CULTIVATING SUSTAINABILITY THROUGH

PARTICIPATORY ACTION RESEARCH: PLACE-BASED EDUCATION AND

COMMUNITY FOOD SYSTEMS IN INTERIOR ALASKA

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Abstract

As the environmental movement grows into a broader sustainability revolution, we must move beyond the traditional scope of environmental education to address social-ecological challenges through integrated education for sustainability. This research explores how place-based education can promote sustainability of a community food system in which feedbacks between production and consumption are integrated within a biocultural region. Through participatory action research, the project develops and demonstrates pedagogical components of sustainability that are applicable to formal and non-formal educational contexts. In this pedagogy, the purpose of sustainability education is to foster a community culture that will promote the emergence of sustainability in complex adaptive systems with social and ecological components.

This work is based at the Effie Kokrine Charter School (EKCS), a junior-senior high school in Fairbanks, Alaska that teaches with an Alaska Native approach, emphasizing place-based, experiential, and holistic education by utilizing students' natural and human communities to facilitate learning. The collaborative design of an Interior Alaska gardening curriculum serves as both an organizing framework for the project's fieldwork as well as an outcome of the research. The resultant gardening curriculum and the rationale behind its design demonstrate components of pedagogy for sustainability, including systems thinking, place-based and problem-based learning, eco-cultural literacy, eco-justice values, and appropriate assessment. Sustainability pedagogy within settings of higher education should also include action research. The structure of this dissertation research reflects how action research incorporates components of sustainability pedagogy. This pedagogical framework has theoretical and practical implications in multiple educational settings and indicates ways for our educational institutions to participate in the global sustainability revolution.

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Chapter 1: Introduction

1.1 Problem Statement

      This research is concerned with the practice and theory of sustainability education (Cloud, 2005; Scott & Gough, 2003; Stone & Barlow, 2005). Through participatory action research with teachers at a charter school in Interior Alaska, I collaboratively developed a place-based gardening curriculum as a way to explore pedagogy for sustainability. Place-based education constitutes a set of practices wherein educators use students' local environment and community as a teaching context (Sobel, 2004; Williams, 2003). The following research question draws together my practical and theoretical interests in sustainability education: *How can the design of a place-based gardening curriculum at an Interior Alaska Native charter school link youth to their communities and contribute to the sustainability of local food systems?* Within this question, I pursued the following research objectives:

- Conduct participatory action research to design gardening curriculum that is ecologically and culturally appropriate for Interior Alaska Native communities.
- Work with Alaska Native elder(s) to elucidate the historical role of gardening in Alaska Native communities and incorporate this knowledge into curriculum.
- Identify ways to engage students with their local food systems through place-based education.
- Illuminate where some of the biggest impacts can be made in promoting sustainability of local food systems through education.
- Cultivate sustainability pedagogy and associated practices that connect students with their natural and human communities in order to promote cultural and ecological sustainability.

      My initial research questions arose from my own experiences living and working in Interior Alaska, especially during a summer internship working for the Council of Athabascan Tribal Governments in Fort Yukon, Alaska, where I learned from Alaska Native cultures in a way that augmented my academic, Anglo-American background. My short time in this community gave me a deeper understanding of how to unite my interests in human-environment interactions with what I saw as real problems facing rural communities like Fort Yukon. My research has been driven in part by my desire to share this cross-cultural learning with others.   I have developed an appreciation of Native ways of knowing and living not only through direct

experiences working with Alaska Natives but also through reading extensively about other's experiences, both Native (e.g. Huntington & Rearden, 1993; Kawagley,1995; Luke, 1998; Mishler, 1995; Peter, 1992, 2001; Wallis, 2002) and non-Native (e.g. Beaver, 1955; Berger, 1985; Fast, 2002; McKennan, 1965; Nelson, 1983, 1986a, 1986b). I believe that Alaska Natives have much to teach Western culture about living appropriately within given social-ecological systems. An underlying assumption of this research is that the goals, content, and skills associated with place-based education for sustainability have much in common with Native American/Alaska Native and other indigenous forms of education. While it is not the purpose of this research to examine this assumption, I chose the research setting in part because of this assumed correlation.

Initially, the sustainability issues I was most interested in fell within the two realms of food systems and educational institutions. To further refine these interests, I conducted another internship working for a small farm in Fairbanks, which I describe in greater detail in Chapter 4. Hence, when I began my own dissertation research, I was initially more focused on the dynamics of food systems and viewed the design of educational practices linked to such systems as a window into deeper understanding of food systems in Interior Alaska. However, during the course of my research—in part due to the interests of my teacher collaborators—my focus gradually shifted primarily to education, while still remaining grounded in the context of local food systems. In addition, I was originally hesitant to utilize the concept of sustainability to frame my research. Over time it became clear that my work most closely related to that of others attempting to design educational practices that embrace and promote a paradigm of sustainability (Edwards, 2005; Scott & Gough, 2003). I intend for my research to contribute to what I see as a shift in mainstream perspectives needed to create more sustainable interdependent relationships between humans and our environments than what industrial societies and economies currently exhibit. Some would say that such a value-laden approach negates my contribution as a researcher and makes me untrustworthy as an educator. However, all researchers and educators have biases; we just vary in the extent to which we articulate them. If I state my objectives and biases clearly to my collaborators and my audiences, they can then determine whether they find my research useful, either practically, academically, or, ideally, both. Action researchers especially believe they have a responsibility to clarify their own biases and values (Herr & Anderson, 2005).

1.2 Research Design

       1.2.1 Participatory Action Research

       This dissertation falls within a transdisciplinary research framework known as participatory action research (Greenwood & Levin, 1998; Herr & Anderson, 2005; Kemmis & McTaggart, 2000; Reason & Bradbury, 2002). In such research, practical and theoretical goals are linked because the primary researcher prioritizes the inclusion of local collaborators in the research process—the "participatory" part of participatory action research. My primary collaborators were teachers at the Effie Kokrine Charter School in Fairbanks, Alaska. Over an eighteen-month period, I worked with teachers and their students to design a place-based gardening curriculum to fit within this charter school's unique educational philosophy based upon Alaska Native epistemology. Through this process of curriculum design—the "action" part of participatory action research—I also explored my theoretical interests in sustainability education and pedagogy, the subject of my concluding chapter. Participatory action research is a broad framework with much flexibility regarding the extent to which research is collaborative and applied, an issue I discuss in greater detail in Chapter 4. Generally, the research process is strongly influenced by real-world problems and the values and visions of multiple stakeholders involved in solving these problems. In addition, rather than approaching the research problem entirely as an objective observer or experimenter, the primary researcher takes a more participatory stance by collaborating with these stakeholders on multiple stages of the research process. For instance, research questions commonly come from real-world settings rather than from theoretical literature.

       1.2.2 Research Setting

       The Effie Kokrine Charter School (EKCS) has an Alaska Native focus in its curriculum and philosophy. In the proposal submitted to the State of Alaska Department of Education and the local school district (see Appendix C for portions of proposal), the mission for the school is stated as "to provide educational opportunities for students to succeed in the world by developing a strong sense of purpose, identity, place and community through cultural and academic empowerment." A charter school is part of a publicly-funded school system but has more flexibility in designing curriculum for meeting formal educational standards. While sustainability education has implications for all forms of education, including non-formal programs and parenting, this research is primarily focused on how formal education can be re-designed to provide students with skills necessary for creating sustainable communities. As such, this Alaska

Native-focused charter school has high potential for leading the way in both Native and non-Native communities towards designing place-based education strategies for sustainability; this research is a part of that vision. I also chose the research setting because of the opportunity to use gardening education as a way to examine the food system of Interior Alaska. By focusing on a tangible system such as where and how food moves from the land to a table, I can address some of the specific components of sustainability in the concrete rather than in the abstract. As such, this project serves as a demonstration project for similar food education initiatives in Interior Alaska.

1.2.3 Collaborators

I spent a great deal of time in the early stages of my research design identifying an organization and individuals with whom I could collaborate, a process I analyze in Chapter 4. Here, I identify the primary participants in my research. Once I had clarified that the EKCS would be a good match for my research interests, I submitted a proposal to the school's Academic Policy Committee (Appendix H) and they approved my participatory action research plan, thus becoming my primary collaborating organization. My closest individual collaborator was a specific teacher at the EKCS who welcomed me into her classroom to work with her and her students on various gardening projects. Over the 18 months I spent working at the school, I engaged two other key teacher collaborators whose input became crucial to the development of my project. However, many other stakeholders from the EKCS community participated in the project, including students, other teachers, and other EKCS staff and consultants. Finally, I also worked with Athabascan elder Howard Luke to conduct education and gardening activities at his traditional camp in Interior Alaska.

1.2.4 Interdisciplinary Nature of Research

I also characterize this action research as interdisciplinary. There is no simple definition of what constitutes interdisciplinary research, and so each researcher must reflect critically on her own research and arrive at a suitable characterization. Eigenbrode and O' Rourke (2007) use three different terms to describe research that they consider cross-disciplinary—*multidisciplinary, interdisciplinary*, and *transdisciplinary*, each with a different level of integration among disciplines. The least integrated version, multidisciplinary research relies upon a method-based approach in which researchers from different disciplines collaborate to merge their different methods. During the course of my PhD education, I became uncomfortable with a methods-based definition of interdisciplinarity. Quality research is driven by problem formulation and that the

appropriate methods used to address the problem follow secondarily, regardless of whether they are quantitative or qualitative methods. This problem-driven approach allows for more honest integration of different disciplines, and constitutes transdisciplinary research. If a researcher wants to use both qualitative and quantitative methods and data, then he must formulate a question that requires both approaches—a tall order for an individual research project like my own. My action research approach has resulted in the use of research methods that are traditionally considered qualitative, yet as I hope to demonstrate, action research and sustainability research go beyond these limited research methods. My approach to linking disparate frameworks concerning place-based education and food systems through a lens of sustainability reflects the fact that interdisciplinary research tends to have more breadth of perspective than depth of focus. The depth in my research can be found in the long and collaborative relationship with my research setting.

 1.2.5 Qualitative Data Collection and Analysis

 My specific research methods included action-oriented participant observation and semi-structured interviews that resulted in hundreds of pages of field notes and transcripts. In the nature of action research, my data analysis occurred in several stages during the course of the research, especially as I applied it to curriculum development. For instance, I incorporated into the emerging gardening curriculum both my own observations from working with students and observations shared with me during interviews with teachers. For the purposes of this dissertation, the coding of my qualitative data was influenced by methods associated with grounded theory (Charmaz, 2000) and critical theory (Carspecken, 1996). The resulting chapters resemble what Denzin and Lincoln (1994) call a *bricolage,* where the "*bricoleur* produces…a pieced-together, close-knit set of practices that provide solutions to a problem in a concrete situation." (p. 2). My dissertation constitutes a documentary narrative of the context and process leading to this curriculum and a justification for my design, which also leads to identifying several general components of sustainability pedagogy.

1.3 Defining Sustainability

 The proliferation of definitions of sustainability in recent decades has led some researchers and practitioners to eschew any formulation of a definition, while others simply list a multiplicity of relevant definitions (Bell & Morse, 2000). For the purposes of my research, I feel it is important to articulate my own understanding of sustainability because it has both evolved

from and framed the work I have done. The best-known definition of sustainability is not precisely about sustainability at all but rather about *sustainable development*. In 1992, the World Commission on Environment and Development (WCED) issued a statement created by the Brundtland Commission in which *sustainable development* was defined as "development that meets the needs of current generations without compromising the ability of future generations to meet their needs and aspirations" (WCED, 1987). Fifteen years later, literature abounds which examines the theory and practice of sustainable development and sustainability. Sustainability is popularly portrayed as having overlapping ecological, economic, and social spheres. Only when relevant problems in all three areas are addressed can sustainability be achieved.

In the academic world, disciplines that traditionally deal with environment, economy, and society and culture have each developed their own body of literature and research related to these areas. The lens through which one addresses sustainability depends in large part on her academic background. An ecologist may have a working definition of ecological sustainability, often based on the concept of *carrying capacity* (Bell & Morse, 2000). The framework of *resilience* has also emerged to address more complex dynamics than carrying capacity (Gunderson & Holling, 2002; Walker & Salt, 2006). Economic sustainability has been the domain of environmental economists, who distinguish between *weak sustainability*, in which economic growth is balanced with environmental protection, and *strong sustainability*, in which ecological sustainability always takes priority over the viability of economic institutions. (Barron, Perlack & Boland, 1998). The concept of sustainability in social sciences such as anthropology, sociology, and political science has been more ambiguous (Becker & Jahn, 1999). Frameworks such as *vulnerability*, used by geographers, and *adaptability*, used by anthropologists, each attempt to address factors related to sustainability (Janssen, Schoon, Ke & Borner, 2006). The identification of that which needs to be sustained in socio-cultural systems is always an academic and ideological challenge (Bell & Morse, 2000). Sustainability is a meaningless framework of analysis unless it is grounded in a specific time and place and used to address problems in a particular system. To meet this challenge, many researchers and planners use *sustainability indicators* that lay out the characteristics and qualities of a given system that can be used to gauge the sustainability or resilience of the system (Bell & Morse, 2000; Walker & Salt, 2006).

Becker and Jahn (1999) suggest that within social sciences, the concept of sustainability can serve as a "generator of problems" rather than as a unifying theory. Irvine and Kaplan (2001) discuss the concept of the "small experiment" in managing for sustainability. This problem-

based, quasi-experimental approach is perhaps the most accurate portrayal of how my own research addresses sustainability. However, I have been most interested in concepts of sustainability that transcend disciplinary approaches and draw from a systems perspective, such as those of Fritjof Capra (1996, 2002). During my research, I have grounded my broad interest in sustainability by applying it to a real-world context of food systems education. With all these diverse approaches to fostering sustainability in human systems in relation to their environments, many are taking up the task of incorporating these insights into educational practices. Therefore, my working definition of sustainability presented below is meant to provide a framework for my research goal of developing sustainability pedagogy.

I define sustainability as *the capacity of a complex adaptive system to maintain and nourish its primary functional characteristics over a long period of time. In the context of social-ecological systems, sustainability is a property that emerges when human activities occur within the appropriate spatial and temporal scales determined by the limits of their natural and cultural support systems. The role of sustainability education is to facilitate the creation, maintenance, and exchange of knowledge and skills necessary for human communities to live within these limits and hence maintain the conditions needed for sustainability of particular systems*. This definition is quite different from viewing sustainability as a state condition and relies on an understanding of complex systems.

1.4 Systems Thinking

Systems thinking permeates this dissertation in multiple and recurring ways. I review this concept extensively here in order to provide context for the rest of the document. One of the most crucial components of sustainability research is the incorporation of systems thinking in designing and implementing research. Just as with *sustainability*, there exists a myriad of definitions and understandings of a *system*, most of which are only useful once they are grounded in a specific context. Systems thinking has been embraced by a broad spectrum of researchers and writers, theorists and teachers, who are committed to creating and implementing more ecologically sustainable practices in Western mainstream culture. Many versions and adaptations of systems thinking have been suggested and explored for the purposes of research and education (Banathy, 1992; Bertalanffy, 1969; Checkland,1981; Checkland & Scholes, 1990; Flood, 2002; Senge, 1990), but I have been most influenced by the holistic systems approach postulated by writers such as Gregory Bateson (1972, 1979, 1991), Fritjof Capra (1996, 2002), and Donella

Meadows (1972, 1991, 1992, 2005). These writers are especially interested identifying underlying patterns and processes that exist in all living systems of which humans are a part. Bateson offers a general definition of a system as "a unit containing feedback structure and therefore competent to process information. There are ecological systems, social systems, and the individual organism *plus* the environment with which it interacts is itself a system" (1991, p. 260, italics in original).

There are several key characteristics of complex living systems, including boundaries, inputs and outputs, feedback, components, networks, and emergent properties. Rather than defining these terms in the abstract, it is more helpful to apply them to a specific system. Because we are interested in living systems, I follow Capra's (2002) lead in focusing on the fundamental unit of life—the cell—to elaborate on some of these systems properties. A cell has clear a *boundary*—the cellular membrane. This semi-permeable membrane allows for *inputs and outputs* of biological materials and of information encoded in chemical compounds exchanged between the cell and its environment. These inputs and outputs are what make an open system like a cell different from a closed system, in which the system boundary is not open to energy exchange with its environment. The exchange of information often constitutes *feedback* from the environment which allows the cell to learn and respond. Within the cell, there are multiple *components* that interact with one another to maintain the overarching system of which they are all a part. These components exist in a *network* with one another in which they too exchange materials and information internally. Finally, a cell demonstrates one of the most important aspects of a complex system—an *emergent property*, in this case the existence of life itself.

An emergent property exists when the whole of a system is greater than the sum of the parts, which is why systems cannot be explained solely through reductionist methods. None of the components of the cell are themselves "alive," but when they work together systemically, the property that we recognize as life emerges. Capra summarizes, "This is the key to the systemic definition of life: living networks continually create, or re-create, themselves by transforming or replacing their components" (2002, p. 10). Here he introduces the concept of autopoeisis, or "the self-generation of living networks" (p. 34). "The definition of a living system as an autopoietic network means that the phenomena of life has to be understood as a property of the system as a whole" (p. 10). Because of this ability to re-create components, a living system like a cell also has the ability to learn about and adapt to its environment. Again, Capra writes,

The defining characteristic of an autopoietic system is that it undergoes continual

structural changes while preserving its weblike pattern of organization…As a

living organism responds to environmental influences with structural changes,

these changes will in turn alter its future behavior. In other words, a structurally

coupled system is a learning system (p. 34).

Applying these systems characteristics to social systems is not a straightforward process. The type of system with which my research is concerned is a linked social-ecological system, a theoretical construct based upon the biological concept of an ecosystem that incorporates human social interactions as well (Berkes & Folke, 1998). Capra (2002) is trained in biophysical sciences and frames much of his discussion in terms of biological systems, yet he explores how systems patterns, processes, and structures in natural systems also exist in social systems. His book sketches out "a unified conceptual framework" that "integrates life's biological, cognitive, and social dimensions" (p. xv). If a cell is the fundamental unit of living systems, then an individual human could be considered the fundamental unit of social systems. At these scales, the physical boundary of the system is clear—the cell membrane or the human skin, both of which are semi-permeable in both a material and an informational sense. However, in both biological and social systems, determining boundaries in more complex systems becomes more challenging. For instance, there are multiple definitions of what constitutes an ecosystem (Golley, 1993), much less a linked social-ecological system. Biophysical systems tend to be nested systems, such that systems that exist at smaller scales can also be components of larger-scale systems. A cell is a system but is also a component of an organ, which is a component of an organism, which is a member of an ecological community, which interacts with other communities to form an ecosystem. This nested hierarchy can be followed all the way out to the scale of the entire universe. In contrast, social systems do not nest as neatly, so that an individual human may be a component in a number of overlapping systems. For instance, he could be a citizen of a political state but also a member of a cultural community. These two types of systems—a state and a culture—are multidimensional. They do not fit one inside another and do not have clear boundaries.

This challenge of determining appropriate boundaries at various scales is complicated by the existence of *meaning* within social systems. Capra explains that when we try to apply his definition of living systems to social systems, "we immediately come up against a bewildering multitude of phenomena—rules of behavior, values, intentions, goals, strategies, designs, power

relations—that…are essential to human social life" (2002, p. 73). These phenomena are all underpinned by the *meaning* that humans apply to our worlds. Of course, the primary way that we communicate meaning is through language. It is the existence of meaning that necessitates applying a broader concept of living systems to those that include humans than simply figuring us in as another material component of such systems.

Rather than reviewing the multitudinous ways in which social research has tried to make use of systems thinking, I the idea of complex adaptive systems (CAS) in the study of learning and change in human organizations (Eoyang, 2001). A CAS is as "a collection of semi-autonomous agents whose interactions generate system-wide patterns" (p. vii). Agents are people operating together within a CAS, which has three important characteristics—containers, exchanges, and differences. Some of these characteristics are analogous to those of living systems presented above. For instance, containers are system components with distinct boundaries and exchanges constitute and internal network. However, *differences* does not have a clear analogy within biological system properties because *differences* refer to *meanings*. When these three characteristics are operating in a proper balance within an organization, the property of self-organization can emerge, allowing the organization to function as a complete unit that can learn and adapt and grow. I found this concept of a CAS especially useful in helping me understand the collaborative dynamics of action research explored in Chapter 4. However, I extend the concept of a CAS to include ecological components as well as human agents. Finally, for the purposes of both action research and designing curriculum, I find Donella Meadows' (2005) tips for "Dancing with Systems" to be helpful.

1. Get the beat.
2. Listen to the wisdom of the system.
3. Expose your mental models to the open air.
4. Stay humble. Stay a learner.
5. Honor and protect information.
6. Locate responsibility in the system.
7. Make feedback policies for feedback systems.
8. Pay attention to what is important, not just what is quantifiable.
9. Go for the good of the whole.
10. Expand time horizons.
11. Expand thought horizons.

12. Expand the boundary of caring.

13. Celebrate complexity.

14. Hold fast to the goal of goodness (p. 193-4).

1.5 Curriculum and Pedagogy

Finally, I address here the heart of what this action research on place-based education became—curriculum design. I did not begin this project intending to write curriculum. My goals as stated in my initial research proposals were to "integrate gardening" into the existing charter school curriculum. Simply "integrating" an activity such as gardening seemed more realistic than "designing" curriculum. But several developments convinced me that writing curriculum was the best focus for my research, which I discuss in Chapter 5. Along the way I developed my own understanding of curriculum, which includes not only content but also a rationale, as referred to in the following:

> Any definition of curriculum, if it is to be practically effective and productive, must offer much more than a statement about the knowledge-content or merely the subjects which schooling is to 'teach' or transmit. It must go far beyond this to an explanation, and indeed a justification, of the purposes of such transmission and an exploration of the effects that exposure to such knowledge and such subjects is likely to have, or is intended to have, on its recipients—indeed it is from these deeper concerns…that any curriculum planning worthy of the name must start (Kelly, 1999: 3).

Curriculum also must address educational processes. Because process really falls within the domain of the teacher implementing the curriculum, the final author of a curriculum is the teacher. Hence, this dissertation reflects not only a suggested content of a gardening curriculum and a process for teaching it, but also the rationale behind it, all developed in a collaborative way. (The complete curriculum is presented in Appendix A.)

There are several reasons why curriculum design became a useful way to focus this participatory action research. The first concerns one of the most important goals of action research—the production of local knowledge to help address needs of local collaborators. In my research setting, working with a new charter school, curriculum is indeed one of the local needs, as it is with most teachers and schools everywhere. This school particularly wants place-based curriculum that is culturally appropriate. Also, the content of this curriculum concerns

knowledge about local food systems, including how to grow food appropriately and sustainably in the Interior Alaska bioregion. However, part of the challenge of curriculum-writing is striking a good balance between specificity and flexibility. Ideally, this will be a curriculum that is not only tailored to fit well with the goals and calendar of the EKCS but also can be adapted and used in schools throughout Alaska, especially rural Alaska. Second, again in accordance with action research, I discovered that the process of curriculum design offered a constructive research protocol for many steps of the research process. Focusing on the design of a curriculum helped me identify who the appropriate collaborators and participants in the research were and guided me in what kinds of questions I needed to ask or what kind of activities to test with students. When it came time to analyze my qualitative data, I struggled to find appropriate categories and labels for coding my data until I realized that the emerging framework for a gardening curriculum provided an appropriate structure for coding my data.

Designing curriculum kept my research grounded in practice but also allowed me to explore my more theoretical research interests, again addressing one of the goals of action research—to unite practice and theory. Collaborative curriculum design offered a window for exploring the question of how place-based education can foster the emergence of more sustainable patterns of community life. What we teach our youth both formally and informally is a reflection of our own cultural values; therefore, designing place-based gardening curriculum is a productive venue for exploring human-environment interactions. If I am advocating teaching students different kinds of knowledge with a different process, collaboratively designing curriculum is a natural way to "dance with the system" (Meadows, 2005) in order to create a realistic path for change.

In conclusion, this participatory action research merges the theory of sustainability with the practice of curriculum design. While the EKCS gardening curriculum is the practical outcome of this process, there are theoretical implications of this research as well. I apply the theoretical insights from this collaborative curriculum design to the emergence of what I call *sustainability pedagogy*. *Pedagogy* refers to the practice of educating. It comes from Greek, meaning "to lead a child." The goal of sustainability pedagogy is to provide educators with a framework for designing and implementing their teaching practices in such a way as to cultivate sustainability. The process of creating curriculum led to the emergence of five components of this suggested pedagogy—systems thinking, place-based and problem-based education,

ecological literacy and cultural competence, eco-justice values, and appropriate assessment, with a sixth added for higher education contexts—participatory action research.

1.6 Outline of Chapters

The chapters of this dissertation roughly reflect the traditional layout of qualitative research chapters, including background, literature review, methods, results, and discussion. However, their organization is influenced by themes that emerged from the research as well. Action research is characterized by repeating research cycles; similarly, the dissertation chapters are not entirely linear or chronological but revolve around repeating themes. Chapter 2 provides background to the study, describing the bioregion of Interior Alaska as an integrated social-ecological system and elaborating on sustainability challenges facing Interior Alaska communities. The focus is on problems in food systems and educational practices that relate to ecological and cultural sustainability and that the design of gardening curriculum is meant to address. Chapter 3 provides a review of several models or approaches used by other practitioners and/or researchers to address similar challenges in other regions, but this review is not limited to conventional literature review. It explores place-based education, cross-cultural education, and food system education as various approaches to education for sustainability. Because action research generally does not follow a linear process but rather cycles among various stages of the research process, separating methods from results from analysis is somewhat artificial. Methods often change based on an ongoing analysis of results and sometimes on changing research objectives. For this reason, Chapters 4 and 5 include both methods and data analysis. Chapter 4 focuses on participatory processes in the research and the lessons learned regarding effective collaboration. This chapter includes an analysis of an internship conducted as a pilot study before entering collaboration with the Effie Kokrine Charter School, which constitutes the remaining bulk of the chapter. Chapter 5 deals with field methods and results associated with the curriculum design process. As an important complement to this chapter, a draft of the resultant gardening curriculum is presented in Appendix A. Finally, Chapter 6 presents the research themes that cycle throughout the preceding chapters by synthesizing them into an emergent pedagogy for sustainability.

Chapter 2: Sustainability Challenges in Interior Alaska:
Integrated Social-Ecological Problems Concerning Food Systems and Educational Practices

This chapter provides context and background for the sustainability challenges in Interior Alaska that this action research is designed to address. Applying the concept of sustainability to this particular place has identified some ecological and cultural challenges, specifically within the arenas of food systems and educational practices and institutions. If Interior Alaska is viewed as a complex adaptive system, and this research concerns fostering appropriate interactions within such a system in order to allow for the emergence of sustainability, then the guiding research question is how formal education can be designed to promote healthy relationships between people and the land. In the following background, the focus is on tracing the development of particular challenges to sustainability involving the need for communities to maintain healthy relationships with the land, primarily regarding procurement of food. The unifying thread in the ensuing background material is the assumption that changes in food systems and in educational practices in Interior Alaska over the last 150 years parallel each other and have led to many of current challenges to maintaining healthy relationships with land. These are integrated problems that require integrated solutions.

For a few reasons, the ensuing discussion focuses primarily on the history and context of Native cultures of Interior Alaska and secondarily on the way the arrival and establishment of non-Native cultures affected the region. The charter school with which I collaborated has an Alaska Native focus to its curriculum and overall philosophy and in fact emerged in part from the historical context described below. Of course, I requested to work with this school in part because of its Native focus. I was interested in exploring the overlaps between Native approaches to education and education for sustainability, using gardens and food as the vehicle to explore these overlaps. In this exploration, I operated with the assumption that Alaska Native cultures have been more integrated with their local environments at appropriate spatial and temporal scales than the immigrant Euro-American Alaska cultures have been. If these integrated challenges to sustainability require integrated approaches, then perhaps something can be learned from the ways in which Alaska Native cultures educated their children about making a living from the land, lessons that can be applied to current sustainability education efforts within both Native and non-Native cultures.

2.1 Interior Alaska Biocultural Region

      Place serves as a primary organizing concept throughout this project. The place under consideration is the bioregion of Interior Alaska. As an action researcher and educator, my own knowledge of place is fundamental to effective problem-solving and educating. In the spirit of Wes Jackson's (1994) phrase, "becoming native to this place," the place where I conducted this work is also the place where I live. Much of this background information comes from my own experiences as a resident of Interior Alaska. This project has been only one of many activities that have given me insights and perspectives on the place I have called home for eight years. Other experiences include working in the tourist industry, living in a rural Athabascan community while interning for a Native organization, managing the office of an environmental organization, studying at the University of Alaska Fairbanks, traveling by foot, car, bike, canoe, and plane around the region, and participating in community life in a variety of other ways. I bring all of these perspectives to bear on my work. I begin by describing the biocultural region of Interior Alaska before focusing specifically on food and educational systems then concluding with a discussion of specific challenges to regional sustainability.

