of coherence among states and schools. In 2005, a national report “celebrates the success of EE” since the passing of the National EE Act of 1990 (National EE Advisory Council), and reads as a plan for the future with little delineation of the current status of EE implementation nationally. In comparison, a series of national surveys have found state EE programs in a wide range of development and are using a variety of strategies. There is also a current trend of states losing EE assessment and support structures, or never establishing them (Ruskey Wilke, & Beasley, 2001; Smaldone & Dey, 2010).

As EE initiatives are commonly interpreted at the district and school levels (Flanagan, 1990; Smaldone & Dey, 2010), they have been found to be inhibited by high-stakes initiatives, such as those based in the No Child Left Behind Act (Gruenewald & Manteaw, 2007). There are very few resources, and little direction or incentives for districts to implement EE programming, although the Minnesota State Academic Standards in Science revisions have included an emphasis on incorporating EE. Within this climate, teachers have become the most significant EE implementers in the classrooms.

The current research on teachers’ EE perceptions has just begun to provide insight on the complexity of how teachers perceive EE. They have explored teachers’ perceptions of training and implementation of EE (Winther, Volk & Shrock, 2002), commitment to EE (Sosu, McWilliam and Gray, 2008), barriers to EE in the classroom (Ernst, 2007; Simmons, 1998; Middlestadt, Ledsky, & Sanchack, 1999) and advocate for EE practices and teaching reality (Robertson & Krugly-Smolka, 1997). There is a tendency in the research to focus on a particular program or aspect of EE, and to have a predetermined set of factors established for the participants to respond to in regards to their perceptions. Whereas previous studies have treated

teachers' EE perceptions as a single phenomenon, this study parses out the perceptions into EE as an academic idea without consideration of a context, how it is perceived as an ideal version of EE teaching in a context, as well as the perceived realities of teaching EE in attempt to better understand the complexity inherent in teachers' perceptions of EE.

The remaining portion of this chapter is divided into four sections according to the questions of this study:

1. What are the participating elementary teachers' perceptions of EE?
2. What are the participating elementary teachers' perceptions of ideal EE teaching?
3. What are the participating elementary teachers' perceptions of the reality of teaching EE?
4. How do the individual participating teachers' three types of EE perceptions align?

The results of this study are a discussion of the findings in light of the guidelines put forth at the international, national and state levels, as well as the research literature on teacher EE perceptions. Within these discussions are the implications of the findings. The chapter then ends with conclusions from this study and suggestions for further research.

Question 1 Findings: What are the participating elementary teachers' perceptions of EE?

The first question is about the participants' perception of EE as an idea without consideration of a context. The teachers' perceptions focused on EE being integrated into teaching, interdisciplinary, taking on a planetary view and centering on responsibility. They also perceived EE to be inspired by their personal experiences and passion. When compared to the various international, national, and state level prescriptions of EE, we can claim that these teachers' perceptions of EE reference a limited number of academic groundings of EE, such as interdisciplinary, curriculum integration, planetary perspective and student responsibility, and that their references to these ideas are very shallow. We can assert the participants lack the

foundational scope of EE, by the lack of references to the knowledge, skills and actions usually included in EE. Coupled with this cursory scope is the confusion teachers displayed when describing aspects of EE, such as integration, and evidence of a lack of clarity in the teachers' perceptions of EE.

The limited scope and lack of clarity about EE as an academic idea is not unexpected considering the minimal, if any, attention given to EE in teacher professional development. If the findings here are confirmed by larger scale studies, the results have important implications for both pre-service and in-service education for teachers. If we desire to have teachers develop and implement EE in a way that corresponds to EE's foundational aspects, a more effective and substantial type of teacher education in EE is warranted.

The findings regarding teacher perceptions of EE suggest teacher professional development could more effectively address their perceptions as interdisciplinary, planetary and integrated, but also advocates for attending to their personal experiences and passions regarding EE. The teachers' strong focus on their own personal connections to EE is unique to this study. The participants had meaningful and often inspiring experiences that were cited as the impetus for their teaching of EE. If teachers also include references to personal experiences when EE specific resources are unavailable, as reported by Robertson and Krugly-Smolka (1997), it seems reasonable to assert that teacher education in EE needs to create meaningful personal experiences and capitalize on those experiences during teacher education programs and professional development.

Question 2 Findings: What are the participating elementary teachers' perceptions of ideal EE?