      One way to conceptualize a given geographical region is as a linked social-ecological system (Berkes & Folke, 1998). The three main categories used to describe a social-ecological system typically include culture, economy, and ecology. The emphasis in this construction is on the links between humans and their natural environments. In the following sections, I will discuss two specific systems that illuminate some of these links that are most relevant to the curriculum design in question, specifically, the food system and the education system. But first, in this section, I will provide background material on the social-ecological system of concern, the Interior Alaska region. As the painter of this picture of Interior Alaska, my objectives are to delineate the region of relevance to the Effie Kokrine Charter School and its gardening curriculum. From an ecological perspective, the most important considerations are the ones that determine the viability of small-scale agriculture, namely soil and climate characteristics. However, there are extensive microclimates throughout the Interior, and so these characteristics do not lend themselves to clear boundaries either. So I turn to a concept introduced by anthropologist Alfred Kroeber (1953) and further developed by later writers—the biocultural region, or *bioregion* (Sale, 2000; Snyder, 1990; Thayer, 2003). A bioregion is primarily an ecologically-bounded region, but further characterized by the cultural groups indigenous to the area. Kroeber observed that indigenous cultures throughout North America were tightly tied to

these ecological regions, such that ecological boundaries often closely correlated with boundaries between distinct cultural and/or language groups. I apply this concept to Interior Alaska as a biocultural region with integrated ecological and cultural components. The Interior biocultural region is composed of Athabascan cultures integrated with the boreal forest biome (Figures 2.1 and 2.2).

Interior Alaska is a phrase that is used often enough in popular media that the majority of Alaska residents have no problem conjuring up a geographical image of the region in question. Interior Alaska is exactly that—the region in the interior of the state (Thorson, 1986). The contemporary economic center of Interior Alaska is one of the state's three urban areas, Fairbanks. With a population of about 30,000 in the city proper and a regional population of about 80,000, Fairbanks was founded by Euro-Americans in 1903 on the banks of the Chena River as a fur and gold trading post (Cole, 1999). Fairbanks' economy is often characterized as boom and bust, dependent on the global supply and demand for Alaska's resources, the last boom in the 1970's with the construction of the Trans-Alaska Pipeline (ibid). Fairbanks' economy is still largely dependent on the oil industry, but it has other large employers such as the military and the University of Alaska. Beyond Fairbanks, there are major highways leading south, east, and north, with the region's other large communities generally situated on these roads. There are far more villages in the bush, off the road system. While Fairbanks is considered the only urban area in the Interior and hence has demographic characteristics unique from bush villages, urban and rural areas of Interior Alaska are inextricably linked economically, culturally, and ecologically (Huskey, Berman & Hill, 2004). For instance, Fairbanks has a high proportion of Alaska Native residents who have home ties to rural villages. For these residents, many of the same economic, cultural, educational and ecological issues exist in both places, just at different scales.

There are distinct climatic and ecological differences that distinguish Interior Alaska from the other regions of the state. The Interior is not like the more temperate but mountainous coast of South Central Alaska, which encompasses Anchorage, or like the Seward Peninsula, on which Nome can be found. While these places are cold, the actual air temperature in the winter rarely gets as cold as in the Interior, thanks to the tempering effect of the ocean. In the summer, the Interior often has the hottest temperatures in the state for the same reason. Similarly, the Interior is literally and figuratively far from the rainforest carpeting the panhandle of Southeast Alaska. And while the climate in the Interior may have much in common with the arctic of

Alaska's North Slope, it is technically sub-arctic, lying mostly south of the Arctic Circle, and it is part of the boreal forest biome rather than the arctic tundra.
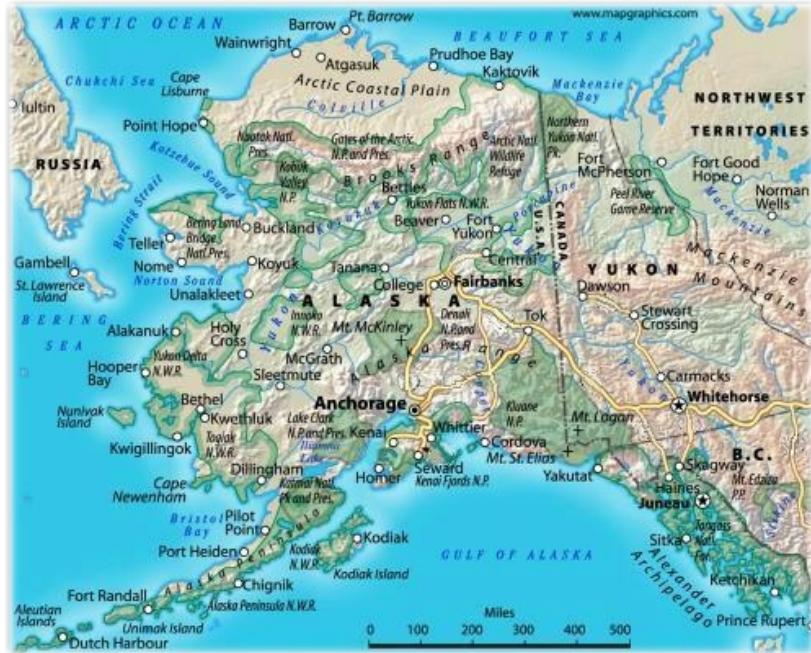
Figure 2.1 Physical Map of Alaska
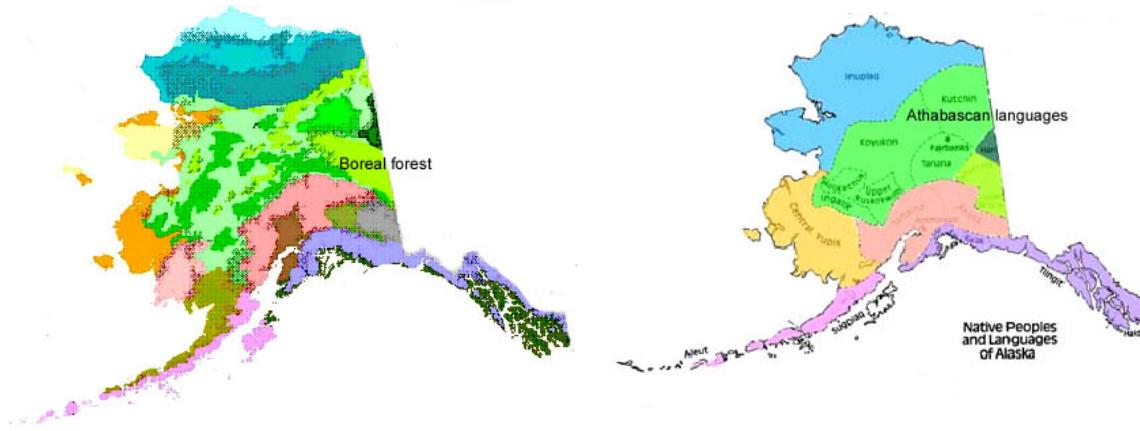
Figure 2.2 Vegetation and Language Maps of Alaska. The green areas of both of these maps portray the Interior Alaska biocultural region. The map on the left is a vegetation map of Alaska (Gallant, et al, 1995), and the green area is the boreal forest ecoregion. The map on the right is a language map of Alaska (based on ANLC, 1982), and the green area depicts Athabascan languages. The overlap between boreal forest and Athabascan cultures is clear.

Clarifying boundaries beyond these broad brush strokes depends in large part on the perspective of the painter. To the north, there are a couple of possibilities. The Arctic Circle technically delimits the southern boundary of the Arctic, and hence the northern boundary of the sub-Arctic, but the North Slope is usually thought to begin north of that, at the east-to-west crest of the Brooks Range. The southern boundary of the Interior is clearer: it is the Alaska Range, which also runs roughly east-west. Traveling north or south from Fairbanks, one can use these mountain ranges as definite indicators that one has left the Interior. These mountains also clearly delineate watershed boundaries. All of Interior Alaska lies within the watersheds of the Yukon and Tanana Rivers, winding their way through the heart of the region, from a network of tributaries, channels, and sloughs across the vast watershed. However, there are also ecological clues to alert the observant traveler that one of these borders has been or is being crossed. The vegetation is the main clue. The boreal forest is patchy—the four or five primary tree species are not evenly distributed across the landscape. Rather, there are vast sweeps of black spruce, the climax forest of the region, interspersed by stands of mixed birch and aspen on south-facing slopes or in young forests and by strips of tall white spruce along rivers and streams and in other places with favorable soils. When traveling north, the forest first becomes entirely black spruce with little of anything else, and then the spruce gets smaller and spindlier until it disappears altogether when one enters the Arctic tundra. Discerning the southern border takes a keener eye. The black spruce becomes less common as more and larger hardwoods, not just birch and aspen but also including balsam poplars and cottonwoods, line the lowlands approaching the Alaska Range.

As for the eastern and western borders of Interior Alaska, the former is much more clearly delineated than the latter because it is a political boundary rather than a physical or ecological one. The boreal forest extends for thousands of miles east out of Alaska across Canada, but Interior Alaska stops at the Canadian border. The western border is perhaps the most sketchy for the average Alaskan to identify, perhaps because there are no highways extending west from the heart of the Interior. The main modes of transportation to the western areas are plane or boat. But again, air or river travelers witness the boreal forest gradually fade out into tundra, this time the coastal tundra of the Bering Sea. There is no large mountain range demarcating the beginning of the coastal zone, although the rolling hills of the Interior do give way to a vast plain. Likewise, there is no clear watershed boundary, as the Yukon River continues out of the Interior to the coast.

Interior Alaska was traditionally occupied by multiple groups speaking different dialects of the Athabascan language family (Fast, 2002; Mishler & Simeone, 2004, 2006; Nelson, 1983, 1986a, 1986b; Peter, 2001; Schneider, 1976, 1986). They were and are distinct from the coastal Eskimo cultures of Alaska, such as the Yup'ik of the west and the Inupiaq of the north. Not coincidentally, the Alaska Native language map (Figure 2.2) shows the Athabascan language family closely fitting within the region of the boreal forest biome of Interior Alaska. But like ecological boundaries, these cultural boundaries are not well-defined either. There are many contemporary villages on the perimeter of the Interior that are a mix of Athabascan and another culture, as with Russian Mission on the lower Yukon River, which is about half Athabascan and half Yup'ik. On the other hand, Arctic Village, another outlier, is almost entirely Athabascan even though it lies far north of the Arctic Circle and well within the Brooks Range Mountains. In addition, as with the many ecological variations within the Interior, there are cultural variations as well. The Athabascan language family is further divided into a variety of subgroups such as Koyukon, Dene'aina, and Gwich'in Athabascan, and these subgroups often lie within distinct geographical regions defined by different watersheds.

Not being an Alaska Native—or even a Native Alaskan—myself, I am hesitant to claim a voice of authority in describing a culture which I have been getting to know over only the last four years. However, during the two summer months I spent living in a primarily Gwich'in Athabascan village, I gained a deep appreciation for the connection with the land that many villagers have. I felt an affinity with and empathy for a group of people much different from the ones I grew up with and the ones I live most of my life with in Fairbanks. While I learned much in my time there through the generosity of my hosts, I depend here in large part upon the work and writings of others to interpret Athabascan cultures. The best voices are those of Athabascans themselves, but for a non-Native person, the work of anthropologist Richard Nelson (1983, 1986a, 1986b) on Athabascan cultures is perhaps the most accessible for portraying the relationship between these cultures and their natural environments.

My analysis of components of the Interior Alaska biocultural region rests on a fundamental assumption that Alaska Native peoples prior to the incursion of non-Native cultures in the region were well-integrated with their environments. The depth of knowledge that Athabascans prior to modern times had regarding their environment was of an intimacy far beyond that of contemporary American cultures. Nelson (1983) shares multiple examples of the traditional knowledge that Gwich'in people had of the physical and biological characteristics of

their places and the ecological relationships between themselves and their environments—what is referred to as *traditional ecological knowledge* in academic literature (Berkes, 1999; Huntington, 2000). For instance, Nelson writes,

> Another important dimension of Athabaskan environmental knowledge focuses on ecology, the interrelationships among elements of nature and the changes that affect them over time…Watching these changes over the course of generations, Athabaskans have come to understand the many aspects of animal population dynamics… If there are no major floods for many years, fish populations in the lakes will decline, but elders say that their numbers will increase dramatically after high water brings the lakes a flush of nutrients (Nelson, 1983, p. 44).

I sensed some of this depth of knowledge from time I spent boating on the Yukon River with a Gwich'in man, who was, in his words, an "FBI"—full-blooded Indian. He was constantly watching the river, the banks, the sky. While chatty at other times, when on the river he had no energy to spare for unnecessary words because all of his attention was directed at observing. He told me about a time when he guided some non-local guests on an overnight river trip, and he was surprised when they got to camp and they had not packed dinner because they thought he would be feeding them. So he put together an impromptu meal of caribou meat from a nearby herd, Indian potatoes from tubers growing in the forest, and wild onions from the river bank. He was amused at his creative meal, and I was amazed at the unplanned ease with which he could feed himself and his guests from his immediate surroundings.

This knowledge and attention to detail came from being far more dependent than residents of urban Alaska communities on the local environment for livelihood. Because of the erosion of economic relationships between contemporary Athabascans and their immediate environments, much of this knowledge is being lost. The magnitude of the loss is only beginning to be understood by non-Native academics, politicians, and other Western wielders of knowledge and power. However, much of life in the close to 50 rural villages in Interior Alaska still revolves around obtaining natural resources for local use from the regional environment. Again, as Nelson eloquently explains,

> Someone casually visiting an Athabaskan village might conclude that the traditional culture and lifeway have largely faded—judging by the comfortable housing, assorted modern implements, and ease with which people can talk about an outsider's interests. But inside the people's houses and in the wildlands

> beyond the village, an older pattern sustains itself today. This is the life blood of
> an Athabaskan community—the ways that people relate to each other, view the
> world around them, and harvest resources from their natural environment
> (Nelson 1983, p. 54).

These resources are the resources of the boreal forest, including the various tree species already mentioned as well as the terrestrial animals associated with the forest, such as moose, caribou, beaver, porcupine, grouse, ptarmigan, waterfowl, and many types of rodents, and the many fish species living in rivers and lakes, especially salmon, whitefish, and pike. While all the necessities of traditional life, including clothing, shelter, and fuel, as well as the types of things normally considered to be amenities—i.e. decorative clothing and house wares—came from the boreal forest, in this background I am concerned largely with food because of its relevance to gardening curriculum.

In the following two sections, I examine two specific components of the social-ecological system of Interior Alaska—the food system and the education system, including the influences of Western cultures. I first present a framework for examining these systems, followed by a picture of what traditional Athabascan food and education systems looked like, a discussion of how they have adapted in the face of rapid cultural change to resemble what they are today, and a description of some of the problems that have resulted from this change. I will then conclude with examples of recent and ongoing attempts in both food and education arenas to rectify some of these problems. In looking for solutions, I am especially interested in bottom-up, small-scale efforts. In addition to assuming that Native cultures were more integrated with their environments, I suggest that the process of imposing a Western education system upon Athabascan peoples contributed to the disintegration of healthy food systems in Interior Alaska, a thesis I explore in the next section.

2.2 Food Systems in Interior Alaska

There are several ways to conceptualize what is meant by a food system. Before discussing the characteristics of the food systems of Interior Alaska, I briefly outline some of the theoretical frameworks that frame this discussion. The concept of a community food system (CFS) is gaining currency among researchers and community organizers (Feenstra, 2002; Pelletier, et al., 1999, 2000; Sundkvist, Milestad & Jansson, 2005). As a theoretical framework, it draws from many other bodies of thought, including systems theory and thinking (Bateson, 1972,

Bertalanffy, 1969; Checkland, 1981, 1990; Flood, 2002, Meadows, 2005), ecosystem ecology (Golley, 1993; Moran, 1990), bioregionalism (Sale, 2000; Thayer, 2003), ecological economics (Costanza, 1991), and sustainable agriculture (Altieri, 1987; Berry 1977, 1987). Food system researchers and extension agents at Cornell University offer the following description of food systems:

> The food system includes all processes involved in keeping us fed: growing, harvesting, processing, packaging, transporting, marketing, consuming and disposing of food. It also includes the inputs needed and outputs generated at each step. The food system operates within and is influenced by social, economic and natural environments. Each step is also dependent on human resources that provide labor, research and education…
>
> (http://www.cfap.org/afs_temp3.cfm?topicID=229; Accessed April 22, 2006).

I begin with this definition in part because these researchers go on to describe a way to embed this abstract concept of a food system in a particular geo-political location, in this case a community.

> A community food system is promoted as an ideal—a food system in which food production, processing, distribution and consumption are integrated to enhance the environmental, economic, social and nutritional health of a particular geographic location. A community food system can refer to a relatively small area, such as a neighborhood, or progressively larger areas—towns, cities, counties, regions, or bioregions. The concept of community food systems is sometimes used interchangeably with "local" or "regional" food systems, but by including the word "community" there is an emphasis on strengthening (or developing) the relationships between all components of the food system. This reflects a prescriptive approach to building a food system, one that holds sustainability—economic, environmental and social—as a long-term goal toward which a community strives (http://www.cfap.org/afs_temp3.cfm?topicID=229; Accessed April 22, 2006).

This understanding of a community food system (CFS) aptly frames my research regarding the role of school gardening in improving a CFS and the utility of the CFS for strengthening sustainability education through curriculum design. However, there are many ways to describe this goal of improving a food system. In the definition above, the words *strengthening*,

developing, and *sustainability* are used without being well-defined. Another more focused term often used within CFS research is food *security*, "the ability of a community to ensure that all its members have adequate access to healthful and acceptable food through environmentally sustainable, economically viable, and socially desirable production, processing, and distribution systems" (Pelletier, et al., 1999, p. 401). Finally, another related concept is *health* of a food system—a holistic concept that can be monitored with both quantitative and qualitative indicators—which provides a link to the need for a CFS to maintain the health of its members, nutritionally and psychologically.

Another research team attributes their understanding of sustainable food systems to a concept of sustainable development offered by Berkes and Folke (1998), in which "'sustainability implies not challenging ecological thresholds on temporal and spatial scales that will negatively affect ecological systems and social systems' combined with the objective to provide all global citizens with an adequate and sufficient diet—now and in the future" (Sundkvist, et al., 2005, p. 225). They suggest that a necessary way to pursue sustainable food systems is by tightening feedback loops within such systems. Indeed, a focus on sustainability correlates with a movement in international food production known as sustainable agriculture, or "an environmentally sound productive, economically viable, and socially desirable agriculture" which offers an alternative to conventional agriculture that tends to rely heavily on exogenous, synthetic inputs, fossil fuels and environmentally exploitative techniques (Schaller, 1993, p. 89). CFS researchers often include sustainable agriculture as a requisite component of community food systems (Feenstra 2002; Sundkvist 2005).

Finally, another organizing concept that relates well to Kroeber's biocultural region is the concept of a *foodshed* (Kloppenburg, Hendrickson & Stevenson, 1996; Loring, 2007). A foodshed is meant to be analogous to a watershed, but the material that "flows" in a particular region is food rather than water. It is a way to ground the abstract notion of a food system in a specific place. They further explain,

> [T]he replacement of "water" with "food" does something very
> important: it connects the cultural ("food") to the natural (" . . . shed").
> The term "foodshed" thus becomes a unifying and organizing metaphor
> for conceptual development that starts from a premise of the unity of
> place and people, of nature and society (p. 34).

Much like the Cornell CFS researchers, Kloppenburg suggests this framework as a way to analyze and improve specific foodsheds. After detailing the many problems with the commodification of food in the global food system, the authors suggest five principles that can be used to guide the improvement of a foodshed: a "moral economy" focused on feeding people rather than making a profit, a "commensal community" that builds direct links among producers and consumers of food, a process of "self-protection, secession, and succession" that will allow for the evolution of appropriate food systems separate from the pressures of the existing global food system, "proximity" that allows for food systems to be embedded in particular places, and using "nature as measure" in designing place-appropriate methods of food production and distribution. Finally, Kloppenburg suggests that these principles be used in foodshed analysis, an examination of the components of global and local food systems that constitute the foodshed.

While the ensuing background material is not meant to provide an exhaustive analysis of the food systems or foodshed(s) of Interior Alaska, it will explore some of the primary historical and contemporary components of Interior Alaska food systems (Loring, 2007). If part of the goal of this gardening curriculum design is to improve community food systems, then a working knowledge of the history and characteristics of the existing systems is requisite. This working knowledge in large part concerns how food systems in Interior Alaska have changed drastically in the last hundred years as they have shifted from an integration with the local environment to a dependence on the exogenous global food system (Gerlach et al, in press).

2.2.1 Land-based Athabascan Food Systems

To begin, any discussion of traditional food systems in Alaska must involve an examination of the local variations, applications and ramifications of the concept of *subsistence*. The various ways that Alaska Natives have obtained and used natural resources from their local environments are packaged within this inadequate term. Again, Nelson succinctly introduces the ways in which Athabascans subsisted from the boreal forest, their foodshed. "All Athabaskan economies are based on hunting and trapping of game animals, fishing, and gathering whatever plant foods and products are available" (1983, p. 5). He goes on to describe the seasonal round of subsistence activities, such as fishing and hunting waterfowl during the summer, hunting moose and caribou and picking berries in the fall, and trapping small fur-bearing mammals in the winter. Nelson's in-depth ethnographies of Athabascan communities provide some of the most thorough narratives of this system. Many other researchers have tried to describe these subsistence patterns, from early ethnographers (e.g. Osgood, 1970; McKennan, 1965) to contemporary

researchers (e.g. Caulfield, 1983; Sumida & Anderson, 1990). But their work does little to capture the true complexity and depth of subsistence practices. The expert knowledge-holders are Athabascan hunters and gatherers themselves, and the traditional way for them to pass on such knowledge was not through the written word but rather through intergenerational transfer of oral and practical knowledge necessary for survival.

Euro-Americans who started arriving in the Interior in the 1800's brought with them food systems that evolved in different ecological and cultural contexts than that of the Athabascans (Schneider, 1986). In his ethnohistory of Interior Alaska, Schneider (1986) repeatedly highlights that maintaining adequate food supplies was an ongoing problem for the early fur trading companies. At first the scale of change was small, as described by Nelson.

> These early Europeans entered Athabaskan country in search of furs. They came
> in small numbers; they did not change the environment or take people's land; and
> they offered such desired goods as firearms, tea, and tobacco. Trapping and
> trading quickly became a way of life throughout interior Alaska, causing a shift
> in people's activity cycle but leaving their relationship to the environment
> basically intact (1983, p. 52).

However, a resource that had been used primarily locally—furs—was now converted into a commodity for trade. Trade was always a part of Athabascan culture, but was concentrated on trading with neighboring indigenous peoples (Schneider, 1986). The fur trade was the first major change in spatial scale in that furs were now being shipped to Europe. The next big change was prompted by the gold rush. "In 1898, the Klondike Gold Rush brought thousands of whites into Athabascan country. For the first time there were whole communities of outsiders, and miners' camps sprang up everywhere in the wildlands" (Nelson 1983, p. 52). The rate and scale of change increased as Native communities became more sedentary and dependent upon white economies, as many Natives responded by becoming market hunters for the gold rush. Besides exploiting natural resources for a global market, these white settlers also brought with them a new system for making a living from one's local environment—gardening. Traditionally, Athabascans practiced little of what would be commonly recognized as agriculture, although they probably managed their local ecosystems in such a way as to promote the growth of favorable plants through techniques such as fire. In contrast, many white newcomers had gardens. As mission and government schools became more prevalent in the 1900's, Natives were exposed to larger-scale gardens (Schneider, 1986; Loring 2007).

It is significant that the incursion of white food economies did not simply replace Native ones. There was quite a bit of inter-cultural exchange in which Euro-Americans did learn about living in Interior Alaska from the Athabascans. As Schneider (1986) writes, "The closeness of Natives and outsiders during [the early 1900's] promoted a cultural exchange that went both ways and helped to create a lasting way of life in Alaska's Interior" (p. 179). Likewise, Natives have always been selective about which components of new systems to adapt into their existing systems. Anthropologist McKennan, writing in 1965 based on his field work with people he called the Chandalar Kutchin in 1933, addressed changes in regional food systems introduced by the economies of white men. According to him,

> Since the arrival of white man, life has become more secure. The fur trade has provided new foods, such as flour, sugar, rice and beans. Fishing has become more important, largely because of the introduction of the fish net…The white man's rifle has replaced the bow and arrow and the surround, and the steel trap has replaced the snare and deadfall. But in spite of such changes the Chandalar Kutchin life continues to follow the old, basic pattern of hunting nomadism, reinforced now by the trapping of such fur-bearing animals as marten, fox, wolverine, mink, otter, beaver, and muskrat (1965, p. 28).

Much has occurred since McKennan's time to change the practices of subsistence. With the influx of white mining communities, Western political systems were not far behind. The need to legally define these indigenous subsistence practices has roots in the development of a Western political system of natural resource management. In 1959, Alaska became a state and wrote a constitution, addressing natural resource use with the following statement: "Wherever occurring in their natural state, fish, wildlife, and waters are reserved to the people for their common use," thereby codifying equal access to natural resources (AK Const. Art. VIII sec. 3). Simple though this stipulation may appear, it did not forestall the ensuing conflict over resource use between various groups of citizens in the new state. For one thing, statehood did not resolve land claims among the State of Alaska, the federal government, the Alaska Native tribes, and private citizens. The federal government took a significant step in resolving these land disputes in 1971 with the passage of the Alaska Native Claims Settlement Act (ANCSA). Building on this, in 1980 the U.S. Congress passed the Alaska National Interest Lands Conservation Act (ANILCA), which designated large areas of the state as federally-managed public lands.

ANILCA included an attempt to ensure subsistence rights for Alaska Natives by establishing the eligibility for subsistence priority in resource management decisions with three criteria. These are "1) customary and direct dependence upon the populations as the mainstay of livelihood; 2) local residency; and 3) the availability of alternative resources" (PL 96-847 S803/4). However, the Alaska State Supreme Court ruled in 1989 in *McDowell v. State of Alaska* that the state could not give any group of residents priority over others because of the common use clause in the state constitution. Hence, currently there are dual management systems of fish and game resources in Alaska by both state and federal agencies. The federal agencies recognize a rural preference when allowing for subsistence priority according to ANILCA, while the state allows any state resident to apply for subsistence hunting and fishing permits. In rural Alaska, these laws have affected the practice of subsistence by forcing regulatory changes on hunting and fishing practices that previously had been regulated by the practitioners themselves. On the ground, this means, "A hunter or trapper might find himself crossing several boundaries every time he went out, each with slightly different management regulations that he was supposed to know and heed" (Schneider, 1986), regulations that he may have had little say in creating in the first place. While once subsistence had been largely opportunistic and integrated into indigenous knowledge, language and social systems, it has now become subject to management by Western science and governance.

How Alaska Natives make a living and feed themselves has changed throughout time and will continue to do so, although the rate and scale of change has been more extreme in the last century than in prior Athabascan history because of the spread of Euro-American culture. While seasonal patterns may have remained roughly consistent through at least the last hundred years of Western research, much has changed in how Athabascans practice subsistence. For instance, a fundamental change affecting the way subsistence is practiced has been the shift from a nomadic to sedentary lifestyle for Alaska Natives. McKennan's quote above mentions that the Chandalar Kutchin were still following a nomadic lifestyle when he met them. However, for multiple reasons, virtually no one is nomadic today (Nelson, 1983). Because of improved motorized transportation provided by outboard motor boats, all terrain vehicles (ATVs), and snowmobiles, hunters are able to live in town for most of the year. Rather than shifting locations in parallel with the seasonal round, Alaska Native hunters now radiate out from a home base.

It is notable that McKennan mentions security, quoted above. It is difficult to know exactly what he meant with his observation that "life has become more secure," but he seems to

be referring to economic security. For him, there was no question that subsistence was mostly defined by its practical rather than its symbolic purposes. Certainly, subsistence continues to fill a nutritional need in many parts of Alaska, yet in today's setting, security may have cultural as well as material elements for rural Alaska communities. Also, there is positive feedback between a sedentary lifestyle and dependence on food sources other than subsistence sources. If a family chooses to live in a rural community but still hunt and fish as much as possible, the hunters need transportation to get to the fish and game. Whereas at one time human or dog-powered travel may have been feasible, the only practical options now are modern machines that require cash input to buy and maintain. This is in part due to the fact that sedentary hunters must travel farther faster from a central location. Cash requires either wage jobs, local product sales, or dependence on welfare. If wage jobs within the family are sought, the family has to stay in town for the job. Therefore, even if a family wants to practice subsistence, they are locked into a sedentary system, which produces a higher localized impact on the region's natural resources and hence may eventually require individuals to travel even further from town to access resources, in turn requiring them to invest more cash in fuel and maintenance.