The second question is about the participants' perception of ideal EE in a context they know. The teachers' perception of ideal EE called for enriched experiences and connections for students,

collaboration with colleagues and changing the existing context. The teachers' perceptions of ideal EE included providing students experiences that would raise awareness of the environment and assist them in making personal connections. Although student awareness and connections align with some of the central aspects of the EE guideline documents, the participants did not perceive providing student experiences, such as teaching outdoors or with experts, as venues for engaging in decision making, investigations, and active participation in communities. The results suggest that while teachers perceive EE to include providing enriched experiences outside traditional classroom structure, they are not connecting these experiences to the EE attitudes, values, skills, processes or knowledge to those settings. Teachers express a desire to teach with enriched experiences and believe them to be enjoyable and educationally worthwhile without being able to explain what was educationally worthwhile. This has been observed previously by Simmons (1998). This implies that professional development about connecting the academic aspects of EE and the experiences they want to provide their students is needed.

The results of this study also suggest that we should offer teacher education in a collaborative setting. Participants' ideal EE perceptions included collaboration as a means of strengthening both the teachers and the students understanding of EE. State EE guidelines assume some type of collaboration among the teachers and thus it seems reasonable to recommend providing opportunities, resources, and structures for teacher collaboration at the school level. Providing for teacher collaboration would attend to reports that social norms play a role in teachers' perceptions of EE (Middlestadt, Ledsky, & Sanchack, 1999; Sosu, McWilliam & Gray, 2008).

The recommendation of providing the professional development structured at the school level could also address the participants' perception of EE as needing to be in a different context, such as the place or teaching assignment, in order to be ideal. Guided exploration among colleagues of how EE could be taught in the existing school structure also would address reports of teachers' uncertainty about how to meet the goals of EE in their setting (Robertson & Krugly-Smolksa,

1997). If teachers are expected to change their practice in the classroom because of EE initiatives, but the context of the site, the program or the teachers' role in relationship to the initiatives are not addressed, teachers may not perceive the changes as feasible or worthwhile for them to attempt.

Question 3 Findings: What are the participating elementary teachers' perceptions of the reality of teaching EE?

The results of for the third question show the participants' perception of EE as it actually occurs in their teaching reality. The teachers' perceptions of the reality of teaching EE included meeting academic standards, locating EE primarily in science, having students apply their learning, using informal assessment, and using the available literature. They also cited time as an issue, used a 'making the pieces fit' implementation strategy, and considered family and parents when teaching EE. Their perceptions of EE are influenced by the organization of the school, they speak of EE in broad terms, and while they are using the same terminology, they seem to be assigning different meanings to the terminology.

The participants gave varying and often conflicting descriptions of how EE fits into the rest of the curriculum they teach. Teacher's perceptions ranged from views that saw standards as supporting their EE efforts to those who saw standards as a hindrance. For most teachers EE was seen as a small part of science, while the others saw EE as embedded in all subject areas. Participants consistently used examples of science activities to describe their EE practices regardless of how they explained EE fit into the curriculum. This is understandable considering that the curriculum coordinator at the district level explained EE as part of the science curriculum and the state had new EE learning benchmarks implemented under the academic standards for science. It should be noted that there appears to be some tension for the teachers in this study between EE as part of social skills development and as part of the science curriculum as reported.

This has been reported previously by Sosu, et al (2008) and Robertson & Krugly-Smolka (1997). Regardless, concern arises when teachers seem to have a disjointed perception of the reality of teaching EE. This occurred with teachers in this study and those of Robertson & Krugly-Smolka, where teachers were describing their EE as based in teaching social skills, yet consistently cited their concerns about their own science understanding and the science content in their teaching. The guiding EE documents all point to an integrated and interdisciplinary vision for EE, but those at the state level tend to focus on EE implementation in the sciences, muddling the perception of EE teaching further. Addressing this disjointed reality of teaching EE by delineating how EE is a part of the whole curriculum, including initiatives such as improving literacy, for each specific school context would provide improved clarity for the teachers and how they perceive EE in reality. In order for EE implementation to be effective, the current perceptions of curricular requirements and their relationship to EE need to be clarified or they will be influenced by the variety of the perceptions, and ensuing teaching practices will not be aligned with desired outcomes.

The findings from these cases suggest teachers understand that there are a number of skills important to EE and students need to practice applying them, but indicate that teachers do not know the skills they should be teaching. The teachers have general and vague ideas of what should be taught but there is little depth to their understanding. When teachers emphasize environmental concerns beyond recycling and related measures, yet continue to focus on such activities, it indicates a need for more extensive and applicable EE professional development. Furthermore, the teachers in this study demonstrated they will fall back on their understanding of general teaching practice in order to compensate for deficiencies in their EE teaching. Teachers seemingly will contradict themselves by reporting they need and desire more

training in EE situations, yet say they already know what to do with their students and know what teaching techniques to use in each setting, which was also reported by Simmons (1998).