2.2.2 Introduced Euro-American Food Systems

Native Athabascans practiced little of what would be commonly recognized as agriculture, although they managed their local ecosystems in such a way as to promote the growth of favorable plants. Where the literature draws the line between "gathering" and "agriculture" is not always clear and ignores a lot of activities in between. However, it is important to distinguish among different types of agriculture, primarily according to the purpose for which the crops are produced and the scale at which production occurs. Ironically, in many parts of the world, *subsistence* is a term usually attached to *agriculture* or *farming* (i.e., Waters, 2007). In much the same way that subsistence hunting and gathering feeds people in Alaska—through small-scale, local, and often family-based activities—subsistence agriculture has fed indigenous people all over the world. The gardening practiced by Alaskan miners and missionaries in the early 20th century may best be considered analogous to this self-sufficient style of agriculture. Euro-American newcomers hunted and fished and trapped like their Athabascan neighbors, but because their lifestyles required additional food inputs, they brought with them the practice of cultivating fully domesticated vegetables in small garden plots. Many Natives adopted this practice as they shifted to more sedentary, village-based lifestyles as well. Beyond these small gardens, agricultural production has played a sporadic and poorly documented role in Interior Alaska. It

has rarely been a large economic presence even in non-Native communities (Francis, 1967; Shortridge, 1976).

A second broad category of agriculture is commercial production, although the means and ends of commercial agriculture vary drastically. Karl Francis (1967) posits the term *outpost* agriculture to characterize a form of commercial agriculture unique to Alaska. "The function of Alaskan agriculture is and always has been to provide a few fresh products for local consumption to supplement the bulk of food shipped in from 'Outside'" (p. 496). Later, he elaborates on what he means by local consumption. "In reality, agriculture in Alaska is of the unusual kind that supplies an outpost. It can be likened to the garden behind the fur trading post, or the greenhouse annex to the Arctic research station" (p. 504). In other words, outpost agriculture falls somewhere in the realm between what Francis calls *pioneer* agriculture, a more self-sufficient form of farming connected with the homesteading movement in the American frontier, and other types of commercial agriculture that exist to serve a large commercial demand.

One of Francis' working assumptions is that promoting larger-scale commercial agriculture in Alaska was a good idea, as in this ominous statement, "Alaska desperately needs something more to sell to the world" (p. 499). A few years after his paper was published, Alaska figured out what it had to sell to the world—oil—and how to sell it, which irrevocably changed the trajectory of Alaska's economy. However, many of Francis' observations about the limitations to commercial agriculture in the 1960's hold true today. What he calls a "host of handicaps" includes "generally poor soils, a short growing season, permafrost, limited investment capital, high labor costs, expensive machinery and supplies, and haphazard merchandizing," but perhaps most importantly, "the transportation barrier between Alaska and the coterminous states" (p. 497). Clearly, his analysis of these handicaps rests on the Neo-classical economic belief that a healthy economy should be driven by free market forces.

Overall, the Interior has not historically supported commercial agriculture very successfully. Starting in the mid-century, some commercial farms sprang up. The best known of these in the Fairbanks area is Creamer's Dairy, which has been preserved as a local wildlife refuge. The dairy profited until the 1960s, when imported milk became more affordable because of government transportation subsidies (Cole, 1999). Most of Alaska's successful commercial agriculture enterprises exist in the Matanuska Valley of South-central Alaska. Concurrent with many of the other systemic changes in food systems in Interior Alaska during the 1900's, the rest of the country and world has been experiencing the globalization and industrialization of the

world's food supply. These changes have affected Alaska's food systems as well. From the beginning of European contact in Alaska, importation of food products from exogenous sources has been a part of Alaskan economies, altering the pre-existing balance of people with their local ecosystems as residents became less dependent on local food sources and more dependent on imports.

2.2.3 Contemporary Interior Alaska Food Systems

Currently, both urban and rural Alaska communities rely heavily on food imports, calling into question the reliability of food supplies. Dependence on exogenous global food systems in both rural and urban, Native and non-Native communities creates challenges throughout Interior Alaska. Many Alaskans cannot trust their food choices to be of high quality or dependable. Also, a regional system that is heavily reliant on imports is unlikely to be secure in times of stress or over long periods of time. One possible way to increase local food system security is by designing ways to produce food locally, much in the way that Native Alaskans still depend on subsistence hunting and gathering from their local ecosystems. A complementary system to hunting and gathering to fill local food needs could be found in locally-based farming or gardening initiatives. Indeed, as Native communities became more and more sedentary, many individuals integrated small-scale gardening into their lives (Loring & Gerlach, in review). In recent decades, several farmers have succeeded in various small-scale agricultural enterprises. One of the limiting factors is certainly climate. The growing season in Interior Alaska is relatively short (approx. 90 days), although there are significant local variations. Also, climate change predictions indicate that the growing season may lengthen (IPCC, ACIA). In addition, the acidic soils in the boreal forest or the glacial deposits of old river beds and floodplains need special attention in order to produce crops. However, the long summer days of the sub-arctic and the cool climate are ideal for many vegetables, including all the cruciferous family as well as potatoes, carrots and squashes. Some people have supplemented their income from other employment with profits from selling produce or products created from their gardens, such as herbal supplements.

One of the most successful models in recent years has been that of community supported agriculture (CSA). As a national movement in sustainable, small-scale agriculture, CSA farms and gardens exist as an economic partnership between producers and consumers. Customers of a specific farm buy a share of the produce at the beginning of the season, thereby sharing the risk of a poor season or the bounty of a plentiful season with the farmer. Many CSA farmers adhere

to principles of organic or sustainable agriculture as well. Since they are freed from the demands of selling on a free market which rewards a high quantity of product without regard to externalities, they can maintain a longer-term perspective on maintaining the health of their land instead of forcing as much production from it as possible. This approach to local food production holds much potential for addressing food system security and resilience in Interior Alaska, and for engaging local youth in sustainable agriculture.

2.3 Educational Practices in Interior Alaska

In addition to a global food system, non-Native Alaskans imported another social system to the region—formal schooling based on a European model that was being further refined in schools throughout North America. In this section, I will examine the history of formal schooling in Alaska specifically as it relates to Alaska Native education. An in-depth critique of Western schooling or an analysis of the many reform movements throughout the history of public education in the United States is beyond the scope of this background. However, throughout Alaska, from the beginning of European contact there have been problems resulting from the imposition of a Euro-American educational system on Alaska Native communities and cultures. Again, I have learned much of this history during my time working at the EKCS and at UAF; however, I have taken much of this information from the work of those associated with the Alaska Rural Systemic Initiative, the primary Alaska Native education reform effort of the last decade, which I will describe in greater detail at the end of this section.

2.3.1 Traditional Alaska Native Education

In Alaska's indigenous communities, education of youth was not separated from the everyday tasks of life. Young people learned life skills through watching and participating in tasks given to them by their elders (Kawagley & Barnhardt, 1999; Kawagley, 1995). Again, Nelson's insights are helpful here. "Before the age of ten, children used to begin learning practical skills, not by formal instruction, but by watching and imitating adults, and by listening quietly to their conversations. In the old days it was education by practice, not by the verbal instruction emphasized in village schools today" (1983, p. 13). Storytelling was also a primary form of transferring knowledge to young generations. In an interview (quoted in Barnhardt, C., 2001), Koyukon Athabascan Eliza Jones explains how her stepfather told stories to her and her brothers at bedtime.

'The audience was expected to respond during pauses with 'hmmm,
hmmm'…and when he didn't hear the 'hmmms' anymore he stopped, and knew
everybody was sleeping. The next night a new tale would not begin until the
young listeners could repeat the story they heard the night before. You had to be
an active listener' (p. 10).

As Sidney Stephens (2000) summarizes in the *Handbook for Culturally Responsive Science
Curriculum*, there are two primary premises embedded in the educational philosophies of many
Alaska Native cultures. "The *application of knowledge* is of paramount importance in Native
cultures and has traditionally been equated with the ability to survive." The second is "the *need
to know*. Plainly said this means that you teach children what they need to know when they need
to know it."

2.3.2 History of Formal Schooling in Alaska

This philosophy of education is distinctly different from the premises of Western
education, which emphasizes decontextualized and compartmentalized knowledge taught in
formal classrooms walled off from community life. This approach to education is so drastically
different from Native approaches that Western colonizers did not even recognize Native child-
rearing as "education." As more and more Euro-Americans arrived in Alaska, they wanted their
children to learn skills necessary for literacy in Western culture—reading, writing, and arithmetic.
Schools were soon established in permanent communities. As for Native students, they too were
soon expected to learn "the three r's," and were first taught by missionaries bent on "civilizing"
the Natives (Barnhardt, C., 2001). In 1905, the Nelson Act established a dual system of schools
in which the Bureau of Education operated federal schools in Alaska Native villages while the
territorial government ran schools in incorporated towns for white children and "civilized" Native
children. The Bureau of Education operated with the belief that "the best mechanism for
achieving assimilation into American society was education" (p. 12). This attitude permeated
formal education for Alaska Natives throughout the early years and continued to have long-
lasting impacts, such as the decline of Native languages, as Native students were sometimes
physically punished for speaking their languages in schools. Formal schooling was also a
primary driver in prompting many Athabascans to abandon nomadism in order to live in
permanent villages where their children could attend school.

In 1934, the Indian Reorganization Act and the Johnson-O'Malley Act (JOM) both
passed the U.S. Congress, partly in response to the Meriam Report released a few years earlier

which condemned the meager efforts of the federal government to offer equal educational opportunities to American Indians and Alaska Natives. In Alaska, JOM "led to the beginning of negotiations between the Alaska Territorial Department of Education and the Bureau of Indian Affairs for the transfer of federally operated rural BIA elementary schools to the territory" (p. 13). But the momentum for transferring schools ceased in 1954 in part because of a swing towards conservative political values at the federal level. After statehood in 1959, the State of Alaska took over the territorial schools. In 1965, the state again began the transfer of BIA schools to the state, but the process was not completed until 1985.

In the meantime, first the territory and later the Alaska state government engaged in extensive debate over how to manage its public school system. Regarding education for Natives, between the mid 60's and 70's, several movements at the national level stimulated changes in educational philosophies and approaches in Alaska. After several federal reports released by various task forces and commissions echoed some of the criticisms of the Meriam Report decades earlier, Alaska sought ways to allow for more local control and input from Native communities into the education of their children. In addition, the Alaska Native Claims Settlement Act, passed in 1971, in part served to organize Alaska Natives politically, "and as a result Alaska Natives faced an unprecedented period of new institution-building that, in turn, required a massive effort in human resource development to prepare Native people for the many new decision-making roles that would emerge" (Barnhardt, R., 2002). Several major obstacles existed regarding providing equivalent educational opportunities to Native students that existed for non-Native ones. For instance, most rural villages with primarily Native populations did not have high schools, while those with significant non-Native populations did. After a student completed 8th grade, Native families who wanted to continue their child's formal education had no choice but send her away to boarding school. A class-action lawsuit charged discrimination over this issue and in 1976, the State of Alaska agreed to open high schools in any community where an elementary school already existed. However, many Native adults today did not attend high school in their home villages. Meanwhile, the Alaska State-Operated School System, with responsibility for rural and military schools, was disbanded and created 21 rural school districts were created, known as Regional Educational Attendance Areas (REAAs). "State regulations provide each REAA with enough latitude to design its schooling policies and practices in ways that are appropriate for the particular region and for the cultural and linguistic group of people that it serves" (Barnhardt, C., 2001, p. 21).

2.3.3 Contemporary Alaska Education System

These historical events set the scene for what we have today for formal schooling of both non-Natives and Alaska Natives by the state.   The current state school system is composed of three main types of schools—village schools where the majority of students are Alaska Native, rural regional center and road system/marine highway schools where populations are 30-50 percent or more non-Native, and urban schools in Anchorage, Fairbanks, and Juneau, which combined serve 30% of the state's Native population (Barnhardt, C., 2001, pp. 24-5). But again, political trends at the national level concerning education are influencing the practice of teaching in all of these schools. "Most of the State's reforms are based on national models related to issues of accountability, standards, and standardized testing for students and teachers" (p. 26). Indeed, the *No Child Left Behind Act of 2001* has mandated the evaluation of individual students—and by extrapolation their teachers, schools, and school districts—through standards-based testing of content knowledge, largely focused on math, science, and reading (NCLB 2001, Public Law 107-110). Federal funding of schools can be dependent upon demonstrated improvement in test scores of entire student bodies as well as of specific groups of students, such as those defined by ethnicity and socio-economic status, in an attempt to ensure that schools are effectively serving underprivileged groups. This act in many ways represents a further tightening of a European model of formal schooling and holds public schools accountable for maintaining this model.

While a wide variety of social problems have been attributed to the arrival of white men in Alaska generally and the incursion of Euro-American social institutions such as education and religion specifically, my interest here is especially in linked social-ecological problems associated with changing educational practices. For Alaska Natives representing multiple cultures, such as the Yupiaq culture written about by Oscar Kawagley (1995), all learning was mediated through the surrounding landscape, as the everyday activities of life were intimately linked with components of the immediate natural environment. The requirement of Native students to attend schools effectively eliminated this link. Children were unable to spend the necessary time with their families on the land to learn the skills their ancestors had needed to survive. During the decades when most youth had to leave their home communities to attend a boarding high school, those links to the land were further disintegrated. Many Elders have bemoaned the implications of the loss of these skills and knowledge to their cultural sustainability. However, Native cultures have proven to be quite resilient in that despite these challenges, many individuals are consciously retaining the knowledge and skills associated with living within appropriate scales set

by their natural environments. In addition, there have been significant efforts in recent years to reform formal schooling in Alaska to create enough flexibility in the system to allow for incorporation of local knowledge and Native ways of knowing (Barnhardt & Kawagley, 2005; Kawagley & Barnhardt, 1999).

   2.3.4 Local Education Reform Efforts

The Alaska Rural Systemic Initiative (AKRSI) is a cooperative school reform program based at UAF and also supported by the Alaska Federation of Natives (AFN). The AKRSI began in 1994 with a ten-year grant from the National Science Foundation to "implement a set of initiatives that systematically document the indigenous knowledge systems of Alaska Native peoples and develop pedagogical practices that appropriately integrate indigenous knowledge and ways of knowing into all aspects of the education system" (Barnhardt & Kawagley, 2004, p. 59). A diagrammatic explanation of the objective of integrating Native and Western science in specific can be found in Figure 2.3. Given that the contemporary education system still rests primarily in a Western science framework, AKRSI's initiatives reflect the theory that the best Alaska educational system is grounded in both sets of organizing principles. Hence, AKRSI constitutes an initiative that is attempting to integrate different types of systems to improve the functioning of the overarching system.

   Upon conclusion of the initial ten-year period, the AKRSI had created several lasting outcomes, detailed by Boyer (2006) in his review of NSF's national rural systemic initiative programs as follows:

- the creation of several Native Educator Associations,
- the ongoing documentation of "Native ways of knowing" and the incorporation of this knowledge into education resources,
- the convening of annual Academies of Native Elders,
- the creation of *Alaska Standards for Culturally Responsive Schools* to complement other state educational standards,
- the publishing of several volumes of *Village Science and Math Curriculum Applications*, and
- the founding of several rural chapters of the Alaska Native Science and Engineering Society and Native science fairs (p. 21).
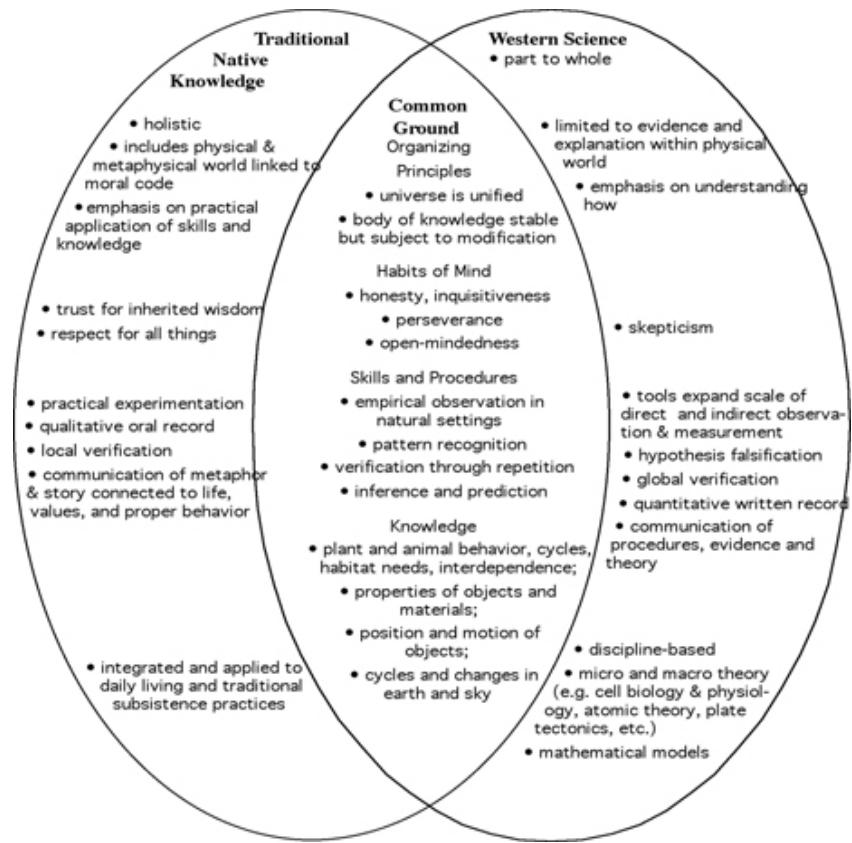
Figure 2.3 Native-Western Science Venn Diagram (Stephens, 2000). This diagram depicts some of the differences and commonalities between traditional Native knowledge and Western science.

The AKRSI also created the Alaska Native Knowledge Network (ANKN) at the University of Alaska Fairbanks to serve as a clearinghouse for resources related to the AKRSI. (Many curricular and other resources can be found on their website at www.ankn.uaf.edu.) The ANKN also publishes *Sharing Our Pathways*, which originally began as the newsletter of the AKRSI and continues to be published electronically. This newsletter and an email listserv connect people from around the state interested in the works of the AKRSI/ANKN.

The newsletter highlights educational initiatives from different regions of the state. In a 2002 issue, a rural Alaska school principal wrote about the use of place-based education to integrate indigenous and Western knowledge systems in Russian Mission, a small Yup'ik village on the Yukon River (Hull, 2002). Realizing that the school needed to find an innovative way to engage youth—one third of whom were not attending school in the late 90's—principal Mike Hull and his teachers implemented some changes in the school's curriculum. As Hull explains,

"We built a curriculum based on the subsistence activities of each season" (p. 2). He involved community members to help students "acquire the skills one needs to lead a productive life in one's community" (p. 3). Three years later, attendance and test scores were up, providing evidence that incorporating place into curriculum for indigenous students can be a more successful model for education than the more formal style Russian Mission had been using. Most relevant to this study, the AKRSI also laid the groundwork for the formation of the school with which I collaborated, the Effie Kokrine Charter School (EKCS).

EKCS Principal Eleanor Laughlin shared the story of the evolution of EKCS at the 2006 Bilingual and Multicultural Education conference in Fairbanks, Alaska (Laughlin, 2006). Laughlin described the conversation that several Native educators had at a workshop in 2001, where they discussed the challenges before them as Native educators to create formal educational alternatives in Alaska to meet the needs of Native students. Several of these practitioners formed a working group that began meeting regularly in Fairbanks as the Native Charter School Organizing Committee. Out of these discussions came the idea for the EKCS, a state-approved charter school that would focus on teaching *through* Alaska Native culture. From this initial committee evolved an Academic Policy Committee to serve as the managing board of the charter school. Together, the two committees drafted a charter school proposal that was approved by both the local Fairbanks North Star Borough (FNSB) School District and the Alaska State Department of Education in the spring of 2005. The EKCS opened its doors to its first students the following September with four teachers at the high school level and four at the junior high level and a total of well over 150 students, the minimum required to obtain full state funding..

In accordance with state law regarding charter schools, the EKCS founders envisioned a school designed specifically "for students who will benefit from a particular teaching method or curriculum" (AS 14.03.265). The particular philosophy of the EKCS is captured in the following tenets for the basis of the curriculum, as described in the EKCS Proposal (portions of which can be found in Appendix C):

- Teaching methods based in Native ways of instruction and learning
- Active, project-based learning
- Curriculum based in Native knowledge of the world
- Presence and involvement of Native elders
- Use of broad community as a learning context

- Building students' pride in Native culture as an element in success
- Academic success

The proposal further explains,

> The Charter School is designed to build on [student] experiences and on the
> related resources in order to immerse students in the knowledge, values and
> practices of Alaska Native cultures. It is designed to help the students experience
> academic success from within a cultural context (EKCS Proposal, Appendix C).

This cultural context does not exist in an abstract vacuum. It is linked to place and community.

> In this cultural context, effective schooling for children must therefore be
> embedded in place and community – concepts which are intimately connected in
> Native cultures. To support its students, therefore, everything the school does
> contributes to belonging-in-a-place and to developing community (EKCS
> Proposal, Appendix C).

The EKCS is located in Fairbanks, just a mile from the UAF campus. But its setting is much bigger than the small, 30,000-person town of Fairbanks. Indeed, the proposal rarely mentions "the Fairbanks community" as the setting for the school, but rather names "Interior Alaska" several times. While the school purportedly teaches through the very broad lens of "Alaska Native" culture, and while it accepts both Native and non-Native students with varying backgrounds, the school primarily serves and reflects an Interior Athabascan population.

2.4 Addressing Integrated Sustainability Challenges

In conclusion, many of the current challenges to sustainability in Interior Alaska Native communities have resulted from these parallel histories of food system change and formal schooling practices. Sustainability requires that individuals and communities support themselves while also maintaining the health of the social-ecological system of which they are a part. What are the impediments to the function of the biocultural region of Interior Alaska as an integrated adaptive system that fosters sustainability? The purpose of this study is not to answer this question; rather, this question provides a backdrop to the investigation of the role that education plays in such a system. My contention is that youth in Interior Alaska are not obtaining the skills and knowledge they need in order to meet the goal of sustainability for their region, especially given the uncertainty regarding effects of climate change. Individuals and communities must be adaptive to potential changes, which requires appropriate knowledge and skill. In times past,

Athabascan cultures raised and educated their youth in a way that did give them the ability to take care of their bioregions. I argue that this was in part because education and food systems were not disintegrated as they are in Alaska and the rest of the United States today. My research explores the premise that pedagogy that links students to the land through gardening and food education can foster more sustainable social-ecological systems in the Interior Alaska bioregion.

If one of the keys to creating more sustainable community food systems is to "tighten feedback loops" (Feenstra, 2002) of information and food production, then education is surely one way to accomplish this objective. Teaching youth how and why to produce food in sustainable ways must be a component of any food system work. As Wendell Berry puts it, "Knowing how to grow food leads to food. Knowing how to grow food in the best ways leads to a dependable supply of food for a long time" (Berry, 2006). School gardening is one way to make such a link in community food systems, and culturally appropriate gardening curriculum in an Alaska Native setting will draw from and can re-establish a rich history of people's links to the land. There is a precedence in Alaska for school and community gardening (Loring, 2007). For instance, many mission schools had gardens in which students worked. It depended on the teacher in these places as to how much the practice of gardening was used as an educational opportunity versus simply as a way to produce food for the school and community. On a much larger scale, Sheldon Jackson is one of the best-known figures in both early education and agricultural initiatives in Alaska. His agricultural efforts did not concern gardening in particular but focused more on reindeer herding. Also, his approaches to community development through these education and herding practices were top-down and did not necessarily promote integration and feedback among local system components (Simon, 1998; Elanna & Sherrod, 2004).

In collaboratively designing culturally-appropriate gardening curriculum at the Effie Kokrine Charter School (EKCS), I follow the lead of bottom-up and integrative initiatives such as the AKRSI. This research draws from an Alaska Native model of place-based education concerning how to feed ourselves from the land. The EKCS offers unique opportunities because of its Alaska Native curricular focus and foundation. It is well-situated to explore the incorporation of school gardening more thoroughly into its curriculum. Traditional food systems among Alaska Native communities were much more integrated and sustainable than the food systems upon which students at the EKCS currently rely. Youth in self-reliant, Native rural communities had practical roles to play in feeding themselves and their families, and their education into adulthood was part and parcel of learning these practical and social skills. Part of

the objective of the EKCS is to honor and draw from the cultural roots of Native Alaskans. Using gardening to teach about the role of food in students' lives and to strengthen community food systems is a natural fit with EKCS's overarching goals.

In conclusion, it is imperative to emphasize that in exploring this place-based approach to education, I am not limiting my curriculum, pedagogy, or conclusions about how and why to do this kind of education to Alaska Native students and communities. Most bioregions and social-ecological systems around the country have become disintegrated, and re-integration of food systems with education is a growing need. There may be many lessons about how to be more integrated embedded in traditional Athabascan educational systems. This research is a dialog between Native ways of knowing and educating and Western approaches to education reform and ecological sustainability. I explore the latter in the next chapter.

Chapter 3: Models for Sustainability Education:
Place-based Education and Community Food Systems

In Chapter 2, I discussed some specific cultural and ecological challenges to sustainability in Interior Alaska. This chapter reviews some theoretical and applied approaches to meeting these challenges in other places. Rather than providing a review of theoretical literature on sustainability education, this chapter has a more practical tone in answering the question "*How* is this kind of education done?" Specifically, I focus on the educational framework of place-based education and an examination of youth and school gardening as an example of this approach to sustainability education. These are bodies of literature that I explored initially before beginning my own place-based education project centered on school gardening. However, I begin by presenting some theoretical frameworks regarding sustainability education that I will examine in more detail in Chapter 6 to investigate a corollary question, "*Why* do we need this kind of education?"

3.1 Sustainability Education

The United Nations Educational, Scientific and Cultural Organization (UNESCO) declared the years 2005-2014 the United Nations Decade of Education for Sustainable Development (DESD), with the goal "to integrate the principles, values, and practices of sustainable development into all aspects of education and learning. This educational effort will encourage changes in behaviour that will create a more sustainable future in terms of environmental integrity, economic viability, and a just society for present and future generations" (www.unesco.org/education, Accessed on November 1, 2007). Leading up to and during this decade, there has been a proliferation of literature defining the components of education for sustainable development. In a review of "different aspects or emphases of environmental education," Palmer (1998) offers the following definition of *education for sustainable development*:

> [It] aims to help people understand the inter-dependence of life on Earth, the
> effects of actions and decisions relating to resource use, and factors which foster
> or impede sustainable development. It is concerned with developing people's
> awareness, values, and attitudes, thus enabling them to be involved effectively in
> sustainable development (p. 30).

This functionalist characterization depends largely on the controversial concept of sustainable development articulated in the Brundtland Commission's famous definition, "development that meets the needs of current generations without compromising the ability of future generations to meet their needs and aspirations" (WCED, 1987).

Besides education for sustainable development, there are a number of other labels addressing the same sets of goals, including *sustainability education* (e.g., Dawson, 1995), *sustainable education* (e.g., Sterling, 2001)*, education for sustainability* (e.g., Cloud, 2005), *education for sustainable living* (e.g., www.ecoliteracy.org/education), and *education for a sustainable future* (e.g. Blockstein & Green, 2003), all of which have slightly different connotations and backgrounds. This plethora of names echoes the international debate over what sustainability is about in the first place. Palmer's concept is limiting because of its focus on economic development and the ambiguity of "the needs of the future." Dawson (1995) discusses the skepticism of educators in British Columbia regarding education for sustainable development because it appears to be advancing a particular economic development agenda with which they may not agree.

Jickling (1992) expresses concerns that education *for* anything is "inconsistent with [the] criterion" that "education is concerned with enabling people to think for themselves" (p. 8). Similar debates regarding education-as-indoctrination have abounded in the field of environmental education as well (Jickling, 2003). Sterling (2001) addresses some of these concerns by using the label *sustainable education* in his briefing in the Shumacher series. He writes,

> The term 'sustainable education' implies whole paradigm change, one which asserts both humanistic and ecological values. By contrast, any 'education for *something*,' however worthy, such as for 'the environment,' or 'citizenship' tends to become both accommodated and marginalized by the mainstream. So while 'education for sustainable development' has in recent years won a small niche, the overall educational paradigm otherwise remains unchanged (p. 14)

Regarding more of the nuts and bolts of what education for sustainability might look like, the North American Association for Environmental Education (NAAEE) outlines several components of a core content of education for sustainability. These include ecological literacy, systems thinking and systems dynamics, multiple perspectives, place, sustainable economics, citizenship, and creativity and visioning (Cloud, 2005). Educators such as Orr (1992, 1994) and

Uhl (2003) have advocated for redesigning Western mainstream education to enhance ecological literacy and consciousness among citizens.