Giving attention to how teachers express their understanding of EE is also warranted as the study's participants were found to be using common terminology to describe their perceptions, but were assigning different meanings to those terms. This is reflected in the ways teachers talked about terms such as academic standards and student families, and the variety of ways they interpret the relationships between those terms and other aspects of their perceptions in their EE descriptions. In regards to implications, the question then is the limited voice they are allowed to use in their answers due to data collection methods portraying the same intent as it used by researchers? A limited voice conundrum is reflected in studies of teachers who are struggling to understand what the task of EE really is amid the "many conflicting ideas and resources" (page 318, Robertson and Krugly-Smolska, 1997). The uncertainty of how teachers are interpreting terms clouds our view of the relationship of the researchers' questions and the participants' descriptions. While studies like Middlestadt, et al. (1999) were able to provide opportunities for teachers to comment on a predetermined set of terms associated with EE, it is uncertain how the teachers are interpreting the relationships between each of those terms and in what context. Providing predetermined sets of factors to initiate discussions with teachers without further discussion of the meanings, context, and relationships assigned to the factors, may inadvertently create misunderstandings in how teachers perceive EE.

Research Question #4: How do the individual participating teachers' three types of EE perceptions misalign?

The answer to the fourth question is a two part discussion of how teachers' three perceptions are misaligned. Data analysis under question four in the previous chapter demonstrated that there are misalignments, whereas this discussion reports how they are misaligned.

The first part of the discussion is focused on the categorization of the misalignments across the four cases by using the individual theme misalignments found in each case. As a reminder, misalignments were delineated by descriptions that are conflicting, have changed significantly in strength, or inferred a shift in understanding during the explanations of perceptions by an individual and can occur within or across the three perceptions. Each of the internal theme misalignments found in the previous chapter was compared to the other misalignments to categorize how perception misalignments are similar across cases. These categories provide a way to look at how misalignments were being expressed by all of the participants and provide insight to the ways they may be expressed in other teachers.

The second part of the discussion reports a different approach to misalignments in this study. The focus is comparing each of the twenty-one themes reported in the previous chapter with the other themes, regardless if they were individually found to be internally aligned or not. Misalignments in this sense are findings of contrary nature, where two or more themes oppose or disagree with each other. All of the cases and all of the perceptions are viewed together, and misalignments are delineated between ideas or themes expressed by the participants. The misalignments found between themes provide opportunities to look at how participants were incongruent in their perception descriptions.

In order to present the implications for this question, more details are included in the discussion than are provided in the discussions of the other three research questions. This was done because these details are not expressed in chapter five.

Categorizing the themes that are internal misaligned.

There are three categories of misalignments across the four cases created by comparing the internal theme misalignments found in each case. These misalignments are categorized as subtle issue-based misalignments, as well as the stronger context-based misalignments, and

comprehension-based misalignments. These misalignments are explained with examples provided in the paragraphs that follow.

Issue-based misalignments were found within the cases, wherein as the interview progressed, the participant's perception shifted because of an issue that emerged from the discussion. An example of this occurred when Jane alluded to EE being interdisciplinary but did not focus on during the discussion until she mentioned her frustration that other teachers did not understand EE to be interdisciplinary. From that point on, a more significant status was given for EE being interdisciplinary. .

Context-based misalignments arose when parts of EE perceptions misaligned or shifted as they were explored in relation to different contexts, such as the teacher's perception of an ideal classroom compared to the teacher's real classroom. For example, Heather's collaboration with colleagues was positive and proactive in her perception of ideal EE, but her descriptions shift to negative and reactionary when she talked about her perception of her EE reality, where she felt she could not collaborate due to contextual constraints from administrative mandates. Heather's constraints to EE teaching are similar to the barriers reported by teachers in studies by Robertson and Krugly-Smolka (1997), Middlestadt, et al. (1999), and Ernst (2007). Heather's perceptions of ideal EE and her EE teaching reality were incongruent with each other. While some misalignment between real and idealized EE is to be expected, the findings here suggest that this misalignment is significant and warrant further exploration.

Comprehension misalignment was the third type found in the data, occurring within and across the participants' perceptions, but most strongly within the perception of EE itself. For instance, as Paul tried to explain his perception of EE, he started with EE being interdisciplinary, but when asked to explain further he shifted the descriptions to be more squarely based in science. He shared his reasoning process during the shift, explaining how he came to new conclusions and pointing out where he was unsure in his own logic. As the exploration process

progressed, Paul went so far as to expand his descriptions back to a multidisciplinary EE. These comprehension misalignments in the participants' perceptions of EE provided an opportunity to look at the attributes the individuals were assigning to EE, and how those attributes were weighed against each other. Furthermore, these comprehension misalignments illustrate the developmental quality of participants' emerging understanding of EE as an idea.

The implication of the three types of misalignments within the cases, categorized here as issue-based, context-based, and comprehension-based, is striking in that teacher EE perceptions research has not attempted to parse out how teachers perceive EE as an academic idea without consideration of a context, how it is perceived as an ideal version of EE teaching in a context, as well as the perceived realities of teaching EE, and therefore have not delved into the complexity and possible misalignments existing in the teachers' perceptions. This was not problematic for this study, in the sense that participants were given opportunities to delve deeper into their own understanding, and realizations occurred as they explored their perceptions of EE. This may be considered an issue, however, when teachers are not given that opportunity for exploration, and the initial response, verbal or written, is not reflected on or viewed in multiple ways. The lack of exploration ignores the interplay of teachers' perceptions with the issues that the teachers confront, the contexts that they teach or desire to teach in, and the lack of clarity in the teachers' comprehension of EE. The complexity of the teachers' perception risks being minimized, and possibility misunderstood.

Misalignments found between themes.

The following section of research question four findings now turns to the misalignments between themes across all of the participants' perceptions. The misalignments can be positioned around three salient points: the perception of implementation of EE in the classroom, the relationship of EE to the school curriculum and the role of the teacher as EE practitioner.

First, the data was conflicting pertaining to how the participants perceived EE implementation in the classroom. Teachers were describing EE as integrated, going so far as stating that EE cannot be distinguished from the disciplines that make it up and cannot be pulled apart. This integrated perception of EE conflicts with their descriptions of taking distinct ‘pieces’ of EE, or EE related topics and interjecting them when they notice a related topic in the subject they are teaching. The piecemeal process of adding EE to other subjects is exacerbated by the structure and status of the school context within which the teachers are not allowed the flexibility nor given the resources to shift towards a more integrated approach to EE.

The second part of the discussion about EE perception misalignment is positioned around the relationship of EE to the school curriculum. Similar to the findings in Robertson and Krugly-Smolka (1997), even as the participants describe EE as interdisciplinary, they referred to EE as a part of science. When the participants then described their perceptions of EE teaching, they also used science lesson examples as EE in the classroom. For some of the participants, the struggle to delineate a relationship between an interdisciplinary variety of EE and science was obvious and they admitted that they changed their minds as they discussed their EE perceptions.

The interdisciplinary versus science misalignment was further complicated as the participants spoke of EE as personally inspired. Even as they described EE as related to science, they explained including science topics they considered as personally interesting or meaningful EE. This creates a misalignment that gives the impression EE is a personal choice based on what the teachers think would be good science, and can be viewed as putting the required science curriculum in opposition to what the teachers feel has a connection to the students. The result is a perception that EE is not based on a set of ideas or a part of a measurable program, but a set of inspired experiences that cannot be easily quantified. Interestingly, the one participant who did not consider EE personally inspired was also the most consistent in referring to EE as science by

grounding EE in the state standards. This showed an additional misalignment that occurred when EE and science are coupled with the standards in the participants' perceptions of reality. As the teachers related EE with science, the standards become the point of accountability that could be reconciled by the teachers. They were choosing what to include as EE topics, but feel that they have limited choices because of the requirements of the science standards.

The third part of the discussion about EE perception misalignment is positioned around the strategy of using general teaching practice to describe EE. While the participants in this study were able to speak to how they perceived EE, they were not given guidance on what themes to include in their descriptions. This drew out the nuances of how teachers are processing EE as a part of their teaching, both as an educational movement and in their teaching context. Some of the participants were candid in their struggle to understand what EE was, based in part not understanding how EE can be delineated. These teachers, in turn, were found trying to compensate for lack of EE understanding by using general teaching practice to describe their EE teaching. This compensation creates a tension in trying to parse out what teachers understand of EE and what is simply best practice in teaching. The literature theme found in the perception of EE teaching can be used as an example. The teachers are implementing a reading initiative across the school, so the impetus to incorporate literature into the entire curriculum is in place. Jane, who has the most significant and well-developed understanding of EE, incorporates the literature theme at a significant and embedded level in her EE perception. Paul, who voluntarily proclaimed he did not understand what EE was, and used his general teaching to supply explanations and themes for his EE perception, incorporates the literature theme to the same extent as Jane. When comparing the literature theme between the two participants, it is difficult, if not impossible to distinguish if they both understand what EE is in relationship to teaching with children's literature. The strategy of compensating with general teaching practice has a broader tension, in that the act of being able to describe a teaching strategy blurs the focus on the skills and

knowledge of EE that should be taught, such as problem solving skills and understanding the interconnectedness of natural and social systems.

In closing, the misalignments presented here illustrate the variability in a teacher's perceptions of EE. Teachers do not have completely organized and coherent perceptions regarding EE and this was highlighted in their descriptions of ideal settings and the reality in which they teach. Attention given to the contexts and the comprehension of ideas will help teachers better articulate how they perceive EE, and in turn improve their effectiveness as EE teachers and EE in the schools as a whole.