I have chosen to use *sustainability education* in this dissertation in order to emphasize the holistic nature of sustainability, which requires the integration of ecological, socio-cultural, economic, and educational components of a sustainable system. I also prefer a characterization flexible and visionary enough to be adapted to local contexts, another requirement of defining sustainability. Hence, I develop an argument that place-based education and sustainability education complement each other, as suggested by Woodhouse and Knapp (2000), who write, "Proponents of place-based education often envision a role for it in achieving local ecological and cultural sustainability" (p. 1). Sobel's (2004) proposition that place-based education can improve "community vitality and environmental quality" can be considered a place-based definition of sustainability. A focus on place in education can lead to sustainability in a qualitative sense. This formulation relies on a concept of sustainability as a property of a complex system rather than as a pre-determined form or state of development.

Understanding systems is requisite to understanding sustainability. As Cloud (2005) explains, a key component of sustainability education is *systems thinking* or *systems dynamics*. There has been some work done on applying systems thinking to educational reform (Banathy, 1992; Sweeney & Meadows, 1995). However, much of this work does not relate directly to creating ecologically sustainable systems. One of the most insightful explorations of the characteristics of complex living systems is that of Fritjof Capra, specifically in his books *The Web of Life: A New Scientific Understanding of Living Systems* (1996) and *The Hidden Connections: A Science for Sustainable Living* (2002). A physicist by training, Capra's recent work involves looking for the properties of systems that apply to a wide variety of living systems, from human consciousness to the global ecosystem, or Gaia. Some of these systems characteristics include *scale*, *networks*, *feedback loops*, and *self-organization*. Understanding how to design sustainable systems is a key goal of Capra's work. Regarding definitions of sustainability, he writes,

> The outstanding characteristic of the Earth household is its inherent ability to sustain life. As members of the global community of living beings, it behooves us to behave in such a way that we do not interfere with this inherent ability: this is the essential meaning of ecological sustainability…In order to combine respect for human rights with the ethics of ecological sustainability, we need to realize

that sustainability—in ecosystems as well as in human society—is not an individual property but a property of an entire web of relationships: it involves a whole community. A sustainable human community interacts with other living systems—human and nonhuman—in ways that enable those systems to live and develop according to their nature (2002, pp. 214-5).

One systems property that seems especially relevant to designing sustainability education is *emergent properties*. "Throughout the living world, the creativity of life expresses itself through the process of emergence" (Capra, 2002, p. 119). Structures or properties that emerge from this process cannot be planned into being through a linear design process, but rather emerge from a self-organizing complex of factors. In contrast to designed structures, emergent structures "provide novelty, creativity, and flexibility. They are adaptive, capable of changing and evolving" (p.121). Capra explains that all human systems are a combination of emergent structures and designed structures. I suggest that sustainability can be considered an emergent property of complex systems. Perhaps sustainable communities are not something that can be designed through linear or directional models, but are rather a combination of planned and emergent properties of non-linear systems.

This question then follows: How does one design an educational system that allows a sustainable system to emerge? Sustainability education must address this question. It is not enough to expect students to learn to think systemically; teachers must learn to teach systemically if we are to pursue sustainability through education. Specifically, how can place-based education promote this emergence of sustainability within a local or community system? The remainder of this chapter examines two primary frameworks for answering this question relevant to my own research, that of place-based education and of youth gardening in community food systems.

3.2 Place-based Education

Educational theorist David Gruenewald (2003, 2006) points out that place-based education does not have a well-developed theoretical tradition but has emerged out of the *practice* of multiple traditions. In his attempt to start developing such theory, he uses the theoretical underpinnings of critical pedagogy to inform place-based education, creating a theory he calls *critical pedagogy of place*. He summarizes, "I will generalize that critical pedagogy and place-based education each make fundamental contributions to a critical pedagogy of place: specifically, while critical pedagogy offers an agenda of cultural decolonization, place-based

education leads the way toward ecological 'reinhabitation'" (2003, p.4). Place-based education emphasizes learning to live well in a specific place, or "reinhabiting" ecosystems and communities through education.

In making this assertion, Gruenewald is attempting to move past the concerns about critical theory and other theories of liberal education raised by C.A. Bowers (1987, 1995, 2001 and 2005). Bowers' criticism is that by overemphasizing the liberation of the individual through critical education, vital conservative traditions regarding human-environment relationships are being lost. Bowers is especially disapproving of the father of critical pedagogy, Paulo Freire (1970 and 1995) but also includes John Dewey (1915, 1916) and other liberal education theorists in his appraisal. As Gruenewald explains, "Bowers claims that critical pedagogy can work to reinforce cultural beliefs, or 'root metaphors,' that underlie ecological problems and that are reproduced through conventional education: namely, individualism, the belief in the progressive nature of change, and anthropocentrism" (2003, p. 6). While Bowers (2001) suggests the concept of *eco-justice* as an educational framework to replace critical pedagogy as the dominant theory driving educational reform, Gruenewald articulates how a pedagogy of place can complement the strengths of critical theory in the following:

> Perhaps the two most significant intersections between these traditions are place-based education's call for localized social action and critical pedagogy's recognition that experience, or Friere's (1970/1995) 'situationality,' has a geographic dimension. Acknowledging that experience has a geographic context opens the way to admitting critical social and ecological concerns into one's understanding of place, and the role of places in education. This is the goal of a critical pedagogy of place (p. 9).

However, Gruenewald also acknowledges that this type of theory is "still in an early stage of development" (p. 6). My research is intended to contribute to this development.

The relatively new framework of place-based education (PBE) captures several influences, including practical as well as theoretical. In the introduction to David Sobel's (2004) brief but seminal book, *Place-Based Education: Connecting Classroom and Communities*, Laurie Lane-Zucker, the executive director of The Orion Society, a leader in place-based education, writes

> In the early 1990's, The Orion Society termed [its] pedagogical strategy a 'place-based' approach to education…Place-based education might be characterized as

the pedagogy of community, the reintegration of the individual into her

homeground and the restoration of the essential links between a person and her

place (p. ii).

While place-based education has grown out of the environmental and outdoor education

movements, its objectives are broader than teaching students about ecological concepts,

environmental policy or outdoor skills (Elder, 1998; Gruenewald, 2003, 2006; Sobel, 2004;

Woodhouse & Knapp, 2000). Indeed, place-based education, or learning, reflects an attitude of

progressive education reform espoused by many education philosophers and researchers over the

last century (Dewey, 1916; Gardner, 1999; Freire, 1970, 1995; Sizer, 1992). As one of the

founders of this progressive and pragmatic approach in American education a century ago,

Dewey advocated for education that connects learners to their everyday environments in practical

ways that enhance the learning process (Dewey, 1915, 1916). This "pedagogy of place" is

reflected in the work of many contemporary researchers and practitioners (Bowers, 2001; Louv,

2005; Nabhan & Trimble, 1994; Theobald, 1997).

Similarly, place-based education also corresponds well to Native American and Native

Alaskan educational models, in which youth learn through holistic and practical experiences

(Barnhardt, 2006, 2008; Barnhardt & Kawagley, 2004, 2005 ; Kawagley & Barnhardt, 1999;

Cajete, 1994, 1999). Finally, place-based education is also linked to a movement to broaden the

concept of issues-based environmental education to a more holistic approach to fostering

ecological literacy and education for sustainability (Orr, 1992, 1994; Smith & Williams, 1999;

Sterling, 2001; Stone & Barlow, 2005; Uhl, 2003). This chapter draws from literature about

place-based education, indigenous and cross-cultural education, sustainability education, and

related fields in order to develop my own "pedagogy of place" to frame my research.

Place-based education embodies an educational philosophy that encourages educators to

link students to their local places—both natural environments and human communities—in order

to learn fundamental concepts as well as to facilitate student and community well-being (Sobel,

2004; Woodhouse & Knapp, 2000).

Place-based learning is rooted in what is local—the unique history, culture, environment,

and economy of a particular place. The community provides a context for learning,

student work focuses on community needs and interests, and community members serve

as resources and partners in every aspect of teaching and learning. We have found that

this local focus engages students academically, pairing real-world relevance with

intellectual rigor, while promoting genuine citizenship and preparing people to live well

wherever they choose (Williams, 2003, p. i).

Sobel (2004) echoes this definition and adds, "Community vitality and environmental quality are improved through the active engagement of local citizens, community organizations, and environmental resources in the life of the school" (p. 7). Finally, in a foundational review of place-based education, Woodhouse and Knapp (2000) outline five characteristics of the approach, summarized as follows:

1. It emerges from the particular attributes of a place.
2. It is inherently multidisciplinary.
3. It is inherently experiential.
4. It is reflective of an educational philosophy that is broader than "learn to earn."
5. It connects place with self and community. (p. 1)

Place-based educators do not advocate ignoring the goals of formal educational standards regarding content and skills, but rather using place as much as possible to teach this content and skill base.

While much has been written about the practice of place-based education, not much research yet exists on evaluation. A team called the Place-Based Education Evaluation Collaborative (PEEC) conducted a seminal study of four different projects to help meet their broad goals of developing and disseminating evaluation tools and establishing a body of research on place-based education and school change (Powers, 2004). These projects are not described in great detail; rather, the study explores strengths and weaknesses across the programs as well as changes in teacher practices. The researchers used several qualitative research methods including interviews, focus groups, and observation. They found that in all four place-based programs, teacher practice changed in six consistent areas—"use of local places and resources, interdisciplinary teaching, collaboration with other teachers, teacher leadership and personal growth, stronger curriculum planning skills, and greater use of service-learning within the curriculum" (p. 24). Regarding sustainability, one teacher interviewed had this comment: "'It was overwhelming at first to think about having another theme to add to Math Land and Literacy. But then I realized that the sustainability theme gives us more direction to stay focused on our units. If we do writing, then we did it around sustainability'" (pp. 24-5). Another example of evaluation of place-based education is *The Place-Based Learning Portfolio* (Williams, 2003),

published by the non-profit Rural School and Community Trust as a guide for schools to evaluate their own place-based education projects. It includes guidelines for assessing projects at the level of the student, the community, and the institutionalization of the project. Several examples of completed portfolio evaluations can be found at http://portfolio.ruraledu.org/. However, again, this assessment does not include anything specific about ecological sustainability.

While there is not much published research on place-based education per se, there are some classic studies in environmental education that provide additional evidence about the effectiveness of using place as an integrating focus in curriculum. In 1998, the State Education and Environment Roundtable published an often-cited study called *Closing the Achievement Gap: Using the Environment as an Integrating Context* (Lieberman & Hoody, 1998). This study investigated 40 different schools at all grade levels that used the environment as an integrating context (EIC) approach to some extent in their curriculum. As defined by Lieberman and Hoody, an EIC school,

- breaks down traditional boundaries between disciplines;
- provides hands-on learning experiences, often through problem-solving and project-based activities;
- relies on team-teaching;
- adapts to individual students, and their unique skills and abilities; and,
- develops knowledge, understanding, and appreciation for the environment—community and natural surroundings (p. 7)

Many schools included in the study used local places to implement EIC approaches, although some were based primarily in a classroom. This study was also primarily qualitative in nature, although some quantitative analysis conducted by 14 of the participating schools indicated that students educated with an EIC approach "earn higher grades and score better in reading, writing, and math" (p. 2). Qualitative surveys of participating teachers confirmed these results, and the majority of teachers in most cases reported improved learning in various subject areas and in non-academic areas, such as interpersonal skills, due to EIC education.

In a more recent study of schools that implement environmental education to a significant extent, a research team from the Pacific Education Institute conducted an entirely quantitative study, explaining that studies like Lieberman and Hoody's "present promising anecdotal 'success stories'" but that there are "few empirical studies corroborating these findings" (Bartosh et al., 2006, p. 162). After a careful selection process to identify 77 pairs schools using environmental

education (EE) and then pairing them with similar schools that do not use EE, the team conducted a statistical comparison of standardized test scores from these schools and found "that there is *a significant difference* in math, reading, writing, and listening on the [Washington Assessment of Learning] tests, *with EE schools performing better than non-EE comparison schools in all the tests*" (p. 165, italics in original). This piece of quantitative evidence is useful in building an argument that environmental education, and hence place-based education, is an effective way to improve student learning, especially within today's political climate that mandates accountability through standardized testing. However, it does not help answer the question of whether such education contributes to community sustainability. It is perhaps a question of scales. This research focuses on the individual unit of the student, but we may not be able to extrapolate individual student mastery of math, science, and reading skills to improved sustainability of the communities in which they live.

In his comprehensive book, *Last Child in the Woods: Saving our Children from Nature-Deficit Disorder*, Louv (2005) explores the many individual and social benefits of connecting children with natural places that go well beyond simply improving test scores. He surveys extensive research in areas such as child psychology and ecopsychology to support his argument that by depriving children from interaction with the out-of-doors on a regular basis, especially in non-structured play, we may be promoting symptoms of what he calls "nature-deficit disorder" in our culture:

> I am not suggesting that this term represents a medical diagnosis…Nature-deficit disorder describes the human costs of alienation from nature, among them: diminished use of the senses, attention difficulties, and higher rates of physical and emotional illnesses. The disorder can be detected in individuals, families, and communities (p. 34).

3.3 Roots of Place-based Education

There are a multitude of educational approaches that relate in some way to place-based education and go by different names. Gruenewald (2003) provides an extensive list, including,

> [E]xperiential learning, contextual learning, problem-based learning, constructivism, outdoor education, indigenous education, environmental and ecological education, bioregional education, democratic education, multicultural education, community-based education, critical pedagogy… (p. 3)

In this section, I will examine some of these approaches in more detail and then explore how they inform or differ from place-based education. Inevitably, my own educational background has influenced the route I have taken to understanding place-based education, and that influence will show through my emphasis on environmental education. Someone who may be more solidly grounded in another educational background, such as in cross-cultural or global education, may reflect an understanding of the roots of place-based education differently.

3.3.1 Environmental Education

Woodhouse and Knapp (2000) cite both environmental education and outdoor education as two contemporary educational frameworks that relate most closely to place-based education. In the United States, environmental education "grew out of the Nature Studies movement of the early twentieth century and traditionally focused on learning about the natural sciences" (Sobel, 2004, p. 8). However, in the last thirty years, environmental education has taken on a different character. In 1975, the United Nations Educational, Scientific, and Cultural Organization (UNESCO) launched the International Environmental Education Programme (IEEP) at an international conference in Belgrade. As explained by Palmer (1998),

> IEEP produced the first inter-governmental statement on environmental education. It listed the aims, objectives, key concepts and guiding principles of it in a document prepared at the meeting known as 'The Belgrade Charter—A Global Framework for Environmental Education.' The brief but comprehensive set of objectives for environmental education prepared at Belgrade are summarised as follows:
>
> 1. To foster clear awareness of and concern about economic, social, political, and ecological inter-dependence in urban and rural areas;
> 2. To provide every person with opportunities to acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment;
> 3. To create new patterns of behaviour of individuals, groups and society as a whole towards the environment   (UNESCO, 1975, pp. 7-8).

A few years later, UNESCO hosted another international conference on environmental education at Tbilisi, Georgia, USSR, which resulted in a Declaration that "established a framework for an international consensus which without doubt has been the seminal influence on the development of environmental education policies around the globe" (Palmer, 1998, p. 8).

By the time I was in elementary school in the early 1980's, these guidelines were being implemented in schools in the United States primarily through extra-curricular add-ons such as the *Project WILD* curriculum developed and distributed by a national non-profit organization (Council for Environmental Education, 2000). People like my mother attended *Project WILD* trainings, received the curriculum, and then volunteered in schools to conduct activities from the curriculum. I was lucky that my sixth grade teacher and my mother both cared enough about the goals of environmental education to collaborate on such a project. In college ten years later, I attended a similar training and received a *Project Learning Tree* curriculum (American Forest Foundation, 2005). The 2005 version of this curriculum still cites the Tbilisi Declaration as providing the guiding framework, defining environmental education as "a learning process that increases people's awareness and knowledge about the environment and related issues. It helps to develop the necessary skills and expertise to address these issues, and fosters attitudes, motivations, and commitments to make informed decisions and take responsible action" (p. iv).

I was personally dissatisfied with the *Project Learning Tree* approach to environmental education, and for my senior honors thesis in college, I took a different tack and wrote a tour guide to the natural history of my college campus. In retrospect, I see this as an example of place-based education. However, I did not have the means or motives to articulate my rationale at the time, and I was unaware that there was a burgeoning critique of environmental education in my country until I took an environmental education course at UAF in 1998. Our texts were Steve van Matre's (1990) *Earth Education* and Nabhan and Trimble's (1994) *The Geography of Childhood*. Both of these texts outline a much different, more holistic vision for addressing the goals of environmental education. Indeed, van Matre proposes "seven reasons why environmental education failed," citing an international objective that is too broadly defined, an approach too reliant on supplemental materials, projects that are too short-term in scope, and funding from agencies and industries that helped create the problems in the first place (p. 47).

One of the most renowned critics of standard environmental education is education theorist David Orr. In an influential essay from his classic *Earth in Mind: On Education, Environment, and the Human Prospect* (1994), he outlines his concept of *ecological literacy* and explains why environmental education falls short of creating such literacy in our society. Capra (1996) succinctly presents Orr's concept in the following definition: "Being ecologically literate, or 'ecoliterate,' means understanding the principles of organization of ecological communities

(ecosystems) and using those principles for creating sustainable human communities" (p. 297).
Orr elaborates,

> To the extent that most educators have noticed the environment, they have
> regarded it as a set of problems which are: (1) solvable (unlike dilemmas, which
> are not) by (2) the analytical tools and methods of reductionist science which (3)
> create value-neutral, technological remedies that will not create even worse side
> effects…Since there is no particular need for an ecologically literate and
> ecologically competent public, environmental education is most often regarded as
> an extra in the curriculum, not as a core requirement or an aspect pervading the
> entire educational process (1994, p. 12).

Several related bodies of thought about human-environment relationships and education have
emerged as more holistic alternatives to the limits of mainstream environmental education. These
include *ecological education* (Smith, 1999), *bioregional education* (Theobald, 1997), *deep
ecology* (Devall & Sessions, 1985) and *sense of place* (Feld & Basso, 1996). Another example is
the Masters of Art degree I earned in *Earth Literacy*, a program designed to build upon Orr's
concept of ecological literacy by including an exploration of cultural relationships with natural
environments.

Another issue that receives much attention among environmental education critics is the
concern that such education is problematic because it resembles indoctrination motivated by
politics (Dawson, 1995; Jickling, 1992, 2003), something from which educators are supposed to
insulate their students. My environmental education professor emphasized the importance of
wearing "two hats" as environmental educators. We may be so-called environmentalists separate
from our role as educators, but when we put on the educator hat, we must set aside our own
personal ideologies in the name of unbiased education. The *Project Learning Tree* curriculum
deflects this criticism by citing one of the program's founders, explaining, "'Early on we agreed
that our goal was helping students learn HOW to think, not WHAT to think'" (American Forest
Foundation, 2005, p. v).

Debates over the theory and practice of environmental education abound, and it is not the
intention of this paper to review the complete discourse. (See Palmer, 1998 for an excellent
review.) Despite the problems with mainstream approaches to environmental education in the
US, I do support the goals outlined by Tbilisi. I provide this background in environmental
education for two reasons; the first is because my own search for a more appropriate educational

framework to foster ecological literacy in my country has in part led me to place-based education. Second, many of the goals and approaches of place-based education overlap with those of environmental education in that place-based education connects students to the local ecology of their communities.

3.3.2 Outdoor and Experiential Education

I group several additional approaches related to place-based education in this section, primarily outdoor and experiential education. These two frameworks do not have as clear beginnings as the environmental education movement, and the differences among the three approaches are not always clear. As Adkins and Simmons (2002) explain, "For many educators, the terms *outdoor*, *experiential*, and *environmental education* are perceived as interchangeable" (p. 1). They then go on to differentiate among these approaches, citing the Tbilisi Declaration to describe environmental education.

Outdoor education is clearly related to environmental education because it usually occurs in what educators may consider a natural environment; however, the emphasis is on being outdoors to provide "a *context* for learning" (p. 1). One of the most well-developed outdoor education programs in the US is the National Outdoors Leadership School (NOLS), which describes itself as "the premier teacher of outdoor skills and leadership" and "offers courses 10 days to full semesters in the world's most spectacular wilderness classrooms" (www.nols.edu, Accessed November 24, 2006). NOLS serves as an example of a mainstream approach to outdoor education, in which the emphasis is on learning skills necessary to enjoy natural areas. However, many classroom teachers may use an outdoors approach differently. "For example, a teacher could take students outside to measure objects on the schoolyard for a mathematics lesson" (Adkins & Simmons, 2002, p. 1).

Experiential education has a straightforward definition offered by the Association of Experiential Education: "Experiential education is a philosophy and methodology in which educators purposefully engage with learners in direct experience and focused reflection in order to increase knowledge, develop skills and clarify values." (www.aee.org, Accessed February 1, 2008). The emphasis in this approach is on the learner's experience. Many other labels are used for similar experiential approaches, such as inquiry-based or project-based learning, all of which put the learner at the center of the educational process. A well-known example of an effective program that drew from students' experiences is *Foxfire*, which started out as a magazine written and published by a high school class in rural Georgia in the late 1960's

and burgeoned into a multi-volume series of books and a national model for educational reform (see www.foxfire.org). I was exposed to Foxfire in elementary school as well, by a fifth grade teacher who drew from the books to incorporate hands-on activities in our classroom. At that age, I never thought to associate *Foxfire* with *Project WILD*. And yet both approaches have in part prompted the emergence of place-based education.

Eliot Wigginton, the teacher who started the project in a desperate attempt to engage his rebellious and rambunctious students, explains in the introduction to the first *Foxfire* (1972) volume how the project began. He walked into his high school English classroom one day and announced that they would be writing a magazine together.

> The contents? There were lots of possibilities. Many older people in this area,
> for example, still plant today by the signs of the zodiac and the stages of the
> moon. I had heard them mention it, but I didn't know what it meant… [M]y kids
> didn't really know what it was either, and soon they were as curious as I was.
> Why not find out and turn the information into an article? So they went home
> and talked—really talked—to their own relatives, some of them for the first time.
> From those conversations came superstitions, old home remedies, weather signs,
> a story about a hog hunt, a taped interview with the retired sheriff about the time
> the local bank was robbed—and directions for planting by the signs. It was
> looking good (p. 11).

What emerged from this experiment has become the stuff of legend—a wildly successful and long-term program that managed to address conventional content goals through an experiential approach. Wigginton asks, "Is the subject, English, ignored in the process? Hardly. In fact, the opposite is true… [The students] learn more about English than from any other curriculum I could devise" (p. 13).

3.3.3 Summary

Adkins and Simmons (2002) summarize the relationship among environmental, outdoor, and experiential education as follows:

> Outdoor education is a direct antecedent of environmental education but can
> include other subject matter than learning about the environment. Experiential
> education often employs outdoor settings but can take place anywhere
> individuals learn by doing. Environmental education can take place outdoors
> using experiential approaches or indoors using a standard textbook (p. 2).

I suggest that the area of overlap among these three approaches constitutes the realm of place-based education. Place-based education also appears to be a contemporary attempt to put into practice the philosophy of John Dewey, as he is cited by almost every writer on place-based education that I have come across. Adkins and Simmons (2002) claim that environmental, experiential and outdoor education all have their roots in Dewey's educational work. Similarly, in their review of place-based education, Woodhouse and Knapp (2000) quote Dewey in their opening paragraph:

> [I]n *The School and Society*, John Dewey advocated an experiential approach to student learning in the local environment: 'Experience [outside the school] has its geographical aspect, its artistic and its literary, its scientific and its historical sides. All studies arise from aspects of the one earth and the one life lived upon it' (1915, p. 91); (Woodhouse & Knapp, 2000, p. 1).

Dewey's body of work from the early 1900's is massive—his *Collected Works* span thirty-seven volumes—and I cannot do it justice in this cursory review. Suffice to say that his work is solidly linked to the progressive and pragmatic trends in American educational philosophy and that he serves as a highly influential figure in a multitude of educational reform attempts in the last several decades (Hickman & Alexander, 1998). However, there has been some criticism that his ideas have been hard to enact and then assess (Fishman & McCarthy, 1998) and that they are too grounded in a Western focus on the individual (Bowers, 1987). Regardless, it is imperative to recognize Dewey's significant influence on place-based education.

3.4 The Role of Place in Indigenous and Cross-Cultural Education

Because I am working in a largely cross-cultural setting for my research in the context of the Alaska Native-focused Effie Kokrine Charter School, I have also been investigating the relationship between indigenous approaches to education reform and place-based education. Many writers claim that the concept of place is integral to how indigenous people learn about and relate to the natural world. The Sioux scholar Vine Deloria (1991) explores the relationship between *power* and *place* in Native epistemologies, explaining that in Indian systems of knowledge "power and place are dominant concepts—*power* being the living energy that inhabits and/or composes the universe, and *place* being the relationship of things to each other." He concludes with the interesting statement, "Power and place produce personality" (p. 14). Regarding place in education, Gregory Cajete (1994) summarizes,

American Indian people's inherent identification with their Place presents one of

the most viable alternative paradigms for practicing the art of relationship to the

natural world…For Indians, living in a harmonious and sustainable relationship

with the land was a sacred responsibility. It was a perspective tempered with the

realization that neglect of this responsibility would bring dire results and

retribution from the Earth. The perpetuation of this sacred and survival-oriented

responsibility from one generation to the next was accomplished through myth,

ritual, art, traditional education, and honoring the psychology of place (p. 81-2).

This philosophy is echoed by Kawagley and Barnhardt (1999) in their essay, "Education Indigenous to Place: Western Science Meets Indigenous Reality." They write that Alaska Native people used educational approaches that "were carefully constructed around observing natural processes, adapting modes of survival, obtaining sustenance from the plant and animal world, and using natural materials to make their tools and implements" (p. 117). Educators must not only draw upon this worldview when they teach indigenous students, but also recognize that Alaska Native and Western approaches to education can inform each other.

The theoretical framework of *traditional ecological knowledge* (TEK) may offer one way to illuminate the relationship between ecological components of place-based education and indigenous approaches to education. Posey and Anderson (2001) explain that TEK is a concept used by scientists to explain "traditional knowledge, innovations, and practices." However,

TEK is far more than a simple compilation of facts. It is the basis for local-level

decision making in areas of contemporary life, including natural resource

management, nutrition, food preparation, health, education, and community and

social organization. TEK is holistic, inherently dynamic, constantly evolving

through experimentation and innovation, fresh insight, and external stimuli. TEK

is transmitted in many ways. Most is done through repeated practice—

apprenticeships with elders and specialists (p. 13).

Pierotti and Wildcat (2000) add that "TEK is strongly tied to specific physical localities; therefore, all aspects of the physical space can be considered part of the community, including animals, plants, and landforms. As a consequence, native worldviews can be considered to be spatially oriented, in contrast to the temporal orientation of Western political and historical thought" (p. 1333). This definition ties TEK closely to place-based education. There is disagreement over whether TEK belongs entirely to the domain of indigenous cultures or whether

"local knowledge" of a particular environment is sufficient (Berkes, 1999). For instance, Huntington (2000) uses "TEK to mean the knowledge and insights acquired through extensive observation of an area or species. This may include knowledge passed down in an oral tradition, or shared among users of a resource" (p. 1270). Such knowledge may apply to non-indigenous groups. TEK has an educational component in that how knowledge is shared among members of a socio-cultural group is fundamental to educational processes. Among Alaska Native groups, knowledge of how to live well in a specific place "was made understandable through thoughtful stories and demonstration," or education (Kawagley & Barnhardt, 1999, p. 117).

One of the most thorough case studies of indigenous education reform is Teresa McCarty's (2002) *A Place to be Navajo*, an examination of one of the first schools in the United States to be designed and managed by an indigenous community. In this case, the community is Rough Rock, Arizona, in the Navajo Nation near the Four Corners. At the time of the book's publication, researcher McCarty had a unique twenty-plus year relationship with the community, having worked in curriculum development for the school a few years after its founding in 1975. To provide a background for her study, McCarty presents a picture of how education happened traditionally in Navajo communities before formal Western education was established. She writes, "As in other Indigenous communities during this time, education was not an experience divorced from daily life, but was integral to children's socialization and to everyday affairs" (p. 32). For example, one of the primary subsistence activities of the Navajo was raising sheep. Children were given their first sheep at the seemingly young ages of 6 to 9 and started learning how to care for them. "Parents stressed that livestock would provide children with a living and enable them to survive to old age. Daily observation and experience verified and reinforced those lessons" (p. 34). The practice of raising sheep was integral to being Navajo and living in an environment that supported such a subsistence practice. McCarty summarizes,

> Traditional education, then, involved observation and involvement in family
> activities related to the home, the herd, and the fields, and the gradual assumption
> of adult responsibilities. Through formal and informal processes, children
> learned physical and intellectual endurance; in lectures, storytelling, and
> participation in the social world, they learned the roles, relationships, and ideals
> of a good and full life. They learned, in short, what it meant *to be Navajo* (p. 35-
> 6, italics in original).

Moving into the more recent past, McCarty then examines the original design of the community school of Rough Rock. The initiative was originally funded through a federal economic development program and as such was a school not just for the children, but also for the entire community. Community members designed the curriculum and composed the school board, and regularly worked as educators in the school to participate in various projects such as traditional crafts and a greenhouse and poultry program. (Ironically, despite the emphasis on sheep in McCarty's description of traditional education, she does not mention sheep as part of the school's original curriculum.) The communal nature of the school drew from Navajo kinship principles. One of the primary foci of the school was its bilingual emphasis; the primary language of instruction was Navajo, and English was taught as a second language.

McCarty goes on to trace the turbulent evolution of the school over the next 30 years, especially focusing on the inconsistent and unreliable federal funding situation and how that situation related to changes in curriculum over time. Much to her dismay, as she was finalizing her book for the 30th anniversary of the school, a huge protest and boycott of the school broke out, indicating that the community and the school administration were far from united. As she explains, "At the heart of the struggle are fundamental contradictions in the Federal-tribal relationship which, on the one hand, recognizes and protects tribal sovereignty, and, on the other, breeds bureaucratic arrangements that stifle and suppress sovereignty in myriad ways" (p. 196). Despite these many hurdles, through the 30 years of struggle Rough Rock remained a bilingual/bicultural school in theory if not always in practice, always drawing from community resources to various extents. Indeed, the experience of Rough Rock shows that indigenous education ideally is inseparable from the community and from local place.

Takako (2004) conducted four in-depth case studies of what her title calls "outdoor environmental education" programs in Scotland, Nunavut, and Alaska. She examines these educational programs through the lenses of place-based and sustainability education and cross-cultural studies, sharing conclusions about each of the programs individually and then concluding with a cross-study examination of the four programs. She uses the program in Scotland to represent a mainstream "Western" approach to environmental education, in which students participate in extra-curricular conservation work involving trail maintenance. The other three programs take place in indigenous communities from three different cultures—the Canadian Inuit, the Kodiak Alutiiq, and the Russian Mission Yup'ik, and are focused more on reclaiming local traditions of living on the land. Clearly, her criteria for defining *outdoor environmental*

education program are quite broad. But by being so broad, she allows for interesting cross-cultural insights. For instance, concerning attitudes reflected in these programs involving *place*, she writes that the program in Scotland

> …intended to involve locals to a certain extent, but this did not happen to any significant degree. Interviews with parents showed no evidence that they considered their own or other local people's involvement to be important and/or necessary. This may be partly because these are institutionalised enterprises; local residents did not feel enough 'ownership' of the projects to get involved. It may also indicate that locals in these places feel remote from their natural environment. On the other hand, the Inullariit Society, Kodiak Island Borough School District/Native Village of Afognak and Russian Mission School all had a clear intention to involve local communities in the programs. They saw that their goals could only be achieved in the long term through collaboration with communities (p. 484).

Regarding sustainability education, Takano share some thoughtful observations. First, she suggests that the construct of *education for sustainability* (EFS) is a Western construct that may not be appropriate to apply in the same way to a Western program as to her indigenous education case studies. On the other hand, she suggests that "the concept of 'sustainability' is manifest in the traditional worldviews of Inuit, Alutiiq, and Yup'ik" (p. 512). Specifically, she proposes that the indigenous focus on *respect* "has direct implications for sustainability" (p. 513). However, she cautions that just because a concept of sustainability appears to be embedded in indigenous worldviews and practices, one cannot conclude that a "universal philosophical framework for EFS" exists or can be constructed from these indigenous worldviews. Sustainability depends on local contexts, and local contexts are different for indigenous societies now than when much of their worldviews were developed during previous generations (p. 514). Takano concludes with an in-depth review of the academic discussion over whether indigenous peoples can be considered "original ecologists." She summarizes by suggesting that "The construction of a new knowledge system would be achieved by assessing what the indigenous peoples consider necessary for continuing to live in this world," which would by necessity include careful and appropriate incorporation of Western concepts in societies already heavily influenced by these concepts (p. 518).

3.5 Designing and Assessing Place-based Sustainability Education

In the context of formal Western education, one cannot discuss educational and curriculum design separately from evaluation and assessment. Therefore, how does one design place-based sustainability education that includes an assessment plan for those being educated? In non-formal educational settings, this question may be less critical. However, given that I am working in a formal education setting in which the school and its students are expected to meet federal and state standards, I cannot avoid the question. Also, it is incumbent on proponents of sustainability education to offer a way to evaluate whether or not such education is in fact encouraging the emergence of sustainability, and to explore ways to do this within the formal education system as well as through non-formal means. In these final sections, I will review several place-based educational models and research as a way to explore these issues, pulling together several themes from the rest of the paper.

Capra's "laboratory" includes several education projects implemented by The Center for Ecoliteracy (CEL), a non-profit organization that he co-founded. The CEL has developed sixteen "Education for Sustainability Competencies" within four different categories (Table 3.1).

Table 3.1 Center for Ecoliteracy Education for Sustainability Competencies
(www.ecoliteracy.org/education/competencies.html, Accessed February, 2008)

Head	Heart	Hands	Spirit
Ecological knowledge	A deeply felt, not just understood, concern for the well-being of the Earth and of all living things	The ability to apply ecological knowledge to the practice of ecological design	A sense of wonder
The ability to think systemically	Empathy and the ability to see from and appreciate multiple perspectives	Practical skills to create and use tools, objects, and procedures required by sustainable communities	A capacity for reverence
The ability to think critically, to solve problems creatively, and to apply environmental ethics to new situations	A commitment to equity, justice, inclusivity, and respect for all people	The ability to assess and make adjustments to uses of energy and resources	A deep appreciation of place
The ability to assess the impact of human technologies and actions and to envision the long-term consequences of decisions	Skills in building, governing, and sustaining communities	The capacity to convert convictions into practical and effective action	A feeling of kinship with the natural world, and the ability to invoke that feeling in others

The "head" category has a cognitive focus, the "heart" an affective focus, the "hands" a practical focus, and "spirit" a holistic spirituality. These competencies, especially those in *Hands*, seem to reflect the alternative, indigenous view of competency suggested by Kawagley (1995).

> Western thought also differs from Native thought in its notion of competency. In Western terms, competency is based on predetermined ideas of what a person should know in a certain body of knowledge, which is then measured indirectly through various forms of tests… Such an approach does not address whether that person is really capable of putting the knowledge into practice. In the traditional Native sense, competency had an unequivocal relationship to survival or extinction. You either had it, or you didn't, and survival was the ultimate indicator (p. 88).

However, rather than *survival* in the sense Kawagley is using the word, CEL's competencies suggest the more complicated and systemic notion of *sustainability* as an indicator of competency. Survival can have an individual focus, whereas Capra's concept of sustainability necessarily applies to a community level. Much as the State of Alaska has done with cultural standards, the State of Vermont has taken on the challenge of merging sustainability goals with standardized education by articulating a state-wide sustainability standard and associated grade level assessments for its public schools (Table 3.2).

Several educational researchers have been investigating and promoting the idea of *understanding* as a way to design curriculum and assess learning (Wiggins & McTighe, 1998; Wiske, 1998). This is the method being used by teachers and curriculum writers at the Effie Kokrine Charter School. Not only does this type of educational design work well for curriculum centered in a Native Alaskan philosophy of education, but I also suggest that a focus on understanding is crucial to implementing sustainability education effectively. In a handbook written for educators, Wiggins and McTighe (1998) explain,

> Teachers are designers. As essential act of our profession is the design of curriculum and learning experiences to meet specified purposes. We are also designers of assessments to diagnose student needs to guide our teaching and to enable us, our students, and others (parents and administrators) to determine whether our goals have been achieved; that is, did the students learn *and* understand the desired knowledge? (p. 8)

Table 3.2 State of Vermont Sustainability Standard, taken from Vermont Education for Sustainability website (www.vtefs.org/resources/vtstandards.html, Accessed Nov, 2007)

Standard: Students make decisions that demonstrate understanding of natural and human communities, the ecological. economic, political, or social systems within them, and awareness of how their personal and collective actions affect the sustainability of these interrelated systems. This is evident when students:		
Grades Pre K-4	**Grades 5-8**	**Grades 9-12**
a. Identify items that they consume on a daily basis and analyze the resources used in producing, transporting, using, and disposing of these items, including the origins of the resources; b. Distinguish between personal wants and needs and identify how marketing and advertising inform their consumption patterns; c. Identify and practice ways to repair, re-use, recycle (e.g., use both sides of paper), and design and implement a plan to monitor personal resource consumption; d. Explore local natural and human communities (e.g., vernal pools, farms, mines, cities), identify the systems within them, and what is required for these communities to be sustained.	aa. Conduct a life-cycle analysis (e.g., production, distribution, consumption. disposal) for both synthetic and natural products (e.g., toothbrush, maple syrup, automobile). including the effects of these life-cycles on the sustainability of a natural and human community; bb. Collect data in order to investigate and analyze how personal consumption patterns affect the sustainability of natural and human communities (e.g., buying local and imported apples in Vermont); cc. Identify and practice ways to repair, re-use, recycle (e.g., collect and redistribute leftover household paint), and design and implement a plan to monitor community resource consumption (e.g., survey community water, electric, and/or fuel use); dd. Demonstrate understanding that natural and human communities are part of larger systems (e.g., farms as part of the regional watershed and food system for cities, a mine as part of the regional economy) and that the interrelationships between all systems affect their sustainability.	Evidence cc. and dd. applies, plus aaa. Prepare an impact assessment (which includes ecological, economic, political, and social factors) that analyzes the effect of a particular product's or project's life-cycle on the sustainability of a natural and human community; bbb. Collect data in order to investigate and analyze the sustainability of societal consumption patterns that have direct and indirect impact on the local and global environment, economy, and society (e.g., fuel efficiency of vehicles).

Teachers use local, state, and federal standards to create curriculum and assessment tools through a process of "backwards design," in which the end goal of understanding whichever standards are being addressed serves as the starting point for design. For instance, if I wanted to design a lesson or a more extensive curriculum centered on "the ability to apply ecological knowledge to

the practice of ecological design," I would first ask myself what types of performance tasks or other "tests" of knowledge would serve as sufficient evidence of learning among my students that they have mastered this ability. Perhaps I would ask them to work as a group to design a school garden. I would then create lessons to transmit the knowledge they would need and to facilitate their understanding of the application of such knowledge. Principles of systems thinking could be integrated into such design as well. I would need to understand that education is not always a linear process for every student, and that simply lecturing them about ecological agriculture will not necessarily result in the understanding that I am aiming for.

Indeed, another body of education research encourages teachers to account for multiple learning styles (Dunn & Dunn, 1978; Reid, 2005) and intelligences (Gardner, 1999) in their practice. The Effie Kokrine Charter School (EKCS) promotes itself as a learning style school, in which teaching accounts for the fact that different students have different ways of learning. This is especially crucial in cross-cultural education, where students from a culture that is not the dominant, mainstream culture may learn quite differently. A related idea is that different students also have different types of intelligence. Gardner proposes eight types of intelligences—*visual/spatial*, *verbal/linguistic*, *logical/mathematical*, *musical/rhythmic*, *bodily/kinesthetic*, *interpersonal*, *intrapersonal*, and *naturalist* (Gardner, 1999; Roth, 1998). I will not explore these in detail here. I mention multiple learning types and intelligences in order to point out that place-based education is an excellent way to account for these differences among students because they are all permitted to express their relationship to and understanding of place and community in different ways. Taking these differences into account insists in using a systems perspective, in which students are permitted to contribute to their communities in different ways, just as adults do.

3.6 Grounding Sustainability Education in Community Food Systems

Because my research involves using place-based education to improve food systems in Interior Alaska, the remainder of this chapter investigates various models for using youth and school gardening as an example of place-based education, especially those that promote sustainability. Despite a vast array of school garden initiatives, I have found surprisingly little research literature on the theory or practice of school gardening, especially concerning using gardening as a link between education and sustainable community food systems. There is certainly lots of fertile ground for investigation as well as a demand for such research. For

instance, an employee of the Washington Youth Garden expressed her need for research showing the effectiveness of school gardening in meeting program objectives; as a manager of a nonprofit educational program, she is expected to show tangible results to her funders (Kim Rush, personal communication, March 2006). Such managers and funders are interested in a variety of objectives that may have little to do with strengthening food systems. In this review, I am including literature that relates to other educational objectives of school gardening as well, such as increasing environmental literacy in students.

Some of the most thorough studies of school gardens can be found in dissertations and theses, such as Bachert's (1979) *History and Analysis of the School Garden Movement in America, 1890-1910*, and Andrews' (2001) *Growing Sites: The Use of Gardening and Farming in Youth Development Projects*, in which she investigates Boston-based The Food Project and other youth gardening programs. Another foundational work is Laurie Thorp's dissertation (2001), also published as a book, *The Pull of the Earth: Participatory Ethnography in the School Garden* (2006). Both Andrews' and Thorps' works are in-depth qualitative studies presented in a narrative format. Andrew's primary goal was to investigate the role of nonprofit organizations in using gardening and farming in youth development programs. She drew from a number of theoretical frameworks in alternative youth education to illuminate her study. Her methods included working at The Food Project for several months, conducting participant observation and interviews both during and after her time there, and attending a *Rooted in Community* conference in 2001 at which she also conducted numerous informal and formal interviews. In her conclusions, she integrates her experiences and data into a vision for how youth gardens can provide holistic learning experiences for youth, especially adolescents.

Thorp had a similar approach in that she actively participated in a youth gardening program to generate her insights and conclusions. However, she spent four years volunteering at an elementary school in Michigan to investigate the role that school gardening can play in elementary education. As she describes it, her initial intention was to adapt the Texas *Junior Master Gardener* curriculum (Seagraves, 1999) to this Michigan school. However, staying true to her research philosophy of emergent and collaborative research design, she quickly realized that a better role for her to play was to become the volunteer garden coordinator at the school and serve as a resource for teachers. After four years, she accomplished quite a lot, but her conclusions are far from generalizable. With many caveats about the limitations of drawing conclusions at all, she shares some insights from her experience, such as "A garden is a potent

force in shaping school culture," and "The garden connects children to the organizing principle of experience" (Thorp, 2006, p.145). Regarding food production, she writes, "The garden allows us to change the status of food from a mere commodity for consumption to something sacred" (p.146).

Another approach to research on school gardening is reflected in a series of articles published from 1999 through 2005 in *HortTechnology* by a team of researchers at the Departments of Horticultural Sciences and Agricultural Education at Texas A&M University. Many of these researchers use more quantitative methods, indicated by titles such as *Growing Minds: The Effect of a School Gardening Program on the Science Achievement of Elementary Students* (Klemmer, Waliczek & Zajicek, 2005). In the opening essay for a special *HortTech* issue on *Youth in Agriculture*, a pair of researchers write,

> [M]any [youth gardening] studies to date have been inconclusive, and some are
> essentially anecdotal, thus lacking the scientific rigor to substantiate the
> suggested benefits. Large-scale, scientifically valid studies are needed to secure
> administrative support and funding for such programs, but research in this field
> has proven to have many complications not present in research with plant
> subjects (Phibbs & Relf, 2005, p. 425)

In the Klemmer, et al. (2005) study included in this special section, researchers developed and implemented science achievement test instruments and concluded that "the science achievement of students who participated in a hands-on school gardening program was higher than that of students who did not participate in gardening activities as part of their science curriculum" (p. 452). In other articles, researchers found that individuals' positive values about trees were strongly correlated with their experiences gardening as youth (Lohr & Pearson-Mims, 2005), that students in a school gardening program increased their overall life skills—such as working with groups and self-understanding—more than a group of students who did not participate (Robinson & Zajicek, 2005), and that gardening among elementary school students increased their scores on environmental attitude surveys (Skelly & Zajicek, 1998).

Another source of information about the effectiveness of school gardening projects can be found in informal case studies, which the above researchers might consider to be anecdotal but which remain part of the school gardening literature nonetheless. One such case study involved the Chicago School Garden Initiative (Johnson & Bjornson, 2003). The book of the same title details the evolution of the initiative, highlights numerous examples of school gardens around the

city, and provides guidance for other organizations who might be starting or managing similar urban school garden programs. A similar case study of Toronto's school gardening program, *A Breath of Fresh Air* includes breath-taking photos of gardens around Toronto.

Taken together, these bodies of literature provide the type of support that a program director might be looking for to show the benefits of gardening with youth. Because school gardening can be seen as a type of environmental, outdoor, and/or experiential education, one can also turn to literature in these fields to find evidence that school gardens can meet multiple educational objectives. However, I feel there is a significant lack in the research literature regarding the link between school gardens and community food systems. Such an investigation requires an interdisciplinary, systemic approach, one that perhaps does not fit into any of the above categories of qualitative, quantitative, or informal case studies.

One model of such an approach is that of Cornell University's Garden Mosaics (www.gardenmosaics.org, Accessed October 20, 2006), in which university faculty and graduate students collaborate with community members to design and investigate community and youth gardening programs. I find the collaborative, interdisciplinary research model to be unique in youth garden research. While based in Ithaca, New York, Garden Mosaics includes garden partnerships in several cities around the country and in South Africa. Garden Mosaics' broad mission is "Connecting youth and elders…to investigate the mosaic of plants, people and cultures in gardens, to learn about science, and to act together to enhance their community." In addition to contributing to local community garden initiatives, the program has produced a myriad of publications ranging from journal articles to on-line curriculum resources. As the principal investigator for the program, Marianne Krasny's goals are to link outreach and research through three main research areas, posted as follows on her website:

> (1) How do youth environmental education programs promote science understanding and civic action? (2) What participatory and other dissemination strategies promote educator professional development and program implementation? (3) How can we link university outreach with research and professional development of graduate and undergraduate students? (http://krasny.dnr.cornell.edu/page/research-rq.asp, Accessed October 20, 2006)

Most of the Garden Mosaics research literature investigates a specific angle of the program, such as Krasny and Doyle's (2002) article investigating the ways in which Garden Mosaics uses participatory approaches with youth. I have been unable to find publications that

explicitly examine links between educational gardening with youth and creating community food systems, but there are references to such links embedded in various publications. For instance, Schusler and Krasny (in press, available at

www.gardenmosaics.cornell.edu/pgs/aboutus/materials/Youth_Participation.pdf) explain that youth participants generate data that "will be used by the American Community Gardening Association to build a case for the importance of these urban settings for community development and food security" (p. 12).

This review of research has led me to two conclusions. First, my own work is timely and will fill a gap in research literature. Second, I have had to use additional sources to provide background for this comprehensive paper. Because of my own experience working for a youth gardening program in Fairbanks, I know that school gardening is burgeoning around the country. What is this phenomenon all about? And how does it relate to parallel efforts to make community food systems more sustainable?

3.7 Constructing an Image of Contemporary School Gardening

In this section, I address the above questions by compiling information on a variety of specific school gardens and investigating various themes and objectives that I see these projects demonstrating. I attempt to uncover some of the common broad themes (visions or missions) and approaches for meeting various goals and objectives tied to these themes. The school garden programs reviewed herein and described in Table 3.3 were identified through an evolving process that included searching numerous websites, reviewing literature for references to specific programs, and soliciting recommendations from people involved either in school gardening or in community food system work. The internet is an extensive resource for various practitioner communities, and school gardeners are no exception. Some websites offer "clearinghouses" of links to other resources. These often proved to be the backbone of my research. For instance, I relied in large part on one website, www.KidsGardening.com, which includes a registry of school garden projects in North America. There are other online registries of youth garden programs, such as through American Horticultural Society (http://www.ahs.org), but they are much less extensive than KidsGardening.com. A program of the National Gardening Association (NGA), this website offers a variety of support for anyone working with school gardens. On this website, NGA publishes electronic newsletters, sells curricula and other educational materials, and

Table 3.3 Summary of School Garden Programs, examples from the United States

Name of program, website address, and location	Description from website	Focus of program, i.e. age group, primary goals
	Section A: Youth garden programs separate from schools	
Garden Mosaics www.gardenmosaics.org Cornell University, Ithaca, NY	"Garden Mosaics is a youth and community education program that combines science learning with intergenerational mentoring, multicultural understanding, and community action. The initial idea for Garden Mosaics came from a realization that community gardens, because of their unusual blend of people, cultures, plants, and activism, offer unique sites for youth education within a community setting. Educators from non-profit organizations and universities, undergraduate and graduate students, community gardeners, and youth in cities across the US contributed to the development of the Garden Mosaics program." Mission: "Connecting youth and elders to investigate the mosaic of plants, people, and cultures in gardens, to learn about science, and to act together to enhance their community."	All ages, many ethnicities; Education, both classroom and informal.
The Food Project www.thefoodproject.org Boston and Lincoln, MA	"Our mission is to create a thoughtful and productive community of youth and adults from diverse backgrounds who work together to build a sustainable food system. This community produces healthy food for residents of the city and suburbs, provides youth leadership opportunities, and inspires and supports others to create change in their own communities."	High school age youth employment; "We integrate young people of all backgrounds in meaningful work throughout the entire organization. This creates a multi-age, multicultural community that is dynamic and effective in accomplishing change"
Washington Youth Garden, www.fona.org/index.php?option=com_content&task=view&id=38 Washington, DC	"Using the garden cycle as a tool, the mission of the Washington Youth Garden at the U.S. National Arboretum is to inspire children and families to engage in self-discovery, explore relationships with food and the natural world, and contribute to the health and well-being of their communities."	3rd and 4th graders; residents of Northeast DC teach children and families the science, art and pleasure of growing one's own food
Rooted in Community www.rootedincommunity.org	"Rooted in Community (RIC) is a national grassroots network that empowers young people to take leadership in their own communities. We are a diverse movement of youth and adult counterparts who are committed to building healthy communities through urban and rural agriculture, related environmental justice, community gardening, and food security work. Initiated in 1998, RIC helps strengthen the leadership skills of youth and adult community organizers through intensive national trainings, action days, and networking opportunities."	Networking among local groups through annual conferences.

Table 3.3 continued

Name of program, website address, and location	Description from website	Focus of program, i.e. age group, primary goals
¡Cultiva! http://www.growinggardens.org/english/ programs/youth/cultiva/index.html Boulder, Colorado	"¡Cultiva! is a youth operated organic market garden. Participants (ages 11-19) will plant and nurture a 2 acre garden, harvest the produce weekly to sell at the Boulder County Farmer's Market, and donate a portion of what is harvested to those in need in the local community. Through this project, youth will learn to care for and protect the environment, will learn how to operate a small business, and will take part in a variety of activities which create positive change for the community, the environment, and youth themselves."	11-19 years old; Employment-- leadership skills, community service, sustainable agriculture skills, life skills, business skills, interpersonal skills, and entrepreneurial opportunities. Curriculum for local elementary and middle schools.
Garden-Raised Bounty (GRuB) http://goodgrub.org Olympia, Washington	"We dedicate ourselves to nourishing community by empowering people to grow good food. Through our Cultivating Youth programs, designed for young people ages 13 through 19, GRuB focuses on building youths' nutrition, self-esteem, community connections, and academic enthusiasm. These programs have both academic and employment components."	"High school and middle school students participate in our spring and fall academic programs, which have a strong emphasis on science, reading, and writing. Students earn science, community service, and/or elective credit (dependent on their host school) for engaging in challenging curriculum at our Sister Holly Garden site. We are now serving youth through eight schools and agencies."
Section B: School garden partnerships (with nonprofits, research institutions, and/or government agencies)		
The Edible Schoolyard, California www.ediblesdchoolyard.com Berkeley, CA	"The mission of the Edible Schoolyard at Martin Luther King, Jr. Middle School is to create and sustain an organic garden and landscape that is wholly integrated into the school's curriculum and lunch program. It involves the students in all aspects of farming the garden – along with preparing, serving and eating the food – as a means of awakening their senses and encouraging awareness and appreciation of the transformative values of nourishment, community, and stewardship of the land."	Formal education setting at elementary level
Vermont FEED www.vtfeed.org Vermont statewide	"VT FEED works with schools and communities to raise awareness about healthy food, the role of Vermont farms and farmers, and good nutrition. We act as a catalyst for rebuilding healthy food systems, and to cultivate links between the classrooms, cafeterias, local farms, and communities."	Multi-age school students. Education in formal schools and public education

Table 3.3 continued

Name of program, website address, and location	Description from website	Focus of program, i.e. age group, primary goals
Food-based Ecological Education Design (FEED), web.pdx.edu/~feed/index.htm Portland, OR	"FEED empowers youth through food and gardening to achieve a good life. Towards this end we have a long-term vision where schools and communities, keeping children at the center, evolve a food and garden-based pedagogy that promotes: learning gardens, community building, from soil to table; communal and individual health; multi-sensory learning which engages the multiple intelligences; intergenerational learning; multicultural learning."	University outreach
Chicago School Garden Initiative, Illinois www.chicagobotanic.org/schoolg arden/index.php Chicago, IL	"The Chicago Botanic Garden advocates the use of plant-based learning across the curriculum. This goal is achieved by training teachers to incorporate the use of outdoor gardens, natural settings and plant activities in their classroom lessons. The Chicago School Garden Initiative has developed a process and set of practices that can support the good work and creative thinking of thousands of school garden advocates throughout the country."	Multi-age school students; Education in formal schools
The Growing Connection www.ahs.org/youth_gardening/grow ing_connection.htm Alexandria, VA (administrative offices)	"The American Horticultural Society (AHS) and the Food and Agriculture Organization of the United Nations (FAO) believe children are the future and connecting them to the importance of food plants is critical to their life. The Growing Connection engages children in the science of growing food, the experience of sharing their culture and experiments using modern information technology, and offers hope by introducing innovative solutions to health and nutrition issues in the U.S. and around the world."	Middle school, international; Education, nutrition, culture
Granny's Garden www.grannysgardenschool.com Loveland, OH	Mission: "The mission of Granny's Garden School, Inc. is to collaborate with local educators to foster hands-on, schoolyard-based learning experiences for children by using the environment to teach across the curriculum." Vision: "Granny's Garden School, Inc., will be a model for the innovative and practical conversion of school grounds into self sufficient, living laboratories that use the environment to teach across the curriculum." "Granny's Garden School, Inc. (GGS) is about the community coming together to create a healthy, fun, creative and effective outdoor learning environment to enhance our school system. It is located on the grounds of the Loveland, OH primary and elementary schools. The schools share a campus and are attended by all of Loveland's 1,500 first through fourth graders. We are turning the school grounds and surround woods into living laboratories used by teachers and students during the school day. Evenings, weekends and during the summer there are programs for children and their parents that are open to all."	Elementary schools in a local district

Table 3.3 continued

Name of program, website address, and location	Description from website	Focus of program
Urban Nutrition Initiative www.urbannutrition.org/ Philadelphia, PA	"The Urban Nutrition Initiative (UNI) is a university-community partnership that engages K-16+ learners in an active, real-world problem-solving curriculum that strives to improve community nutrition and wellness. In 1999, UNI developed a partnership with University City High School to enable UNI to use their greenhouse to teach students about growing food. In 2000, a parking lot at the school was redeveloped into a schoolyard garden, run by students in UNI's youth job training and entrepreneurship program. UNI grew again in 2003, expanding its involvement to three schools and a church in West Philadelphia. UNI now has ten full-time, twenty part-time, and fifteen high school student employees."	K-16; Increasing food and nutrition knowledge; Increasing the supply of healthy foods; Encouraging and supporting active lifestyles.
Slow Food In Schools www.slowfoodusa.org/education/index.html Brooklyn, NY (administrative offices)	"Slow Food in Schools is a unique national program of garden to table projects with children that cultivates the senses and teaches an ecological approach to food. Following our mission, Slow Food USA is committed to awakening a child to the enjoyment and health benefits of quality foods and the principles of land stewardship through the Slow Food in Schools program. A growing program comprising more than 20 garden to table projects across the country, Slow Food in Schools helps children develop an appreciation for real, wholesome food and an understanding of sustainable food practices."	National nonprofit with multiple education and outreach programs
Agriculture in the Classroom www.agclassroom.org/aitc/index.htm Washington, DC (admin offices)	"Agriculture in the Classroom is a grassroots program coordinated by the United States Department of Agriculture. Its goal is to help students gain a greater awareness of the role of agriculture in the economy and society, so that they may become citizens who support wise agricultural policies. The program is carried out in each state, according to state needs and interests, by individuals representing farm organizations, agribusiness, education and government.	Grassroots program coordination by USDA to supply classrooms with agriculture education materials
Life Lab www.lifelab.org/about/index.html California statewide	"Life Lab Science Program is a 501 (c)(3) nonprofit organization and has been working in the field of science and environmental education for over twenty years. With our award winning curricula and programs, the organization helps schools develop gardens where children can create "living laboratories" for the study of the natural world. Since developing the first Life Lab school garden in Santa Cruz in 1978, Life Lab has worked with over 1400 schools across the US.	California-based non-profit provides gardening and other curriculum and programs to multiple schools