Implications Across All Four Questions

The implications of this study on participating teachers' perceptions of EE, ideal EE and the reality of teaching EE can be summarized into a threefold set of statements. First, efforts supporting the implementation of EE need to account for the context that exists in the school, and how the structure of the school interplays with the implementation. As the teachers describe their perception of EE teaching, they described it as a process of fitting in small EE topics into what they taught. They are looking for relationships between their knowledge of EE compared to their established curriculum, and would make pieces of EE fit into that curriculum. The 'making pieces fit' strategy is in stark contrast with the EE guideline documents and supporting literature that state EE should be fully integrated into the curriculum, across the grades, for a more cohesive program where knowledge and skills are developed over time. In addition, teachers in the research literature as well as the participants in this study cite barriers to incorporating EE into their teaching that come directly from the context that they are teaching in, such as school based initiatives, funding, time, state testing and academic standards. The EE guidelines are presently not realistic in the teachers' perception of reality for teaching EE, compounded by the state's inclusion of EE in a portion of the academic standards for science. This misaligned vision of EE

as a broad philosophy of teaching in the guidelines as opposed to an academic subject results in confusion and incongruent actions at both the classroom and state levels.

Second, future professional development will need to address both the personal connections of the teachers and the key concepts of EE in order for EE to be viewed as a viable and understandable educational movement within the schools. Attention to the duality in teachers' perceptions of EE in relation to their comfort level as well as understanding of EE skills and knowledge base will be needed to help teachers in their implementation of EE amid the other academic areas in their teaching. Professional development focusing on the nature of EE is needed, with time to both process the implications of that development for their EE teaching and to collaborate with colleagues.

Third, great care is needed when delineating individual teacher understanding and practice of EE. Teachers perceive they know more about how to teach EE than what to teach, yet even their understanding of how to teach EE is limited and the teachers compensate by depending on their general teaching practices. Assumptions about particular practices and descriptions related to teacher's perceptions of EE need to be examined in the context and voice of the teacher in order to truly understand how teachers perceive EE. There needs to be an awareness of the interpretations and application of terminology used during discussions in relationship to how EE is perceived by teachers, administrators, and researchers. Clarity in how terms are used and reasoning behind that use can be used to facilitate cohesive EE implementation across members of the community.

Suggestions for Further Study

By looking at how teachers perceive EE and how EE is perceived in the context of the teachers' ideal setting and their teaching reality, rich descriptions were created using the teachers' themes. The nuances in perception were better explored, differences in perception were captured,

and new findings were uncovered as the shift in context occurred between the three types of perceptions.

As a study focused on the perceptions of four individual teachers in one school, the intent is not to try to generalize commonalities in the cases to other teachers, but to shed light on the complexity that needs to be attended to when considering the teacher's perceptions of EE. There are several areas where further research would help in the understanding of that complexity. Additional case studies would not only add to the depth of possible understanding, but the breadth of understanding, expanding into additional teaching settings, and considering different situations and people. With that, an understanding of the range of themes included in perceptions of EE, as well as their strength and development, would expand and inform our understanding, allowing us to move forward with EE initiatives with more confidence.

A study of the terms used in EE is warranted. Teachers are using common themes to describe their perceptions, but are interpreting the themes with different meanings, both among themselves and compared to the interpretation of meaning by school administration, professional developers and researchers. An inventory of EE terms and the possible variations in contextual use would give a purposeful and overt way to look at how EE perceptions vary. This would help explore limitations to the current teacher EE perceptions research consistent use of predetermined sets of traits or factors when exploring participants' EE perceptions. How teachers interpret and perceive the terminology used in association with EE in general, and the within the themes specifically, would also shed light on how to present EE programs and training in a manner that would strengthen and clarify teachers' EE understanding. This would also further strengthen the communication between teachers, administrators, and EE researchers as efforts to improve EE teaching in the classroom continue.

This study did not focus on how the participants' developed the themes they used in or across perceptions. Theme development could be researched to better understand how themes

interplayed and contributed to the participants' EE perceptions, and better inform how training and program implementation can be delivered. An example of this interplay is the persistent teacher perception of EE being connected to science content, found both in this study and that of Robertson and Krugly-Smolska (1997). The science content connection is notable because the guidelines focus on variety of content areas, and the participants in this study also perceive EE as interdisciplinary. Further investigations of theme development would also inform efforts in curricular development. What has supported the occurrence of both of these the perceptions of EE simultaneously in individual teachers? What role has teacher training and EE standard implementation played?