Table 3.3 continued

Section C: School-based garden programs

Name of program, website address, and location	Description from website	Focus of program
March Elementary School, (Excerpted from registry entry on www.kidsgardening.com) PA	"This is the third year for the gardening program, and we have expanded it to include the whole school (K-4). The fourth-grade students have harvested their vegetables: tomatoes, peppers, onions, carrots, potatoes, green beans, basil, and parsley. They used the harvest to make 6 pots of delicious minestrone soup in the classrooms, and they gave 75 pounds of extra vegetables to a local food bank as part of the Plant a Row for the Hungry campaign. In October, these students will add flower bulbs and compost to their butterfly garden, and in the winter, they will learn about Integrated Pest Management (IPM). The third grade students are learning about soil health, compost, and erosion. In the winter, they will learn about plant life cycles and grow vegetable seedlings for both their vegetable garden and the spring plant sale. A lesson on the soil food web and fertilizers will be taught in the spring	In-school elementary program; teachers use for a variety of purposes.
Hershey Montessori Farm School www.hersheymontessori.pvt.k12.oh.us Huntsburg, OH	"Hershey Montessori Farm School, located in Huntsburg, Ohio, one hour east of Cleveland, is a boarding and day school for students ages 12-15. A program of Hershey Montessori School in Concord Township, Ohio, an Association Montessori Internationale (AMI) school established in 1978, the Farm School is guided by Maria Montessori's vision of a farm-based community in which students, through participation in surrounding rural life and commerce, experience practical roles that integrate and engage academic studies, while building a greater connection to society and the world. The school serves approximately 45 local, national, and international students in grade 7 through grade 9 and works to reflect the words of Maria Montessori that 'Education should therefore include the two forms of work, manual and intellectual, for the same person, and thus make it understood by practical experience that these two kinds complete each other and are equally essential to a civilized existence.'"	Montessori middle school
The Montessori School at Lake Forest www.mslf.org Lake Forest, IL	"In January of 2004, the Montessori School of Lake Forest moved its Adolescent Program to Prairie Crossing Organic Farm, in Grayslake, Illinois. Prairie Crossing is a conservation community developed on principles of environmental protection, a healthy life style, a sense of place and community, economic diversity and viability, and life long learning. Adolescent Program students work not only with their Montessori teachers but also learn from Prairie Crossing specialists who are committed to the values expressed by the community's principles, and who are knowledgeable in many areas. Prairie Crossing's guiding principles are also consistent with Maria Montessori's vision of erdkinder, a program she designed for adolescents in which they live in a rural environment and experience both intellectual study and manual work."	Montessori middle school

Table 3.3 continued

Name of program, website address, and location	Description from website	Focus of program
Troy Howard Middle School www.sad34.net/%7esteve tanguay/garden.html Maine	"Our mission is to create a districtwide agricultural project that promotes healthy living. At the Troy Howard Middle School we strive to integrate the school and its land with the community. Our goal is to engage all students in a journey of discovery through gardening projects that achieve Maine science, math, technology and social studies learning results, produce nutritious food and pioneer action-research for sustainability Curriculum Overview. At the heart of the gardening program are the young people excited by making a real difference in their school and community."	Middle school, formal education, sustainability focus
Ross School www.ross.org (Excerpted from registry entry on www.kidsgardening.co m New York	"Our School garden is a collaboration of students from Grades 5 through 12, faculty/staff, and local farmers. All food grown in the garden is used as part of the school lunch. Each grade has selected a plot and picked the seasonal plants and seeds of their choice. One grade is planting herbs of the Rennaisance. Another grade, studying Native American Cultures, is planting the Three Sisters. We use compost from food waste from our School Food Service operations. Our newest additions are our stawberry beds, with seeds started at a local farm and an apple tree planted with the help of another local farmer. In addition, all food waste from the school's Food Service operation is trucked to local farms to become compost instead of landfill material."	A network of private K-12 schools with interdisciplinary curricula; New York
Hood River Middle School www.hoodriver.k12.or.us/s chool-dist-info/md-school.htm (Excerpted from registry entry on www.kidsgardening.co m Oregon	"The Hood River Middle School Outdoor Classroom Project offers students a higher level of connectivity between school and community. Using a hands-on approach to solving real-life problems, students accelerate through the basic skills and concepts outlined in the Oregon Academic Benchmarks. The Outdoor Classroom Project is a work in progress where students are the researchers, engineers, designers, architects, builders, and users of a multidisciplinary, multi-sensory learning experience. The Outdoor Classroom Project connects students to key concepts in sustainability through a field-based, experience-driven curriculum. Key themes of the project include Diversity, Water, Food, Energy, and Waste. The Outdoor Classroom Project follows a set of ideas called Permaculture, a term developed by Bill Mollison of Australia. Permaculture looks at food production as a design system that links water, shelter, plants, animals, and energy. By seeking to create gardens that are ecologically diverse, biologically sustainable, and economically productive one must take into account a wide array of variables. In these variables we find rich opportunities for math, science, writing, and social issues."	Middle school with school garden
Advent Youth Home Service www.adventhome.org Tennessee	"Our school works with students with ADHD and ODD and other learning disabilities. We have a big landscape in our school and the students work with it. Also we have a greenhouse that is not finished yet but we are working hard to make it happen. The garden and greenhouse are used in both the healing and learning processes for our students, and give them work and expierence with nature. All students work two to three hours in the garden and greenhouse. Is wonderful to see how they learn and experience and sense nature."	Serves developmentally-challenged students ; has garden program

identifies funding opportunities. The school garden registry is a searchable electronic database of over 1,000 school gardens around the world, though most registered gardens are in the United States. As one estimate puts the number of school gardens in California alone at 3,000 (Stone & Barlow, 2005), the NGA registry certainly does not list all the gardens in the country. But it offers a good cross-section of self-selected projects that submit brief descriptions of their programs to be posted on the website. Some of the specific programs listed in Table 3.3 I identified originally on this website. Others I found through other sources. For instance, I sent several emails to electronic list serves to which I am subscribed, such as the popular COMFOOD list operated by the Community Food Security Coalition (www.foodsecurity.org). I learned about at least three programs this way. The rest I identified through other internet and literature searching.

Table 3.3 lists names and descriptions of 22 school gardening programs that represent diverse approaches. I organized the gardens in Table 3.3 among the following categories: *Section A: Youth garden programs separate from schools*, *Section B: School garden partnerships (i.e. with nonprofits, research institutions, and/or government agencies)*, and *Section C: School-based garden programs*. These three categories reflect a broad spectrum of approaches to gardening with youth. On one end of the spectrum, school gardens exist in the schoolyard as a natural territory for learning rooted within the context of mainstream, public education, such as the garden at Troy Howard Middle School in Maine. On the other, educational gardening projects are conducted entirely separate from formal schools, such as in summer employment or camp opportunities (e.g. The Food Project and The Washington Youth Garden). In these cases, youth gardening organizations offer opportunities to youth outside of the educational and physical boundaries set by formal schools.

However, many—perhaps most—school gardens exist somewhere along the spectrum between entirely school-based gardens and entirely extracurricular programs and represent some partnership between schools and other entities. Some are extensive programs that include multiple schools and/or partnerships with nonprofit organizations or research institutions (e.g. The Edible Schoolyard and ¡Cultiva!). Also, these divisions are a bit artificial in that some programs cross boundaries. For instance, many summer programs integrate with schools in various ways, such as by helping create garden-based curriculum. ¡Cultiva!, based in Boulder, Colorado, is primarily a summer youth employment program but is also developing curriculum to

be used in local schools.   In cases such as this, gardens may meet multiple educational objectives.

While these approaches are best viewed on a spectrum, I believe that the starting point for many programs—either within the school or without—remains a clear distinction both in a physical and ideological sense. I agree with Greene (1910) that any gardening involving youth has educational outcomes. However, in today's school gardening movement, the objectives of gardening within a school context are more tightly aligned with formal educational objectives mandated at the local, state, or national level than are the objectives of extracurricular youth gardening. My own research is most concerned with the former. However, much can be learned from investigating all approaches to gardening with youth, and school garden programs can be made stronger by learning from and integrating some of the practical approaches of summer youth garden programs. Often, the mission of a school garden is determined in part by the age of the youth involved. School-based programs appear to be more common in elementary schools, where teachers often have more flexibility with their curriculum and control of their students' daily schedules than at higher levels. Summer youth programs tend to involve older youth, if they are employment programs, or sometimes whole families. The latter types of programs enable organizers to be more flexible in establishing their own goals for youth gardening. They are freer to offer experiences that they feel students may be missing in schools, or to operate unconstrained by the demands placed on teachers to meet government educational standards. On the other hand, many teachers see school-based gardens as an ideal vehicle for teaching to a variety of educational standards. Finally, the logistical challenges of the timing of gardening seasons influence the look of a program. Many extracurricular types of programs exist in areas of the country where the majority of the gardening season is limited to the summer months when schools are out of session. For this reason I am especially interested in school gardens in other northern areas with similar school year limitations as Alaska's. I began my search looking for just these types of gardens, but in the end broadened my search nationally because many other factors became more relevant and interesting.

3.7.1 Youth Garden Programs Separate from Schools

One of the first programs I learned about involving youth gardening is Boston-based *The Food Project*. The Food Project is primarily a summer employment program not connected with any formal schools. Started in 1991 as a non-profit organization based in Boston, The Food Project states on its website,

> Our mission is to grow a thoughtful and productive community of youth and
> adults from diverse backgrounds who work together to build a sustainable food
> system. We produce healthy food for residents of the city and suburbs and
> provide youth leadership opportunities.   Most importantly, we strive to inspire
> and support others to create change in their own communities.
> (www.thefoodproject.org, Accessed July 24, 2006)

In her thesis, *Growing Sites: The Use of Gardening and Farming in Youth Development Projects*, Andrews (2001) explores The Food Project and other youth garden programs. She explains that The Food Project hires teenagers during the summer months to work in large gardens growing food to sell at markets, to take to elders' homes and other community organizations, and to produce shares for shareholders in their CSA. Some of these youth are retained year-round to work in internships involving other community food system projects. The Food Project operates separately from the formal school system. As mentioned before, this extracurricular focus is probably due in part to the limited New England growing season. However, it is also clearly an organization devoted to community development through local food production and appears to prioritize this mission above formal educational goals related to gardening with youth. In another example, the Washington Youth Garden also operates during the summer when school is not in session but is not an employment program. Based at the National Arboretum in Washington, DC, the Youth Garden is an educational program in gardening and nutrition for local youth and their families, though there is some outreach to local schools as well (Kim Rush, personal communication, March 2006). Rooted in Community is a nonprofit organization devoted to youth development primarily through gardening. Its main program is an annual conference for youth garden programs.

Several university research programs promote youth or school gardening in connection with their research as well. An excellent example is Garden Mosaics (discussed above), a large-scale, collaborative, community-based research project that connects elders with youth through community gardening programs. A primary emphasis is on community-building through gardening. The program has developed extensive curricular resources, available to anyone online at www.gardenmosaics.org, which can be used in or out of classrooms. Cornell also operates a community food system research program that is not directly connected with school gardening but has also published online an extensive food system curriculum (Wilkins & Eames-Sheavly, n.d., Available at http://foodsys.cce.cornell.edu/).

3.7.2 School Garden Partnerships

A number of school garden programs are collaborations either among multiple schools in a district or between schools and other entities such as nonprofits, universities, or government agencies (Table 3.3, section B). In Berkeley, California, The Edible Schoolyard, started in 1995 at Martin Luther King, Jr. Middle School, states its mission as

> …to create and sustain an organic garden and landscape that is wholly integrated into the school's curriculum and lunch program. It involves the students in all aspects of farming the garden–along with preparing, serving and eating the food– as a means of awakening their senses and encouraging awareness and appreciation of the transformative values of nourishment, community, and stewardship of the land. (www.edibleschoolyard.com, Accessed July 24, 2006)

The Edible Schoolyard is solidly grounded in the school system, as its mission expresses. Being in northern California with a year-round growing season makes this possible. The pilot schoolyard garden at Martin Luther King, Jr. Middle School serves as an educational tool for the school as well as a model for creating a healthier food system for the students. The Edible Schoolyard is connected with The Center for Ecoliteracy, another non-profit with broader objectives concerning both sustainable food systems and education for sustainability. The Center for Ecoliteracy is a public foundation that helped provide funding for Alice Waters to start The Edible Schoolyard. The mission of the Center is simply "education for sustainable living" (www.ecoliteracy.org, Accessed July 25, 2006), which they explain in their book *Ecological Literacy: Educating our Children for a Sustainable World* (Stone & Barlow, 2005). One of the other programs funded by the Center is Rethinking School Lunch, which promotes the integration of student lunches with their education in a way that goes beyond schoolyard gardening. It also involves supporting small local family farms by buying seasonal local food for school lunches. Through the efforts of the Center and policy-makers, the Berkeley Unified School District adopted a district-wide food policy in 1999 reflecting some of these goals.

An example of district-wide but still largely school-based program is Granny's Garden School in Loveland, Ohio. While the organization of Granny's Garden itself is a nonprofit, its emphasis is on supporting the 50 teachers in the district who have their own class gardens (www.grannysgardenschool.com, Accessed August 6, 2006). In other examples, the objectives of a program are strongly influenced by the operational frameworks of partnering organizations,

such as The Edible Schoolyard program discussed previously, which has a "sustainable food system" framework. In another case, the Chicago School Garden Initiative began as a schoolyard improvement program by the City of Chicago and the Chicago Botanical Garden (Johnson & Bjornson, 2003). There are now many school gardens throughout Chicago that serve multiple objectives but that are supported through the Initiative.

The Slow Food in Schools program is a project of the larger organization Slow Food USA, whose mission is to advocate for honoring local, traditional, and whole foods to counter the devastating health effects of the industrial food system (www.slowfoodusa.org, Accessed August 6, 2006). School gardens are only one piece of Slow Food in Schools. The main objective is to teach kids to value local whole foods and to educate them about nutrition. There are other programs that emphasize nutrition education in connection to school gardening, such as the Urban Nutrition Initiative. In many of these programs, nutrition and gardening go hand in hand. A similar angle on gardening draws from the more traditional anti-hunger movement. The Growing Connection, a program of the American Horticultural Association, emphasizes growing food in US classrooms that are also partnered with classrooms abroad as a way for students to learn about and combat hunger.

I also included in the appendix one government program, Agriculture in the Classroom (AITC), coordinated by the US Department of Agriculture but implemented independently in each state. Some states offer curriculum through the program. AITC does not emphasize youth gardening, but some state programs, such as Maine Agriculture in the Classroom, use school gardens as one vehicle for educating about the industry of agriculture in the US. The emphasis seems quite different from other youth gardening programs, and I include it largely for comparison.

3.7.3 School-based Garden Programs

I would venture that the most common type of school garden exists in a small, hidden corner of an elementary schoolyard that has relatively little funding but is simply a project of one or more interested teachers or parents who volunteer their time to grow plants with kids. There is little disagreement that engaging children in gardening is a worthwhile activity. Yet there are a variety of approaches and rationales for designing and implementing school gardens. For instance, for many programs, the primary objective is to use school gardens as educational tools for teachers and their students. Most of the gardens registered on the KidsGardening.com website are of this type. I include in Table 3.3, Section C some descriptions of what appear to be some of

the most well-developed gardens described on KidsGardening.com. The first description of March Elementary School in Easton, Pennsylvania is a representative example. However, elementary school gardens can be much simpler than March Elementary's. Some descriptions are as basic as this one from Love T. Nolan Elementary in College Park, Georgia: "We have a nature trail, and a winter and spring vegetable/flower garden. 'Hands on Atlanta' helped with the initial structure. The students plant, weed, and take care of all gardening tasks." There are hundreds of descriptions on KidsGardening.com that run the spectrum between March Elementary and Love T. Nolan Elementary. Presumably, the primary objective for most of them is to involve students in gardening for both the academic and health benefits that such an outdoor classroom provides. The frameworks from which these programs draw are probably largely dependent on the local context and people involved rather than influence from collaborating organizations. While I believe these elementary programs to be the most common type of school garden in North America today, most of my analysis focuses on more complex programs that either have extensive websites or have been written about in the literature.

Several other school gardens have adopted a "whole school" approach to integrating school gardening into academic curriculum, taking the school garden a step beyond simply being a resource for elementary teachers. While this integration with school curriculum can be accomplished at an elementary level, I have chosen to highlight several middle-school level programs, such as the Troy Howard Middle School in Maine, and two Montessori middle schools. Troy Howard's website expressly states that part of the purpose of the school garden is to allow students to learn through an "integrated curriculum" (http://www.sad34.net/%7esteve_tanguay/garden.html, Accessed August 6, 2006). The program integrates with the school in a variety of ways, including academic classroom activities, garden "apprenticeships," and using garden food in school lunches. Although I have included this as a school-based program, Troy Howard has partnerships with at least two other programs—Maine Agriculture in the Classroom and the Sustainable Schools Project of Jerusalem City Farmers. Hershey Montessori Farm School and The Montessori School at Lake Forest are perhaps even more focused on curricular integration, as they both draw from Maria Montessori's vision of an agricultural boarding school for young adolescents. These appear to be the only two such Montessori middle schools in North America. (I will discuss Montessori education more below.) At these boarding school settings, the operation of the farm becomes a central component of the school.

3.8 School Garden Design Themes

Cross-cutting these different categories of approaches to school gardening are several guiding themes or philosophies about the purposes of school gardening. The themes I discuss below emerged from my review of different programs rather than being something I created ad hoc. However, I knew that one theme of interest to me concerned the concept of community food systems and sustainability. I am investigating how school gardening can contribute to the sustainability of community food systems. But what other broad themes exist for proponents of school gardening? What do they see as the purpose of school gardening beyond the educational benefit to individual children? If so many school garden programs exist as partnerships of schools and other community organizations, what are some of themes to which these community organizations adhere?

To begin to answer this question, I first searched the www.KidsGardening.com website. On the school garden registry of over 1,000 programs, registrants can select a number of descriptive categories that apply to their program, and then others can search the registry for programs based on these categories. A list of these categories appears in Table 3.4.

Table 3.4 Searchable Categories for School Gardens
(registered on www.KidsGardening.com; Accessed July 25, 2006.)

Outdoor, Vegetables	Outdoor, Flowers	Trees
Indoor Light Garden	Community Service	Pond / Wetland
Hydroponics	Intergenerational	Nutrition / Hunger
Butterflies	Garden Business	Special Needs
Birds	Multicultural	Garden Art
Habitat Creation / Restoration	Greenhouse	Weather Stations
Garden Themes	Vermiculture (worms)	Composting

Unfortunately, while these searchable categories initially appeared useful and indicated the sorts of themes that the NGA identified as relevant for their registry, I found that when I searched the registry with this option, many more hits for each category resulted than I expected. The link between the chosen keyword and the specific garden programs was not always clear. Therefore, I used the *Find* function in my internet browser to search the entire list of gardens for various keywords used in the written descriptions. This allowed me to use my own emergent categories and target only registrants that used those keywords in their written descriptions rather than relying on a pre-determined category from NGA's checklist. I created these key words through a combination of

scanning the descriptions on the registry and identifying themes from my review of other school gardening literature. My keywords and the resulting number of programs that used those keywords in their description can be found in Table 3.5.

Table 3.5 Keyword Search of Descriptions of Gardens
(on www.KidsGardening.com; Accessed on May 20, 2006)

Keyword	Number of descriptions using keyword
Habitat (National Wildlife Federation)	100+ (8)
Cooperative Extension/Master Gardener	53
Montessori	24
Three Sisters (Native American)	24
Ecology/ecological	22
Sustainable/sustainability	5
Permaculture	4
Food systems/food security	2

I briefly explain these themes in the order of most commonly cited. The first keyword—*habitat*—hints at a distinction I must make early on. It appears as though many school gardens are operated for the purpose of creating wildlife habitat in the schoolyard, a primary objective of the National Wildlife Federation's Schoolyard Habitat program (http://www.nwf.org/schoolyard/). However, this paper examines school gardens that grow human food. Hence, the rest of my analysis will try to select for school gardens that include vegetables and fruits.

The *Master Gardener* program is a well-established home garden training program administered in individual states and Canadian provinces through state university-based cooperative extension services. The American Horticultural Society describes it as "a two-part educational effort, in which avid gardeners are provided many hours of intense home horticulture training, and in return they 'pay back' local university extension agents through volunteerism." (http://www.ahs.org/master_gardeners/index.htm, Accessed August 5, 2006). In some states, extension services also offer Junior Master Gardener training for youth, and the Texas Cooperative Extension has published two sets of JMG curriculum for elementary and secondary level students (Seagraves, 1999, 2002). In the JMG Level 1 (elementary) curriculum, students can earn "medals" for each chapter they complete. These include a broad range of horticultural topics from plant growth and development to life skills and career exploration. Often, the JMG program is administered through 4-H, another component of many extension services. I suspect

that this is the most commonly cited keyword in my list because Master Gardener is a well-developed program with an extensive network of resources from which teachers and parents can draw for school garden projects. For instance, the National Gardening Association itself advertises and sells the JMG curriculum through the KidsGardening website. It is therefore not surprising that many of the school gardens registered on the same site use the resources. Because Master Gardener is a locally-administered program, specific objectives vary widely.

Montessori has become a popular approach among alternative educators in the US (Chattin-McNichols, 1992). *Montessori* showed up in the *names* of the schools with entries in the garden registry at least as often as in the actual *descriptions* of the gardens. Drawing from the research and writings of early 1900's Italian educator Maria Montessori, the Montessori method is a comprehensive approach to child education that relies on carefully constructed educational environments that promote self-directed learning. Teachers can be certified through one of two U. S.-based or an international organization (e.g. North American Montessori Teachers Association, www.montessori-namta.org). Some Montessori schools require teachers to be certified; however, some schools that purport to be Montessori do not require certification and hence employ teachers who may be interested in the approach but who are not trained in the method (Chattin-McNichols, 1992). It is impossible to distinguish between these two types of schools on the KidsGarden registry. Maria Montessori believed strongly in the value of outdoor labor and gardening (Montessori, 1964, 1976). She even suggested that the concept of *Erdkinder*, or "land-children," be used for structuring programs for young adolescents (1974, p. 107). She advocated that children of this age be educated in boarding schools in rural areas where farms could be an integral part of the schools. Most of the Montessori schools on the KidsGarden registry are elementary schools with schoolyard gardens. But the two middle school gardens mentioned above are pursuing Montessori's more comprehensive vision of making a garden an integral part of a rural residential school for adolescents.

Another popular theme in gardening with youth is to connect gardening to Native American history and culture. Many of the garden descriptions on KidsGardening.com refer to a *Three Sisters Garden*, perhaps drawing from another curriculum resource, *In the Three Sisters Garden: Native American stories and seasonal activities for the curious child* (Dennee, Peduzzi, Hand, & Peduzzi, 1996). The three sisters of Native American gardening are corn, beans, and squash, so these gardens include these crops for cultural education as well as for other educational

purposes. For example, this theme may overlap with the next, *ecology/ecological*. Garden descriptions using this keyword emphasize the lessons in ecology that school gardens provide.

The last three keywords, *sustainable/sustainability, permaculture* and *food systems/food security*, are words that I chose to represent the types of frameworks from which I think The Food Project and The Edible Schoolyard draw. Permaculture is an approach to sustainable agriculture and community design developed by Australians Bill Mollison and David Holgrem in the 1970s (Mollison, 1990).   Permaculture seeks the creation of productive and sustainable ways of living by integrating ecology, landscape, organic gardening, architecture and agroforestry. Neither The Food Project nor The Edible Schoolyard is registered on KidsGardening.com, and clearly there are very few school gardens registered that explicitly express a connection to these frameworks. If KidsGardening.com represents a cross-section of school gardens in North America, then it is probably safe to assume that community food systems and sustainable agriculture are not mainstream frameworks from which school garden practitioners draw. This conclusion is also reflected in the literature on school garden research that I will review later. Interestingly, one registrant uses all three of these keywords in its description—Hood River Middle School, a description of which can be found in Table 3.3.

3.9 Place-based Education through School Gardening

This chapter shows where there are knowledge gaps in literature and theory about the relationship between youth education and sustainable food systems. There is simply not much research literature available addressing this issue of the links between today's youth, education, and food; hence, much of this chapter focuses largely on finding contemporary models of place-based education and school gardening that offer practical ways to explore these relationships. In reviewing the myriad of youth gardening programs in the country today, I identify several that serve as good models for using such programs to strengthen local food systems. Some of the best larger-scale examples include The Food Project and The Edible Schoolyard. However, since I am working with a single school in Fairbanks, I am more interested in the models of school-based gardens that have become an integral part of a unique school curriculum. The Montessori middle schools are an especially intriguing model. But the EKCS is not a boarding school, nor does it purport to employ Montessori education. The Troy Howard Middle School in Maine is a good model, especially given the similar growing season limitations. At this school, multiple academic

subjects are integrated with the school garden through coursework and required internships, and the program is part and parcel with the school's identity as a "Sustainable School."

The overlap between place-based education and sustainable community food systems is of course place-based or local food. There are certainly other ways that place-based education can contribute to the ecological and cultural health of bioregions without a focus on food, but I chose to use food as the vehicle for exploring these relationships. To reiterate a concluding theme mentioned in Chapter 2, place-based education can serve as a way to tighten feedback loops within a community food system. If they understand the impacts that their choices have on the systems of which they are a part, young people may be more competent to evaluate the appropriateness of those impacts. Similarly, if students gain knowledge and skills related to their local food systems, they can help create more adaptive social-ecological systems to respond to stresses on such systems. For instance, if the costs of transporting food to Alaska from outside become prohibitive, youth and their families may have to find alternatives within their community food systems. With these frameworks of thinking and hypotheses about place-based education and community food systems under my belt, I set to work in my own research setting at the Effie Kokrine Charter School to explore the question of how this kind of education can be integrated into formal school systems. The next two chapters discuss the process and products of my participatory action research, in which I add my own project design to the growing list of school gardening projects, and use it to develop broader principles of pedagogy for sustainability, addressed in Chapter 6.

Chapter 4: Participatory Action Research at the Effie Kokrine Charter School:
Pursuing Quality through Collaboration

In Chapter 1, I presented my research methods under the framework of action research. In this chapter, I discuss the practice and theory of action research in more depth in order to provide a framework for discussing specific aspects of my own research approach, especially regarding collaboration and validity. As with many action research projects, my research methods resemble those of almost any qualitative social science. They include participant observation, open-ended interviews and focus groups. However, these broad terms do not quite capture the extent of my collaborative, active involvement in my research setting. What makes them action-oriented is the way in which they were designed and conducted and to what use they were put. For instance, my participant observation often relied more heavily on my participation than my observation, such as through teaching gardening lessons to students. In more traditional research projects, the negotiations that make the project possible are usually treated as background to the project and are not included in the final reports or analyses emerging from the research. I have chosen to foreground both my successful and my unsuccessful collaborative efforts because in participatory research, much of the outcome of the research depends upon the nature of the collaborative relationships leading to it. In this case, both defining what the research product would be as well as what it might contain were influenced by my collaborators. Because of its participatory nature, action research is the most effective way I found to frame the complexities of collaboration.

4.1 Practice and Theory of Action Research

Action research is not a single research tradition, as many influences have contributed to the body of literature that claims action research as its primary framework. However, there are several characteristics common to diverse traditions of action research. Table 4.1 is a compilation of some of the most significant characteristics as addressed in the literature (Atweh, Kemmis & Weeks, 1998; Berg & Schensul, 2004; Gray, 2004; Greenwood & Levin, 1998; Herr & Anderson, 2005; Kemmis & McTaggart, 2000; Reason & Bradbury, 2002; Whyte, 1991). This list represents the aspects that are most important to my research.

Table 4.1 Primary Characteristics of Action Research

1.	Researchers and practitioners/stakeholders collaborate in the design, conduct, and/or analysis of the project.
2.	The creation of locally-relevant knowledge is a primary goal and the standard for evaluating quality and rigor of the research.
3.	The primary researcher has an active and critical role in designing and conducting the "action" rather than "objectively" documenting the process as in, for instance, a case study.
4.	Data are generated through the experiences of the participants.
5.	Theory and practice are united with the end result of action within the context of the research.
6.	The research design reflects a cyclical nature through which data generation and analysis are continuously built back into the research design.
7.	An action research dissertation, in which a clear ending point must be defined and a dissertation written, presents unique opportunities and challenges.

Traditionally, action research is placed within the broad category of social science rather than within natural or physical sciences. Because they tend to address questions of a social or cultural nature, action researchers often use more qualitative methods of inquiry rather than quantitative, but quantitative data are not precluded when they are appropriate for illuminating the research problem (Greenwood & Levin, 1998). For instance, a community may decide to work with a researcher on monitoring the health of a local watershed. Some of the methods for such monitoring would include water testing and other quantitative measures. Action research does not dictate an explicit set of methods but rather provides a structure for supporting the design of whatever methods are appropriate to the research context and goals.

On the other hand, there are a number of methods that are common to many action research projects and indeed to qualitative social science generally. These include interviews and group meetings or workshops at various stages in the research cycle. "Data" generated from these interviews and meetings are usually fed back into the research context in accordance with the goal of producing locally-relevant knowledge that can result in a desired change. In Kemmis and McTaggart's classic *The Action Research Planner* (1988), they describe a variety of potential tools that they call "techniques for monitoring" (p. 100). Their list includes anecdotal records, field notes, ecological behavior description, document analysis, diaries, logs, item sampling cards, portfolio, questionnaires, interviews, sociometric methods, interaction schedules and checklists, tape recordings, video-recording, photographs and slides, and tests of student performance. Which of these are most appropriate depends on the context.

In a sense, action researchers have more in common with community organizers than with conventional social scientists. Among social scientists, there is much concern about earning respect for the validity of their research by maintaining objectivity, which they perceive to be the way that natural and physical science research is conducted. Action researchers view the issue of objectivity differently. As Gray (2004) explains,

> In addressing real world problems, the action researcher becomes directly involved in the research process as a change agent, devoted not only to studying organizations and processes but also to improving them. Contrast this with other research paradigms where the researcher is seen as a detached scientist, intent on avoiding any action that might bias or tarnish the results. Action research, in contrast, is committed and intentional but also informed and systematic…But action researchers do not simply throw themselves into the research process… there are planning, implementation and ethical issues that need addressing (p. 373).

Action research may in fact do a better job than more esoteric research when applied to solving such "real world" problems (Greenwood & Levin, 1998). If action researchers immerse themselves actively in context and make their biases explicit rather than hiding them, then their results may actually be more trustworthy and rigorous than in conventional "objective" research. In fact, Greenwood and Levin (1998) argue that action research resembles physical and biological sciences more than social science and produces more reliable scientific results than traditional social science specifically because of this approach. They summarize,

> At the heart of this problem is the tremendous emphasis social scientists place on their claim that being scientific requires researchers to sever all relations with the observed and to avoid being co-opted by the seduction of their own prejudices. Such social scientists equate objectivity with disengagement from the phenomena under study. Yet this belief undermines the argument that conventional social science can be scientific precisely because biological and physical scientists do not disengage themselves from the phenomena they study to be objective. The experimental method requires just the opposite. The scientific method and its experimental apparatus are a form of praxis on and in the world, though certainly not one oriented around democratic social change (p. 56).

Elsewhere, Levin and Greenwood (2002) advocate for embracing action research as "the dominant form of social inquiry at colleges and universities and in governmental agencies, at least all of those that claim to create knowledge relevant to improving our societies" (p. 112).

Some authors describe this research orientation as another form of applied social science, but others see it as distinctly different from either applied or pure science. Again, Greenwood and Levin (1998) explain,

> AR is not applied research. AR explicitly rejects the separation between thought and action that underlies the pure-applied distinction that has characterized social research for a number of generations. Valid social knowledge is derived from practical reasoning engaged through action. As action researchers, we believe that action is the only sensible way to generate and test new knowledge (p. 6)

In applied research, a practitioner, whether professional or lay, takes that which is learned in the lab (in physical sciences) or through observation (in social sciences) and then applies that knowledge to a real-world setting. In contrast, action research treats the real world *as* a "lab." In summary, action research cross-cuts traditional distinctions between "hard" and "soft" sciences and "pure" and "applied" research.

4.1.1 Traditions of Action Research

Beyond the general characteristics described thus far, action research has roots in multiple fields and research traditions. First, there are two versions of the name of this broad research orientation that seem to be the most common in contemporary social science literature. For instance, Herr and Anderson (2005) favor the term *action research*, while Kemmis and McTaggart (2000) include *participatory* in the name. Indeed, this type of research is often referred to as PAR (for *participatory action research*). I choose to primarily use the shorter version of *action research* in part because, "[I]t is probably the most generically used term in all disciplines and fields of study, so it serves as an umbrella term for the others. It also makes *action* central to the research enterprise and sets up nicely a tension with traditional research, which tends to take a more distanced approach to research settings" (Herr & Anderson, 2005, p. 3). In PAR, the participatory nature of action research is elevated to as important a status as the active nature.

Some of the strongest action research traditions as described in the literature are listed in Table 4.2. There is some overlap in these lists, and some traditions that are undoubtedly missing. Indeed, the moniker could be applied to a number of areas that do not consciously align

themselves with action research. There is not room herein to extensively review all traditions, so I will focus below on a few often-cited ones commonly assumed to be part of the evolution of action research. However, it should be noted that other influences are as diverse as feminism, social work, criminology, nursing and public health, international development, and agriculture (Herr & Anderson, 2005).

Table 4.2 Traditions of Action Research

Herr and Anderson (2005)	**Kemmis and McTaggart (2000)**
2. Organizational learning and	1. Participatory research
3. Action science	2. Critical action research
4. Participatory research	3. Classroom action research
5. Participatory evaluation	4. Action learning
6. Action research in education	5. Action science
7. Teacher-as-researcher (Britain)	6. Soft systems approaches
8. Practitioner research (North America)	7. Industrial action research

Most authors attribute the foundation of action research to the work of Kurt Lewin in the 1940's (Gray, 2004; Herr & Anderson, 2005; Kemmis & McTaggart, 2000; Lewin, 1946). His work focused on human dynamics, usually in the workplace or other social organizations, and on problems of production in factories and discrimination against minorities. "Although Lewin was not the first to use or advocate action research, he was the first to develop a theory of action research that made it a respectable form of research in the social sciences" (Herr & Anderson, 2005, p. 11). Lewin articulated a framework for an action research methodology that included the now oft-cited "action research cycle" or "self-reflective research cycle" (Kemmis & McTaggart, 1988; Wadsworth, 1998). The cycle consists of four repeating components—*plan, act, observe, reflect* (Fig 4.1). Conventional research straightens the cycle out into a straight line with a stepwise methodology that ends with *reflect* and does not repeat (Wadsworth, 1998). Action researchers propose that a more realistic portrayal of the research process generally is to acknowledge that the separation between theory and practice—or reflection and action—is artificial. This statement is both descriptive and prescriptive, in the sense that it describes research generally and prescribes that researchers be more honest in the way they conduct and portray their research according to this methodology. In addition, Lewin is credited with generating a couple of key tenets of action research that have become slogans among practitioners. These are, "'Nothing is as practical as a good theory' and 'The best way to understand something is to try to change it'"(Greenwood & Levin, 1998. p. 19). Since Lewin's

time, many versions of action research have proliferated, some directly stimulated by Lewin, some developing on their own or with other influences playing a bigger role.
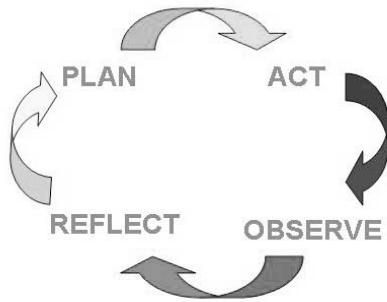
Figure 4.1 Action Research Cycle, Adapted from Lewin (1946)

Participatory research and *action science* are two additional approaches cited in Table 1. Their names capture the two fundamental aspects of *participatory* and *action*. Kemmis and McTaggart (2000) explain that the roots of participatory research lie in "social transformation in the Third World. It has roots in liberation theology and neo-Marxist approaches to community development" (p. 568). Herr and Anderson (2005) attribute participatory research specifically to Paulo Freire's work in the early 1970's. In *Pedagogy of the Oppressed*, Freire theorized about the cultural implications of the formal pedagogies being used in education throughout the world, but especially in Latin America and his home country of Brazil. From this critique, he and others created a type of research that uses generative themes, "or issues of vital importance to community members" which are "identified and used as a basis for literacy instruction and also studied in a collaborative fashion" (p. 15). Herr and Anderson (2005) summarize, "In Freirian-inspired participatory research, the academic research model is challenged at almost every point. The dualisms of macro/micro, theory/practice, subject/object, and research/teaching are collapsed" (p. 16). Participatory research grapples with issues concerning the locus of power in research and how to empower the less powerful in research contexts.

Action science comes from a much different source, another academic from the United States, Chris Argyris (Argyris, Putnam & Smith, 1985). It is more closely connected with Lewin's organizational framework, but seeks to "return to action research its scientific dimension, arguing that the problem-solving focus of action research has moved it too far away from the tasks of theory building and testing" (Herr & Anderson, 2005, p. 14.) Like Lewin, Argyris is interested in "the study of practice in organizational settings as a source of new understandings

and improved practice" and does this through a methodological system of linking academic knowledge to organizational practice (Kemmis & McTaggart, 2000, p. 570).

Another tradition that is not mentioned explicitly by these authors lies within anthropology. Sol Tax is credited with introducing the concept of *action anthropology* through his work with the Fox Indians in Iowa in the 1950's (Harrison, 2001). In a 1958 paper reprinted in *Current Anthropology* in 1975, Tax describes the approach of an action anthropologist working in a cross-cultural setting where cultural change is happening in part because of indigenous contact with Western society. Regarding an anthropological researcher's role, Tax summarily dismisses "simple observation" as "a wholly inadequate tool" (Tax 1975, p. 515). Rather, the action anthropologist engages with the community he is working with in order to develop and pursue goals that stem from a "value of freedom… freedom for individuals to choose the group with which to identify, and freedom for a community to choose its way of life" (p. 516). Implementing these goals amounts to "community organizing," and the action anthropologist's "chief tool is education" (p. 515). This is a much different stance from Geertz's famous "thick description," which has come to define contemporary cultural anthropological research (Geertz, 1973).

While many anthropologists may shun this action approach for fear of conducting invalid, biased research, one place within anthropology that has embraced Tax's philosophy is among the "practicing" or "applied" anthropologists as represented by the Society for Applied Anthropology and its publication, *Practicing Anthropology*, for which Tax was one of the original advisors. Leaving aside the question of whether action research is a form of applied research or a different beast altogether, which Tax (1975) himself left unsettled, many anthropologists who call themselves applied researchers are doing action research. For example, a recent issue of Practicing Anthropology (Berg & Schensul, 2004) focused on "Approaches to Conducting Action Research with Youth." Anthropologist Jean J. Schensul (Schensul J., Berg, Schensul, D., Sydlo, 2004) describes her work with urban youth at the Institute for Community Research and introduces readers to the concept of action research with the following definition: "Participatory action research (PAR) is an activist-oriented participatory approach to addressing social problems that involves community members in identifying, researching, and working to resolve social problems that affect them, their peers, and their communities" (p. 5) While she does not mention Tax's action anthropology, their shared philosophy is clear.

Herr and Anderson (2005) recommend that "the definition that a researcher chooses should be made clear in a dissertation" (p. 5). After exploring the framework of action research, I concluded that I could not create a definition separately from the context in which I would be working. Certainly, I have been guided by the core characteristics of action research that I outlined above, but how do these coalesce into a specific definition for this dissertation? Because I am working in an educational setting, my definition is tied to educational objectives; I intend to contribute to the goals of the school with which I am working. Throughout my research, my guiding action research goal has been to pursue the union of theory with practice by integrating my theoretical understanding and my field work as closely as possible with the ongoing functioning of the school to meet its goals. The outcomes and validity of my research depend on this integration of my methods with my research setting.

4.1.2 Positionality

Regarding the design of my own collaborative methodology, I find Herr and Anderson's (2005) treatment of the concept of positionality helpful because the role that the researcher plays in the research setting is one of the most important factors in determining both the research goals and the appropriate methods for pursuing those goals. They present six categories of positionality along a continuum from *insider* to *outsider*, beginning with the most insider position. These are

1. Insider working alone on own practice
2. Insider working in collaboration with other insiders
3. Insider(s) working in collaboration with outsider(s)
4. Reciprocal collaboration in insider-outsider teams
5. Outsider(s) working in collaboration with insider(s)
6. Outsider(s) studies insider(s)

This typology is based on Herr and Anderson's own extensive research and investigation of others' research. An example of an insider working alone on her own practice would be a teacher in a classroom conducting action research on her own teaching practice. Most teachers likely do this daily without calling it research, as they implement and evaluate different techniques for promoting learning among their students. Many educators are now intentionally using practitioner action research for higher degrees in education (Sagor, 2005). At the other end of the spectrum is an outside researcher studying insiders in what appears to be a conventional research approach irrelevant to action research. Herr and Anderson include it because "this end of the

continuum does contain some gradations of insider-outsider collaborations and some interesting debates about whether action research is really all that different from traditional research" (p. 41).

I place my research on this continuum in category (5), outsider in collaboration with insiders. Indeed, as Herr and Anderson suggest, "This is probably the most common type of collaborative action research because it is more common for outsiders to initiate research projects than insiders" (p. 39). They go on to discuss some considerations for researchers who are attempting to create the right levels of participation for researchers and participants. Herr and Anderson (2005) write, "Cochran-Smith and Lytle (1993) point out that there is some justifiable fear that collaborations between university researchers and practitioners or communities can be co-opted by the university researchers, who have greater incentives and interest in publication" (p. 39). There is much literature on collaborative research that is relevant to designing action research methods. For instance, among anthropologists, there is a unique imperative to consider power relationships between the academy and indigenous communities and their members (Harrison, 2001; Smith, 1999).

Because my own research fits within the realm of outsider collaborating with insiders, my methods were influenced by my efforts to strike a balance between my interests and those of my collaborators. Indeed, I experimented with various ways to gain more of an insider perspective among the Boreal Farm staff, the teachers and students at the EKCS, and Howard Luke. I felt that I could ensure that my research questions were more relevant to local practitioners that way. I also learned along the way that human systems dynamics are just as complex and relevant to designing educational practices for sustainability as ecological systems. Therefore, I present below in the discussion of the stages of my research an analysis of the learning process I underwent during my own negotiations of positionality with my collaborators, some with more success than others.

4.1.3 Validity

Identifying and establishing an appropriate position within an action research setting is a key component of being able to validate that research. Before discussing the details of my collaboration with EKCS, I explore in this section some of the theoretical background to validity in action research. In all research, a key consideration in design, conduct, and evaluation of the research is *validity*. Every discipline has its own criteria for evaluating what makes research valid independent from the trustworthiness of the individual researcher. For instance, quantitative research usually has technical definitions for things such as instrumental and statistical validity

which refer to the quality of quantitative data. Qualitative social science generally has broader and more flexible definitions of validity, reflected in terms such as *credibility*, *transferability*, *dependability*, and *confirmability* (Mauch & Birch, 1998). Additionally, validity must be addressed at different stages and for different components of the research. For instance, what constitutes valid data is different from what constitutes valid methods or valid data analysis. Also, there are distinctions between *internal* and *external* validity, the former referring to the inferences drawn from the data and the latter to the applicability of the results to the larger population or another context (Herr & Anderson, 2005; Mauch & Birch, 1998). All of these components must be considered within an action research framework, which may incorporate both qualitative and quantitative methods and data. Herr and Anderson emphasize that an all-inclusive definition of validity for action research does not and cannot exist, when even "what constitutes evidence, or in more traditional terms, data is still being debated" (2005, p. 3). Referring to the positivist term *validity* and the naturalistic term *trustworthiness*, they write, "Neither term is adequate for action research because neither acknowledges its *action-oriented* outcomes. Action researchers, like all researchers, are interested in whether knowledge generated from the research is valid or trustworthy, but they are usually also interested in outcomes that go beyond knowledge generation" (p. 49).

In addition to this action orientation, action researchers want to create knowledge that is *locally* valid. Because of these differences, Herr and Anderson suggest that action researchers cannot rely on quality criteria from positivist or naturalist research traditions but must instead create a different validity structure which in part depends on the local context. On the other hand, they say, "It is too soon to formulate criteria for quality in the absence of significant dialogue and in the context of multiple approaches to action research." (p. 54). However, for dissertation research, researchers must have some sort of framework for addressing validity because of the expectations of the academy as represented by dissertation committees. Hence, they present some of the criteria used by other action researchers. Table 4.3 summarizes their ensuing discussion.

In meeting the goal of generation of new knowledge, Herr and Anderson suggest the two concepts of *dialogic* and *process validity*. Dialogic validity is similar to the peer review process in higher academics. This criterion relates to "what Myers (1985) calls 'goodness-of-fit with the intuitions of the practitioner community,'" in which the practitioner community refers not just to collaborators in the research but also to other action researchers who can act as critical peers

(Herr & Anderson, 2005, p. 57). Process validity addresses more directly issues of methodology. It concerns "to what extent problems are framed and solved in a manner that permits ongoing learning of the individual or system" and addresses "what counts as evidence to sustain assertions, as well as the quality of the relationships that are developed with participants" (p. 55). This is the category in which some criteria from naturalistic inquiry may be most appropriately utilized. For instance, a useful method for addressing validity in qualitative data is that of *triangulation*, in which multiple perspectives or types of data are included in the research. Triangulation can be considered a form of process validity.

Table 4.3 Quality Criteria for Action Research (adapted from Herr and Anderson, 2005)

Goals of AR	*Quality/Validity Criteria*	*Definition of Criterion*
1. The generation of new knowledge	Dialogic and process validity	*Dialogic:* the extent to which research has been "peer reviewed" by both collaborators and other action researchers (see below for definition of *process validity*)
2. The achievement of action-oriented outcomes	Outcome validity	the extent to which action occurs, which leads to a resolution of the problem that led to the study
3. The education of both researcher and participants	Catalytic validity	the degree to which the research process reorients, focuses, and energize participants toward knowing reality in order to transform it
4. Results that are relevant to the local setting	Democratic validity	the extent to which research is done in collaboration with all parties who have a stake in the problem under investigation
5. A sound and appropriate research methodology	Process validity	to what extent problems are framed and solved in a manner that permits ongoing learning of the individual or system

In addressing the goal of an action-oriented outcome, Herr and Anderson (2005) propose *outcome validity*, "the extent to which action occurs, which leads to a resolution of the problem that led to the study" (p. 55). They suggest that outcome validity is analogous to Greenwood and Levin's (1998) concept of *workability*. In addressing outcome validity, action researchers must not only be competent in research procedures but must also be adept at "moving participants toward successful action outcomes" (Herr & Anderson, 2005, p. 55). Of course, this type of validity begs the question of who determines the criteria for success, which is why the categories of *catalytic* and *democratic* validity must be addressed as well. Catalytic validity is "'the degree to which the research process reorients, focuses, and energize participants toward knowing reality in order to transform it' (Lather, 1986, p. 272)" (Herr & Anderson 2005, p. 56). This type of

validity most directly relates to Kemmis' critical or emancipatory action research. Herr and Anderson say of catalytic validity,

> The most powerful action research studies are those in which the researchers recount a spiraling change in their own and their participants' understandings. This reinforces the importance of keeping a research journal in which action researchers can monitor their own change process and consequent changes in the dynamics of the setting (p. 56).

Finally, democratic validity, which attends to the goal of creating results relevant to the local context, rounds out the other types of validity by addressing "the extent to which research is done in collaboration with all parties who have a stake in the problem under investigation" (p. 56). Other researchers use other terms for this criterion as well, such as *local*, *relevancy*, *applicability*, or *ecological* criteria for validity. "While process validity depends on the inclusion of multiple voices for triangulation, democratic validity views it as an ethical and social justice issue" (p. 56).

Perhaps the key concept underpinning the issue of validity is that of *bias*. Rigorous research is supposed to stand on its own apart from the bias of the researcher. As discussed previously, much social science research is conducted in such a way as to attempt to eliminate bias. However, in action research it is impossible and unnecessary to eliminate bias, as researcher subjectivity is a key component of the process, but bias must be made explicit in such a way that it can be critically evaluated both by the researcher and by others. There are ways that bias can be evaluated so that it does not distort outcomes (Herr & Anderson, 2005). For instance, Herr and Anderson introduce the concept of *validation meetings* and *critical friends*. An action researcher should consider putting together a group of critical peers who may be removed from the research and who can give feedback and guidance throughout the research process. My committee members and graduate student colleagues served as critical peers at various stages throughout my research. I discuss other ways in which I implemented various concepts of validity in the stages of my action research below.

4.2 Stages of Action Research

Table 4.4 summarizes the six primary stages into which I organized the action research for my dissertation. (For more detailed research methods, see Appendix H.) The six stages are arranged in chronological order, although there is some temporal overlap between some of the

Table 4.4 Stages of Action Research

Stage	When	Name	Primary activities	Data collection methods	Action research cycle components
1	Summer-Fall 2005	Pilot Project with Boreal Farm	• Garden with students in youth employment program • Discuss collaboration with Boreal Farm regarding additional research	Participant observation Field notes	Act Observe Reflect Plan
2	Fall-Winter 2005-06	Planning with EKCS	• Volunteer in EKCS classrooms • Discuss with EKCS teachers and staff possible collaboration • Obtain approval from EKCS board to conduct project	Field notes	Observe Reflect Plan
3	Spring-Summer 2006	Gardening with EKCS students	• Plan and implement garden planting module in May • Plant EKCS garden boxes and Howard Luke's garden with students • Maintain gardens and use produce in various EKCS classes and functions	Active participant observation Field notes	Act Observe Reflect
4	Fall 2006	Teacher interviews and meetings	• Gather feedback from teachers concerning next stages of gardening education at EKCS • Begin outlining curriculum	Field notes Interviews	Reflect Plan Act Observe
5	Winter-Spring 2007	Curriculum Design	• Conduct additional interviews with EKCS curriculum planners and Howard Luke • Continue visits to EKCS classrooms	Field notes Interviews	Reflect Plan
6	Spring-Fall 2007	Dissertation writing	• Analyze curriculum and other field data • Create sustainability pedagogy	Feedback from collaborators and "critical peers"	Reflect

stages. The descriptive *name* emphasizes the main theme of each stage, while *primary activities* and *data collection methods* present more detailed description of what occurred during those stages. The column *action research cycle components* lists one or more of the four primary components of Lewin's "action research cycle" (Fig 4.1, above) that are most applicable to that

stage of my research. In the following sections of this discussion, I describe these action research stages in more detail, focusing especially on how issues of positionality and validity played out in my collaborative endeavors in the early stages. The data collection in stages 3, 4, and 5 are discussed in greater detail in Chapter 5 because they are most relevant to the heart of my research—designing curriculum and pedagogy. Another component of my research not included in this table was the ongoing literature review I conducted in parallel with many of these stages. For instance, in the fall of 2005, at the same time that I worked on setting up my position with my primary collaborators, I also conducted background reading on participatory action research for a comprehensive exam paper that I was writing for my graduate committee. During the following spring, as I designed a gardening project for the eighth graders at the Effie Kokrine School, I simultaneously explored other school gardening programs around the country and researched the theory of community food systems. Because of my ongoing literature review, I was able to incorporate insights right away into the design of my project. In this way, I reflected one of the primary characteristics of action research—the merging of theory and practice to create action-oriented outcomes.

4.2.1 Stage One: Pilot Project

During the summer of 2005, I worked for Fairbanks-based Boreal Farm as a Youth Garden Supervisor at the school garden of the former Howard Luke Academy (HLA), the site of the current Effie Kokrine Charter School (EKCS). My primary duty was to supervise and assist two high school students in maintaining the HLA garden and operating community-shared agriculture (CSA) programs. The school garden at the HLA supported 20 CSA shareholders who paid a one-time sum at the beginning of the summer in order to pick up a weekly share of vegetables from the garden. I saw this youth garden program as adhering to a place-based ecological education philosophy that reflected my interests in community food systems. When I began the position, I shared with several farm staff that I hoped to develop the internship into a longer-term participatory action research project. As the summer progressed, I learned more about the nature of the new school that was to take the place of the HLA. I foresaw exciting opportunities to collaborate with both Boreal Farm and the EKCS on incorporating gardening into the new curriculum of the school. However, by the following winter, I had established a functional and rewarding collaborative relationship with EKCS staff, but my ongoing attempts to construct a collaborative arrangement with Boreal Farm failed. I progressed on my project without a formal agreement with them.

Even though collaboration with Boreal Farm did not become a centerpiece of my field work, I include a brief discussion of this pilot project for three reasons. First, my hope is that in sharing these experiences, I will provide insight for other action researchers navigating their own positions in the context of their research settings, especially regarding issues of validity. Second, the lessons I learned about collaboration and positionality in this stage influenced how the next stages of my project unfolded, especially because my subsequent work at the EKCS continued to overlap in some ways with Boreal's youth employment program. I also learned much about gardening with youth that influenced the later design of my gardening curriculum. I discuss this angle in more detail in Chapters 5 and 6. Third, in the systems perspective that I bring to bear on my work, I see Boreal as an important component in the food system which my work addresses. I gained insights through my experience about how components of such a system need to work together in an educational setting to promote sustainability of the system.

I attribute the eventual breakdown in collaboration between Boreal Farm and me to unclear expectations and miscommunications that influenced my understanding of my position as a researcher in relationship to my collaborators. I had several misunderstandings regarding the nature of the youth employment program, the duties of the youth I was supervising, my hours of employment during my internship, and the specifics of my job responsibilities and how I would be supervised by Boreal Farm staff. For instance, when I started the job, I expected that I would spend a good deal of time educating my student employees about sustainable agriculture, such as the ecological and social reasons that Boreal and other Fairbanks farms choose to grow food organically and sustainably. However, I soon learned that the focus of the program was actually on developing the students' employment skills, such as showing up to work on time or facing consequences from being chronically late. In the first week, we fired one student and replaced him with another applicant because the first boy had been unacceptably late several times. In addition, our mandate to produce 20 weekly shares of produce focused our time at work on the tasks necessary to cultivate and harvest the garden, often leaving little time for exploring background material on sustainable agriculture or other related skills such as good nutrition tied with the value of fresh, local produce. My student employees often did not each lunch, and one of them rarely took home his share of the weekly produce because he and his family were not interested in learning how to cook with it. Throughout the summer, I struggled with what I saw as a disconnect between the students' work responsibilities and what I felt they needed to learn about nutrition and sustainable food systems.

My misunderstanding of the goals of the program was probably colored by my own interests in youth education rather than youth employment. However, I knew that Boreal had a non-profit component to its program that was driven by an education-oriented mission. I had assumed that the youth employment program was part of this mission. Also, during my interview for the position, I made it clear that my interests were in place-based education, but no one clarified that I was misunderstanding the goals of the program. Solidifying my sense of miscommunicated expectations, after my third week of work, my primary supervisor at Boreal Farm was replaced. My original supervisor had been the farm's education director, while the new one was the farm manager (whom I will call Rachel). I was told that Boreal's directors decided that because this was actually an employment program, it did not fall within the program area of the education director and would be more appropriate in the domain of the farm manager.

We also had disagreements concerning how I would manage my work time between the school garden and the main Boreal Farm site, and my time overall. Because my internship was being funded by the University of Alaska Fairbanks, I was subject to different wage and work time scales than other interns at the farm. The first misunderstanding occurred at the beginning of my internship. I was originally hired to start at the end of May, but funding from the university became available so that I could start two weeks earlier, in mid-May. However, I was not ready to start full-time at that time. I worked at Boreal for the first two weeks at about half-time instead, which my original supervisor approved. However, Rachel later commented to me that she had problems with that situation and suggested that perhaps I should make up those hours (Field notes, June 2005). At the same time, many of the other farm interns lived at the farm and received a minimal stipend but worked well over 40 hours a week. I did not live at the farm; my salary was an hourly wage established by the university; and my work week was limited to 40 hours. Rachel did not have much time to deal with adapting my different schedule into the workings of the farm. Managing my limited time at Boreal Farm was frustrating for both of us. For my part, because I was a graduate student treating this internship as a pilot project for my research, I was conducting additional related activities after my day's work with the students or at the farm, such as writing field notes or reviewing literature on school gardening and community food systems. These were all activities I conducted outside of the 40 hours.