This study purposely did not expand into the realms of practice associated with teachers' perceptions of EE. The next step would be to conduct research between teacher practice and teachers' complex perceptions. Teachers are making decisions pertaining to EE in their classrooms on a daily basis and acting on them. This would likely influence EE program implementation and training, and teacher innovation in EE practice over time. A related realm would be the relationship of EE with society and the environment more broadly, and how those relationships impact teacher perceptions of EE in the classroom.

As we move forward from this study, EE researchers, administrators and teachers need to be mindful of the complexity of EE perceptions. The participants in this study perceive EE in different ways and are at different levels of development in their understanding. This can cause misunderstandings in intent, meaning or importance of EE between teachers and administration, teachers and researchers, and among teachers. It was readily apparent that getting at the participants' perceptions is not as simple as asking teachers, "What is EE?", but understanding that there is an underlying complexity adds insights that had not been available in the past. Efforts to attend to that complexity will inform professional development and EE support, making teachers' efforts with EE result in more effective teaching.

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Appendix A: Teacher Selection Questionnaire (Electronic)

Elementary Teachers and Their Perceptions of Environmental Education in the Classroom

Thank you for participating in this short survey - there are eight questions. Your additional comments are also appreciated throughout the survey.

Please note: Questions # 1 and # 2 are related and will be looked at together. While close estimations of teaching time are appreciated, the difference between them is the focus of the survey.

1. When you think about the topics and skills you have taught throughout this school year, about how much teaching time would you estimate was spent on those that you would consider fitting under the category of environmental education?

- 0 - 3 hours
- 4 - 7 hours
- 8 - 11 hours
- 12 - 15 hours
- more than 15 hours (submit estimation below)

Amount if over 15 hours per year:

2. If you could have changed the total amount of teaching time spent on environmental education topics and skills in this past year, what would you estimate the new total amount of time to be?

- 0 - 3 hours
- 4 - 7 hours
- 8 - 11 hours
- 12 - 15 hours
- more than 15 hours (submit estimation below)

Amount if over 15 hours per year:

Comments:

New screen.

3. Using the rating scale below, how satisfied are you with the amount of time you spend teaching environmental education in a school year?

- I think should not be teaching environmental education (EE) during the school year.
- I think I should be teaching less EE than what I currently teach during the school year.
- I think I am teaching just the right amount of time on EE during the school year.
- I think I should be teaching slightly more EE during the school year.
- I think I should be teaching significantly more EE during the school year.

Comments:

New screen.

4. Make a list of concepts, skills and issues you taught in this school year that could be considered environmental education, and approximately how many hours you spend on each during the school year.

Environmental Education Concepts, Skills and Issues (with approximate hours per school year):

Comments:

New screen.

5. If you could teach what you thought should be in the curriculum, make a list the environmental education concepts, skills and issues you would have throughout the school year, and approximately how many hours you would spend on each during the school year.

Environmental Education Concepts, Skills and Issues (with approximate hours per school year):

Comments:

New screen.

6. Current Classroom Resources: The following is a partial list of possible resources and situations that could contribute to your ability to teach environmental education in your classroom. Select up to four factors that you feel have helped you teach environmental education in your classroom. You may provide examples and/or brief explanations in the comment area below.

One of my top four resources:

- Curriculum from the internet
- Curriculum in printed form (books, magazines)
- Curriculum in other forms
- Professional training within the school or district
- Professional training outside of the district
- Funding
- Student supplies
- Living classroom specimens
- Models
- Collaborations with people or groups within the school
- Collaborations with people or groups within the district
- Collaborations with people or groups outside the district
- The school building (inside)
- The school grounds (outside)
- The area around the school grounds (neighborhood)
- Locations that students are taken to (ie. Fieldtrip)
- Initiatives/directives within the school or district
- Personal interest
- Other (please explain in comments area)
- None

Comments:

New screen.

7. Would you consider participating in a sixty minute follow up interview?

Yes. Maybe. No.

Appendix B: One on One Interview

Opening: “With your permission, I will be recording this interview to expedite our discussion. I am looking to create a description; it is a qualitative research – so there are no right or wrong answers, it is to see what you are experiencing. I do compare your comments to other peoples’ comments, but it is to make a richer description of your experiences, such as you said this because for you it meant this. Feel free to add to anything you might have commented on in the survey during the interview since the interview stands by itself, the survey is used as a separate reference. If you need clarification on anything, just let me know. This interview is very open ended, so if you think something might help or add to the discussion, feel free to add it. We will use the 2008-09 school year as the frame of reference.”

(Semi-structured interview: The following is the framework of questions used during the interview, with additional probing questions throughout for clarification and detail.)

Teacher Background:

- Name, where you are working at, and describe of you, your classroom, etc. so I have a frame of reference and context of where you are at.
- Describe what you teach in your classroom.

Perceiving EE:

- Can you give me your description of “environmental education”?
- How would you describe to a fellow teacher what EE is?
- What influences your understanding of EE?

Ideal EE Practice:

- How would you describe your vision of the ideal EE situation?
- (ten years from now or the perfect situation) Would it be different than now and how?
- How would you describe your goals for EE?

Reality of EE practice:

- What is like for you as you to try to incorporate EE in your teaching? Describe the experience?
- What are the challenges to teaching EE?
- How do you deal with the challenges?

Dealing with Discrepancies:

- How do you cope/ view /ascertain your success with EE?
- Do you feel you are “doing enough”?
- Is your EE teaching having an impact? How can you tell?

Grounding/Defining EE:

- What resources do you use to understand and teach EE?
- Why do you teach EE?

Appendix C: The Tbilisi Declaration

2. The *goals* of environmental education are:
 - d. to foster clear awareness of, and concern about, economic, social, political, and ecological interdependence in urban and rural areas;
 - e. to provide every person with opportunities to acquire the knowledge, values, attitudes, commitment, and skills needed to protect and improve the environment;
 - f. to create new patterns of behavior of individuals, groups, and society as a whole towards the environment.

3. The categories of environmental education *objectives*:

Awareness—to help social groups and individuals acquire an awareness and sensitivity to the total environment and its allied problems.

Knowledge—to help social groups and individuals gain a variety of experience in, and acquire a basic understanding of, the environment and its associated problems.

Attitudes—to help social groups and individuals acquire a set of values and feelings of concern for the environment and the motivation for actively participating in environmental improvement and protection.

Skills—to help social groups and individuals acquire the skills for identifying and solving environmental problems.

Participation—to provide social groups and individuals with an opportunity to be actively involved at all levels in working toward resolution of environmental problems.

4. *Guiding principles* for environmental education:

Environmental education should:

 - consider the environment in its totality—natural and built, technological and social (economic, political, technological, cultural-historical, moral, aesthetic);
 - be a continuous lifelong process, beginning at the preschool level and continuing through all formal and non-formal stages;
 - be interdisciplinary in its approach, drawing on the specific content of each discipline in making possible a holistic and balanced perspective;
 - examine major environmental issues from local, national, regional, and international points of view so that students receive insights into environmental conditions in other geographical areas;
 - focus on current and potential environmental situations while taking into account the historical perspective;
 - promote the value and necessity of local, national, and international cooperation in the prevention and solution of environmental problems;

- explicitly consider environmental aspects in plans for development and growth;
- enable learners to have a role in planning their learning experiences and provide an opportunity for making decisions and accepting their consequences;
- relate environmental sensitivity, knowledge, problem-solving skills, and values clarification to every age, but with special emphasis on environmental sensitivity to the learner's own community in early years;
- help learners discover the symptoms and real causes of environmental problems;
- emphasize the complexity of environmental problems and thus the need to develop critical thinking and problem-solving skills;
- utilize diverse learning environments and a broad array of educational approaches to teaching, learning about and from the environment with due stress on practical activities and first-hand experience. (pages 26 – 27)

Appendix D: NAAEE National Guidelines for Learners (Pre K – 12) (2004)

Summary of the Excellence in Environmental Education: Guidelines for Learning (Pre K-12)

Strand 1- Questioning, Analysis and Interpretation Skills

- Questioning
- Designing Investigations
- Collecting information
- Evaluating accuracy and reliability
- Organizing information
- Working with models and simulations
- Drawing conclusions and developing explanations

Strand 2- Knowledge of Environmental Processes and Systems

2.1 The earth as a physical system

- Processes that shape the earth
- Changes in matter
- Energy

2.2 The living environment

- Organisms, populations, and communities
- Heredity and evolution
- Systems and connections
- Flow of matter and energy

2.3 Humans and their societies

- Individuals and groups
- Culture
- Political and economic systems
- Global connections
- Change and conflict

2.4 Environment and society

- Human/environment interactions
- Places
- Resources
- Technology
- Environmental Issues

Strand 3- Skills for Understanding and Addressing Environmental Issues

3.1 Skills for analyzing and investigating environmental issues

- Identifying and investigating issues
- Sorting out the consequences of issues
- Identifying and evaluating alternative solutions and courses of action
- Working with flexibility, creativity, and openness

3.2 Decision-making and citizenship skills

- Forming and evaluating personal views

- Evaluating the need for citizen action
 - Planning and taking action
 - Evaluating the results of actions
- Strand 4- Personal and Civic Responsibility
- Understanding societal values and principles
 - Recognizing citizen' rights and responsibilities
 - Recognizing efficacy
 - Accepting personal responsibility

Appendix E: State of Minnesota EE Guiding Documents

State EE plan concerning school EE programming, pre K – 12 learners, and teachers (2008)

Environmental education programming at the school location should consider the following:

- Programs that follow the developmentally appropriate environmental literacy benchmarks and concepts will build learning that grows throughout the school experience.
- Programs should be relevant to the educational/developmental levels of students in order to justify the endeavor.
- Programs need to be planned, developed, and delivered in a manner that includes all learners.
- Environmental education is more effective when integrated into existing traditional and nontraditional discipline arenas. (page 27)

As educators of preK-12 students, strive for the following outcomes in your environmental education efforts. By the end of twelfth grade:

A. PreK–12 students are able to ask questions, speculate, and hypothesize about the world around them, seek information, and develop answers to their questions.

Sample indicators of success:

- Students interpret and synthesize information about transportation issues and are able to develop and communicate explanations.
- Students research the topic of packaging to find the most up-to-date, relevant information about the factors concerning this issue.

B. PreK-12 students understand the process, systems, and interactions of natural and social systems as they relate to environmental quality and societal health.

Sample indicators of success:

- Students articulate through demonstrations, projects, testing, and/or case studies how social and natural systems affect and are affected by population growth.
- Using concept mapping, students are able to break down the issue of invasive species, revealing its many social and natural connections, causes, and effects.

C. PreK-12 students define, research, evaluate, and act on environmental issues.

Sample indicators of success:

- Students develop, implement, and assess an action plan designed to promote safe drinking water.
- Students review and evaluate various housing developments for their impacts on the land, water, and community.

D. PreK-12 students draw conclusions about what should be done to ensure environmental quality and act on those conclusions.

Sample indicators of success:

- Students are involved in individual and group discussions on wetlands; their protection, mitigation, and roles. The discussions result in subsequent activities concerning wetlands.
- Students take local and global news stories and relate these issues to environmental quality concerns.

E. PreK-12 students understand the complexity of natural and social systems and their interrelationships.

Sample indicators of success:

- Classes hold a debate on climate change and discuss possible actions as well as their benefits and consequences.
- Students demonstrate their understanding of impacts on both human and environmental systems due to development.

F. PreK-12 students demonstrate the knowledge, skills, attitudes, motivation, and commitment to work individually and collectively toward sustaining a healthy natural and social environment.

Sample indicators of success:

- Students identify and partake in grade-appropriate activities to improve or support an environmental situation, such as a neighborhood garden, degraded trails, or school indoor air quality.
- Students develop, offer, and conduct energy audits of local businesses.

G. PreK-12 students have the capacity to perceive and interpret the health of environmental and social systems and take appropriate action to maintain, restore, or improve the health of those systems.

Sample indicators of success:

- Through observation and analysis, students identify the status of local community neighborhoods and possible triggers for improvement or degradation.
- Students take active roles in community green space efforts, from the planning stages to implementation to monitoring. (page 30 – 31)

Minnesota State Scope and Sequence (page 10-11 , 2002)

Environmental Literacy Benchmarks

The Environmental Literacy Benchmarks define the scope of knowledge students should understand, at the end of each level, in order to become environmentally literate. These Benchmarks are sequenced so that new knowledge is constructed on prior knowledge. Successful EE programs will build upon these Benchmarks, using them to organize instruction and learning experiences for pre K to adult audiences.

Grades pre K - 2

- Social systems and natural systems are made of parts.

- Social systems and natural systems may not continue to function if some of their parts are missing.
- When the parts of social systems and natural systems are put together, they can do things they couldn't do by themselves.

Grades 3 - 5

- In social and natural systems that consist of many parts, the parts usually influence one another.
- Social and natural systems may not function as well if parts are missing, damaged, mismatched or misconnected.

Grades 6 - 8

- Social and natural systems can include processes as well as things.
- The output from a social or natural system can become the input to other parts of social and natural systems.
- Social and natural systems are connected to each other and to other larger or smaller systems.

Grades 9 – 12 (adult)

- The interaction of social and natural systems can create properties that are different from either individual system.
- Interaction between social and natural systems is defined by their boundaries, relation to other systems, and expected inputs and outputs.
- Feedback of output from some parts of a managed social or natural system can be used to bring it closer to desired results.
- It is not always possible to predict accurately the result of changing some part or connection between social and natural systems

Achieving the Benchmarks will require that students, be they age four or forty, understand the five Key Systems Concepts and their Supporting Concepts. These Key Systems Concepts, *parts and objects, interactions and relationships, subsystems, inputs and outputs, and change over time*, derived from the Environmental Literacy Benchmarks, are to be used as a guide to formulate questions about the social and natural systems being examined. The Supporting Concepts help clarify the application of each Benchmark to environmental lessons examining the interaction between social and natural systems.