By the end of the summer, I felt that the fundamental problem was that I started the job expecting to have more autonomy in deciding how to spend my time and how to interact with my student employees than Boreal was able to give me. I was attempting to negotiate an "insider"

position for myself. Because I had made it clear that I was a grad student with specific interests, I thought my expectations were understood and accepted. Perhaps this was an unfair expectation. In my exit interview, I emphasized that in the future, the position should not be filled by a graduate student with her own research objectives. Boreal had its own mission to meet and shareholders to grow produce for, and the youth garden supervisor's job was to help meet that mission in whatever way the farm directors thought most appropriate. But I still supported the educational component of Boreal's mission, and I believed that I had something to contribute to meeting that mission. So, despite the tension I felt with some of the farm staff that had resulted from these misunderstandings, I decided to try to establish a collaborative project with Boreal following my internship. I hoped that once I was no longer officially an employee, I would have more latitude to proffer suggestions for how I could help Boreal meet its educational objectives by collaborating with the new school that would be hosting Boreal's school garden—the Effie Kokrine School. Table 4.5 presents the informal proposal that I submitted to Boreal in September, 2005.

After submitting this proposal, I spent the next several months communicating with Boreal either through email or through the involvement of one or both of my graduate advisors (Drs. Gerlach and Barnhardt). Boreal wanted more specifics about the project I was proposing so they could evaluate how it would fit into their ongoing programs. For my part, I tried to establish a position of more autonomy than I was given as an intern so that I could have flexibility in suggesting ways to adapt the EKCS school garden into the new school curriculum. The dominant theme in our communication was that I was hesitant to create too detailed a plan because I had not yet had the opportunity to collaborate with staff at the Effie Kokrine School about how my work could augment their curricular interests. I did not want to create a project plan without input from the school. Meanwhile, I started volunteering the classroom of an EKCS teacher interested in my gardening ideas. However, I saw more and more evidence that I was going to have to relinquish more of my autonomy than I wanted to in order to sign a collaborative agreement with Boreal, which is what they wanted in place before moving forward. For instance, Boreal began requesting meetings with my advisors without me present to discuss my project, an action that suggested to me that Boreal viewed my relationship with my advisors as that of an employee to a boss, an inadequate and inaccurate analogy of my graduate work.

Table 4.5 Informal Proposal for Collaborative Research
(submitted to Boreal Farm staff in Sept 2005)

Upon the conclusion of my position as the Youth Garden Supervisor at the Howard Luke garden, I would like to make a proposal for my future work with Boreal Farm. This job has been a fantastic experience for me in which I have had the opportunity to hone my own gardening skills as well as to supervise and educate two high school students during one of their first job experiences. Working with the two students and with all of you at has been rewarding. I am in awe of what your organization has managed to accomplish already in this community, and I am proud to have been a small part of it this summer. I hope we can continue the relationship.

As most of you know, I took this internship because of my research interests in linking place-based education with sustainable agriculture as a way to explore issues of community and ecological sustainability. Indeed, this summer has been the first stage of my field work. I want my research to have direct applications in the area of ecological education. I adhere to a research philosophy called "participatory action research," a collaborative form of social science in which the participants work together towards a common goal. I have always seen myself as having similar goals as Boreal's, and I remain excited about continuing to use participatory action research methods to continue my exploration.

When I started this job, I wanted to investigate and learn from Boreal's youth garden program as an example of place-based education, in which students learn through interacting directly with their natural and built environments and communities. I intended to apply what I learned through Boreal to a similar project, perhaps working with rural students in a rural village. However, I again decided early in the season to remain focused in Fairbanks, for several reasons. A primary one is the excellent opportunity that exists at the new Effie Kokrine Charter School (EKCS) to develop a new kind of education and how well their educational philosophy might complement Boreal's education goals.

The EKCS is designing a curriculum with a more holistic approach to education than the traditional classroom subject approach. They are offering an alternative to students in Fairbanks who are attracted to a more Alaska Native educational paradigm. For instance, they are creating a series of multi-week modules, each of which will address Alaska curricular standards in practical ways. They will rotate through these modules sequentially through the school year, and they are extending the school year into the summer, with breaks inserted at opportune times throughout the year. These changes present an opportunity unique in Fairbanks to incorporate gardening directly into the school year.

I propose to collaborate with both Boreal and the EKCS to create and implement an educational plan for the Howard Luke garden next summer. Dr. Ray Barnhardt, who is on the Board of Directors for the EKCS, and several of the teachers at the new school have expressed an interest in incorporating a three-week "garden" module into their curriculum. I believe that collaboration among Boreal staff, EKCS teachers, and myself can result in a fruitful product. Together we could create a demonstration project in sustainable agriculture education for Interior Alaska.

In the spirit of participatory action research, I do not propose to have a complete vision for what the final product will look like, as it will evolve with the input of Boreal and EKCS staff. There are various possible levels of involvement from Boreal and the school and myself. I know that Boreal is currently in the beginning stages of forming a relationship with the EKCS. At this point, I am simply asking to be part of the planning. I do not want to do this project without Boreal's support. I envision at the very least Boreal's logistical support in terms of planting and maintaining the garden next summer. I would most prefer to take an active role in the development of a "garden" module, probably collaborating most closely with Boreal's Education Director. I could also foresee that such a module may not need to be focused entirely on the garden, but the garden could be a component of a broader unit on local foods, for instance.

Table 4.5 continued

To start this process, I propose a stakeholder meeting some time this fall, with staff from both the farm and the school and perhaps Drs. Gerlach and Barnhardt as well. I would like to coordinate and facilitate such a meeting. I have not made any formal proposal to the school, but rather only had a few informal conversations with staff members. When one of the youth gardener students and I met with the teachers, I made it clear that I was representing Boreal as an employee, but that I also had interests in ongoing work with Boreal and the school as part of my graduate work. They are interested in collaborating with me, but I would prefer to have an agreement with Boreal first.

I want to make it clear that I am not proposing to replace or revamp Boreal's school garden program. However, I must admit that my interests are less based in teaching employment skills than they are in fostering students' ecological literacy and consciousness by teaching them why sustainable agriculture is important to them, to their communities and to their environments, turning them into advocates for sustainable agriculture. In addition, my sense about the EKCS is that they are attempting to integrate multiple approaches in their educational paradigm rather than separating such realms as employment skills from educational standards. The relationship between the school garden program and this educational garden module will be something that we will need to work out. I am sure there are many additional factors I have not considered, and part of the process will be sharing these with each other and fleshing out a vision together.

At this early stage, I also do not have a formal plan for funding such a project. I do not anticipate many expenses beyond my own time, and I would not expect Boreal to employ me in this capacity. As this is part of my dissertation research, I may be able to secure funding from another source that will support my graduate work.

Thank you for the opportunity you have already given me to work with you. I hope you will decide that my offer to collaborate with you will serve to further your organizational mission.

At this point my collaborative efforts began to shift from Boreal to EKCS. My initial volunteer work and informal conversations about collaboration with one of the junior high teachers (discussed below) went more smoothly than my ongoing attempts to come to an agreement with Boreal. I felt as though my potential EKCS collaborators better understood my interests and more highly valued the potential contributions I could make to the school. I submitted a brief research proposal to the school's Academic Policy Committee (APC), the managing board, of which my advisor Dr. Barnhardt was a member (Appendix H). At the presentation I gave to the APC, I was reassured when one of the committee members nodded approvingly when I explained that I wanted to conduct participatory action research. I made it clear in my proposal that Boreal and I had not worked out a formal arrangement concerning my research yet, but that I still hoped to. I knew I was risking upsetting Boreal with my decision to present this proposal without consulting them first, but I decided it was worth the risk. At this point, I felt more of an interest in and commitment to the school community than to Boreal. The APC approved my proposal and signed a letter of support for my research.

My decision to solicit approval for my work with the EKCS before coming to a formal agreement with Boreal marked a significant downturn in our ongoing discussions. Boreal was upset that I had submitted a proposal to the school regarding gardening curriculum design that implicated their involvement without their approval. They also did not want me to move forward in my work assuming that Boreal would adapt their school garden youth employment program to my educational project. Dr. Barnhardt and I had another meeting with a collection of four Boreal staff and board members, during which I was allowed to present my proposal for ten minutes and was then asked to leave. My advisor remained for the entire meeting and was optimistic in his report to me afterwards, explaining the agreement they had laid out about my work. Even though I had reservations about the success of a collaborative arrangement made without my presence, I remained open. Boreal followed-up a few days later with a proposal of their own that seemed to contradict the plan that my advisor told me he had put together with them. This contradiction between how my advisor had understood their verbal agreement and how they presented it to me in writing was an indication to me that I had failed and would continue to fail to negotiate the position that I needed to have for my research.

I called a meeting with my co-advisors to discuss what I saw as my options at this point. Table 4.6 contains a pro and con chart that I created for that meeting as a way to organize the discussion. I include it for its content as well as for an example of a reflective stage in my action research process and the way in which I used my advisors as "critical peers" to reflect with me on my research methods. I advocated for "Option C: Design broader gardening curriculum for EKCS." With my advisors' approval, I decided to cease further collaboration with Boreal. I had simply reached my limit in terms of my ability to remain open and flexible regarding their desires while also attempting to pursue my collaborative interests with EKCS. The time had come to choose which organization I would work with rather than continuing to try to work with both. I chose EKCS. I left it to my advisors to communicate our decision to Boreal.

Why did I choose to continue to work on gardening and food system curriculum at the EKCS when I knew that Boreal would prefer that I did not, since they were also continuing their youth employment program in the EKCS school garden, and that my work at EKCS would probably be constrained by our awkward relationship? I was asked this by committee members at the time, some of whom thought I should find another school to work with. My decision was a key point in my action research, and answering it sufficiently was important to my research at the time as well as in my analysis of it now. This is the heart and soul of action research; I test my

own theories about how to design research by putting them into practice and learning from them, then applying lessons to the next stage. First, I wanted to work with the Effie Kokrine School

Table 4.6 Action Research Options Discussed with Advisors in March 2006

	PROS	CONS	METHODS
Option A: Design and teach a summer 2006 module	• "action" emphasized through teaching • ability to pursue my own specific objectives • most direct, extended interaction with students • most tangible connection to place-based ed philosophy	• Boreal is highly opposed, for whatever reason • may demand more time that I have between now and end of May module time • premature because objectives have not been collaboratively designed • could require resources that haven't been identified yet	• Action of teaching module as "demonstration project" • Interviews of students, teachers, and community members before and after module • Video record some module activities
Option B: Conduct "background and observational research" on Boreal's school programs	• Boreal seems supportive and interested in results • useful to extend focus from EKCS to other schools • actual data-collection may be less time-consuming • can focus on collecting data relating to broader research question • least expensive in terms of resources	• "action" focus seems to have less weight • I've already done lots of such research—all last summer • I'm less interested in elementary level than secondary • I'm more interested in place-based, holistic Native Alaska educational approach than in "standard" ed at U Park and Pearl Creek	• Participant observation of Boreal's activities with school garden program • Interviews with participants in Boreal's programs, EKCS staff and students, and community members
Option C: Design broader gardening curriculum for EKCS	• "action" composed of involvement in design through garden curriculum committee meetings and teaching activities • stays focused on EKCS in terms of creating useful product • perhaps acceptable to Boreal, since I won't be actively implementing module • allows multiple stakeholders to have say in democratic design process • allows for hands-on activities with students in Boreal's program as well as other gardens • retains flexibility in timeline and objectives	• perhaps still not the best way to answer my broader research questions • perhaps unrealistic to expect that stakeholders will come to the table with mutual commitment to collaboration • I am not the right person to facilitate garden curriculum committee meetings, which may require outside facilitator	• Active participation in EKCS garden curriculum committee, including audio-recording some meetings • Active participation in teaching gardening lessons with EKCS students, including video-recording some activities • Interviews with participants in Boreal's school garden program, EKCS staff and students, and community members • Design of curriculum as product for EKCS and Boreal

because of their unique curriculum and their links to Alaska Native cultures, specifically rural villages in interior Alaska. It was the best school at which to perform any kind of "demonstration project" relevant to rural Alaska, as the school itself serves as a model for other schools with

large percentages of Alaska Native students. Similarly, the school community was a good fit for me in that they supported my work, and I found the staff easy to collaborate with. I felt that they understood my research interests better than any other groups I had thus far tried to work with. This could have been due in part to the fact that Dr. Barnhardt was one of the main organizers of the school and its curriculum and opened doors for my work there.

I could have continued to work with the EKCS while adjusting my curricular interests even farther away from gardening so as to avoid further conflict with Boreal. However, I felt that I was best prepared to make a contribution through focusing on gardening in part because gardening is generally not seen as a traditional Alaska Native activity like subsistence hunting and gathering are. As a white, female graduate student, I had already experienced the suspicion with which outsiders who claim to be experts on—or even interested in—anything Native can be viewed. Gardening was a good in-between activity in that it fit well with the place-based, hands-on curriculum of the EKCS and had a place in rural Alaska communities while not falling explicitly within the realm of Native subsistence. Also, I had already accumulated a good deal of experience in youth gardening that I wanted to build into a curriculum. Indeed, I wanted to continue to work with EKCS students as part of my research process. I felt that working directly with students was a key part of my action research. Hence, I could have backed off from the idea of doing a gardening module in the summer of 2006, but I did not want to sacrifice that part of my research. One of my strengths was actually working with students, which even Boreal acknowledged, and I wanted to draw from my strengths. I was especially excited that the EKCS was planning to have summer sessions, which opened up all kinds of possibilities for gardening education.

Finally, there was undoubtedly an element of basic tenacity in my decision as well. At this point, I was reluctant to walk away from the excellent relationship I felt I was fostering with the EKCS. Plus, I knew that part of the learning process for me in becoming an action researcher was to accept that not everyone was going to agree with my ideas but that at some point I had to take a stand and express confidence in my contributions. I knew that Boreal might have some valid criticisms of my approach. I worried that they were right that my presence at the school might generate enough confusion over Boreal's goals that I might damage the long-term relationship between the school and the farm. However, I decided that the risk was worth it, and besides, the school was quite capable of forming its own opinions. If they decided that they liked the work I was doing on gardening curriculum and wanted to implement it at the garden in their

schoolyard, then I figured that spoke to the quality of my work. This would be the most real-world test of action research that I could imagine. If I had succeeded in helping meet some of my collaborators' objectives, then the proof would be in their acceptance and use of my work. I also continued to hope that Boreal would come to value my work as well, though I suspected that was unlikely. My decision to risk Boreal's ire was personally difficult because superficially, I am someone who appears to belong to the Fairbanks sub-community who compose a lot of Boreal's support—the white, academic, liberal segment. I know many of these people personally and run into them in my everyday life. I am certainly not an intuitive part of the Effie Kokrine community, which represents many of Fairbanks' Alaska Native families. But I have found that perhaps I have more in common with the latter than with the former, at least in terms of pedagogy.

4.2.2 Stage Two: Planning with EKCS Staff

If I had to identify a clear beginning for my own field work, it would be in the fall of 2005 after finishing my internship with Boreal and beginning to engage more with the EKCS. Even before my Boreal internship, I had been following the development of the EKCS in Fairbanks because of its unique character as the first charter school to be focused on Alaska Native culture. As explained above, when I learned that the EKCS would be opening in the fall of 2005 in the building of the old Howard Luke Academy, where Boreal had been operating their school garden program, I thought it would be an ideal opportunity for me to continue working with Boreal to integrate the school garden into the new school's unique curriculum. Earlier, I had been envisioning my future work with gardening education as taking place in a rural community; however, because I lived in Fairbanks, there were good logistical and philosophical reasons to work in my own home community.

My advisors and I decided that a good first step for me was to volunteer and substitute teach at EKCS in the fall of 2005 in order to learn more about how the school functioned. Early on, I identified one junior high teacher—whom I call Cindy—who was supportive of my research interests and welcomed me into her classroom on a regular basis. My collaboration with Cindy proved fruitful from the beginning. I was immensely gratified when she told me that our collaboration was an ideal situation. She said I needed some students to work with and she needed someone to work with her students. She was happy to let me work with hers. This felt like action research at its best—a researcher-practitioner collaboration that met mutual needs. EKCS wanted to have community members engaged in giving guest presentations and teaching

classes as part of its curriculum, so I felt as though I was meeting an objective of the whole school. In January of 2006, I helped Cindy design and teach a three-week module on the boreal forest. We thought this would be a good way for me to gain experience that I would then apply to designing gardening curriculum.

As mentioned previously, In February 2006, upon the suggestion of Cindy and Dr. Barnhardt, I created a proposal for the school's Academic Policy Committee (APC) to investigate ways to integrate gardening into the curriculum (Appendix H). The APC approved the proposal and signed a letter of support for my project. I was able to use this letter of support in my IRB application to UAF as well as to the local school district, which has to approve all research projects in its schools (see Appendices F and G for IRB materials). It is insightful to compare this process to that I went through with Boreal. First of all, my potential collaborator—Cindy— suggested that I make a formal proposal to the managing board myself. Rachel never encouraged me to approach her managing board myself. Also, a lesson I learned from my difficulties with Boreal was to be as explicit as possible in the way I proposed my project to my potential collaborators, and so the layout of my proposal to the APC was more organized and detailed than the one I submitted informally to Boreal.

By the time my committee and my collaborators and I had all agreed on a rough plan of action, the gardening season was almost upon us. My first priority was preparing to plant a garden with students. Even though I had been working primarily with Cindy and her students at this point, I wanted to garner input from others in the school community about which EKCS students to work with and what garden space to use. Dr. Barnhardt had suggested that I teach a garden planting module as an elective, which would need to be focused at the high school level. However, discussions with EKCS high school teachers and other staff indicated that it would be more practical and beneficial for me to continue to work with Cindy's eighth grade class. Electives had not yet been offered in the new school, and so to organize one would require additional time and resources from the staff than I was prepared to ask for. I was also eager to work at the junior high level because my background reading on gardening education suggested that students at that age are at a good age to connect hands-on gardening work with knowledge about local and global food systems (Montessori, 1976).

Cindy and I then agreed that the best plan to work with her students would be to design a garden planting module that would fall in the last three-week module of the school year, from May 22-June 6. The pre-determined curricular theme for this module, which applied to the whole

school, was *Exploring Horizons*, and the eighth graders were specifically focusing on US History and Geography during that time. Cindy was willing to be quite flexible in how we interpreted "history and geography," so we decided to create a module focused on the US food system and include garden planting within that theme. This was the kind of curricular flexibility that made the school such a unique research setting for me. The school's curriculum was especially open in this first year of its existence, as much of it was still being developed by the teachers and board. Another advantage for the EKCS in pursuing place-based educational activities is that they exist as a "school without walls." Parents and guardians give permission at the beginning of the school year for their students to leave school with their teachers whenever the teachers see fit for field trips to local places during the school day. As part of the module, Cindy and I planned to take all of the eighth grade students—both her class and the one other class at this grade level—to Howard Luke's Gaalee'ya Spirit Camp to plant his garden for him.

Howard Luke is an Athabascan elder in the Fairbanks area who has long been active in Native youth and education. In his book, *My Own Trail* (1998), he describes his upbringing as an Athabascan in the Tanana River watershed, in Native communities near Nenana and Fairbanks. For much of his adult life, he has lived at the "camp" across the Tanana River from Fairbanks where his mother lived until her death. There has always been a garden at the camp from the time when Howard lived there with his mother. Howard has turned this spot into a community resource by building a number of structures, such as a meeting building and an outdoor kitchen, and hosting guests and visitors at his "Gaalee'ya Spirit Camp." Ray Barnhardt writes of Howard in the book's introduction:

> Howard is a person of his own kind, who has walked his own trail, but who has
> found ways to bridge and blend aspects of two worlds to form new opportunities
> that are of benefit to people from all walks of life. A visit to his camp across the
> river is like stepping back and looking forward in time simultaneously. A short
> walk through the woods takes you past a historical cemetery to the remnants of
> the old village of Chena. Nearby you will see the trails where Howard continues
> to trap and hunt, and in the summer you will find him tending his fishwheel or set
> net and hanging fish to dry. The centerpiece of the camp, however, is a new
> hexagonal log structure that he has erected with the help of many donations and
> volunteer labor, to provide a meeting place for people to share and learn from one
> another. His Gaalee'ya Spirit Camp has hosted numerous events over the years,

with Native and non-Native people coming from as far away as New Zealand to
experience life in a traditional Athabascan setting and to learn the contemporary
value of *Gaalee'ya*—showing respect for all things. It is readily apparent
throughout Howard's book that he has high regard for education in all forms, and
he has dedicated his life to that end, offering his services to schools and
community organizations throughout the Fairbanks area. In recognition of his
contribution to education, especially for Native students, the Fairbanks North
Star Borough School District named its new alternative high school after Howard
Luke and the University of Alaska Fairbanks has awarded him an honorary
doctorate. He continues to visit the school that bears his name and donate his
services on a regular basis, serving as an inspiration for the teachers as well as
the students (Luke 1998: xii-xiii).

 The school district building that houses the EKCS formerly operated as the Howard Luke
Academy, an alternative school managed by the FNSB School District for "at-risk students" who
had had inordinate trouble at other schools in the district. When the organizing committees first
created the EKCS proposal, they did not yet have a school site chosen. The school district
offered the building to the EKCS to use because the Howard Luke Academy was closing, and
encouraged the new school to open a year earlier than originally planned and include the high
school grades from the beginning. (Originally, the vision was to open the new school with only
7th and 8th grades and then add on an additional grade each year.) The EKCS committees
accepted the offer of a high quality building in a good location. The EKCS especially wanted to
make use of Howard Luke's camp as an extended part of the school campus. This gardening
project provided a venue for making a connection between Howard and the EKCS students. I
visited Howard's camp myself for the first time in May with an acquaintance to make plans for
bringing students and to start familiarizing myself with how best to work with Howard.

 Collaboration with Howard Luke was much different from my experiences with either
organization above. I could include my work with Howard under the domain of collaboration
with EKCS, but my work with him had value to my research beyond just the role it played with
EKCS. I had spent time with Alaska Native elders and individuals in other settings before, such
as my summer internship in Fort Yukon and a week at the Old Minto Cultural Heritage and
Education Institute. However, Howard was the sole elder involved specifically in my dissertation
research, and as such helped me formulate my thinking about integrating gardening into an

appropriate cultural context. I already knew that the best way to "collaborate" with an elder was to do work with him. So on my first visit, I brought another graduate student along and arrived prepared to do hands-on labor. Howard indeed put us to work. I was most interested in the garden, of course, so my friend and I tilled and raked the garden beds in a fenced-in area of about 400 square feet. This spot was Howard's mother's old garden. Howard shared some of the projects he wanted to do involving the garden, such as replacing the moose fence posts that were rotting at the bottom. He had already cut some spruce poles that he wanted to strip and use for a new fence. I made mental note of this task that I could involve students in. Later, our outdoor labor done for the day, we adjourned to Howard's kitchen for tea and conversation, a pattern I was to become familiar with over the rest of the summer. After listening to some of Howard's stories, I broached the idea of bringing EKCS students to camp in a few weeks, and Howard approved of the idea.

4.2.3 Stage Three: Gardening with EKCS Students

The beginning of this stage marks the point in my research at which I moved away from a focus on setting up collaborations and towards conducting my actual research activities. However, in the following discussion, I continue to focus on the evolving logistics of collaboration with EKCS. While I discuss some of my observations concerning the practice of gardening with students, I reserve a more detailed analysis of how my observations fed into the evolving gardening curriculum for Chapter 5.

With all the pieces in place for our food systems module, Cindy and I dived into preparing the students to garden. Plans continued to evolve even within the context of the module. The most challenging part of making use of Howard's camp and garden was getting the students across the river to the camp. In the winter, they could simply walk across the frozen Tanana. With the river running, we had to hire a boat to drive us there. Cindy found money in a discretionary budget to pay for boat transportation to the camp, and we all spent one night and two days at the camp together. The trip was a natural extension of our module, and well worth the effort. For two days, the eighth grade students and two teachers and I stayed at Howard's camp and helped not only with planting the garden and peeling spruce poles for the fence but also with other tasks that Howard had in mind. My plan was to take students back to the camp several times during the summer to help with garden maintenance and harvest. However, the non-profit board managing Howard's camp did not renew its liability insurance after May 31. We had just barely made it out there in time to be covered on the first trip. After that, the school district

would not approve any more student field trips to the uninsured camp. I returned myself to Howard's camp several times, but it remains a disappointment for me that the students were not able to make more trips that summer.

Conveniently, during the first week of our module, another teacher suggested that since Boreal's garden space was dedicated to Boreal Farm this summer, that we should simply put in more garden space for me to use with the eighth graders. He helped us coordinate the building of several raised garden boxes at the school with the help of his high school students. We obtained donated scrap lumber and top soil and Brian and his students built several raised garden boxes in a sunny spot outside of the "Elder's Room" at the EKCS. This room is adjacent to Cindy's classroom and serves as a meeting space, complete with a kitchen. Conveniently, the south-facing area also had a chain link fence around it that would help protect the garden from moose and hares. The ease with which the garden box project came together seemed to validate that I had chosen an appropriate research setting with collaborators who were in my contributions.

After returning from Howard's camp, where each student was responsible for learning how to plant at least one vegetable, we evaluated the students on their ability to apply their knowledge in the planting of the garden boxes. The last day of school and the module was June 6. (I describe additional module activities in Chapter 5.) When the students returned in early July to start the new school year, they all moved up a grade, so Cindy had a new bunch of students. We did not pursue another gardening-related module with these new students, but I continued to look for ways to integrate the garden box produce in various school activities, such as using cabbage to make coleslaw for an open house dinner in August. I also gave a guest presentation on food systems to a high school class in August, and later we harvested some vegetables from the garden boxes for students to use in a potluck in which they prepared favorite family recipes together. I continued to use these experiences as field work, in which I was testing out different possible garden lessons to build into a more substantial gardening curriculum. At this point, I was unsure of what form my final "product" for the school would take but I still hoped to design either a three-week module that could be implemented as an elective in the future or some other curriculum that the school could use. I designed the next stage of my research in part to help answer this question.

I visited Howard's camp three more times that summer and fall, bringing different friends with me each time to help with tasks. Once my husband and a friend and I put up a new moose fence with the poles the students had peeled and other donated materials. On another trip, I

harvested quite a bit of produce, much of which Howard gave to me because he did not want to eat it all himself. He kept his favorite vegetables—carrots and potatoes—for himself, probably to use in moose stew, and gave us the kale and sugar snap peas. He did, however, want to make sauerkraut with the dozen or so cabbages that we harvested, so on a final trip, again with my husband and another friend, we shredded the cabbage and put it in a five-gallon bucket with salt and left it by Howard's wood stove to ferment.

During each of these visits, I attempted to learn as much as I could from Howard about his gardening knowledge and his opinions about the place of gardening in a subsistence lifestyle and in educating youth. He shared a few stories about his mother's garden and his experiences as a youth working in the large gardens at the mission school he attended briefly in Nenana. But part of the challenge of working with elders is that they do not tend to compartmentalize knowledge the way that academia does. Distilling the topic of gardening from Howard's worldview was not something I really wanted to do, and yet I felt it was a challenge I had to take on for the purposes of both incorporating his Native wisdom into a curriculum and for writing about it in my dissertation. So I returned on my own one final time to the Gaalee'ya Spirit Camp after winter set in and I could walk across the river myself. I asked Howard to sit with me for an official interview, and he agreed to being recorded, a process with which he was quite familiar, as many academic sorts have subjected him to interviews over the years (Appendix B contains the transcript of this interview). I was at least able to capture his stories relevant to gardening, and he passed on to me a couple of jars of sauerkraut that he had canned himself. While I discuss the challenges of integrating my experiences with Howard into the process of designing curriculum later, I want to point out here that at no time did I get the impression that Howard thought gardening irrelevant or inappropriate to a traditional Alaska Native way of life, as some non-Native people have suggested to me from time to time. He seemed to think it perfectly sensible to educate youth about the practice and importance of gardening, another way that my action research was validated by my collaborators.

4.2.4 Stage Four: Conducting Teacher Interviews and Meetings

In August, in addition to using garden produce with students, I started interviewing teachers and other EKCS staff. These were qualitative, open-ended interviews that had two purposes, which I explained at the beginning of each interview. Practically, I was looking for input from teachers on the directions I should take with a garden program plan or a garden curriculum to be used by the school, something with a life after my presence at EKCS ended.

From a research perspective, I was also looking for their opinions and insights on designing education to promote sustainability of community food systems, the topic I would address in more theoretical sections of my dissertation. These interviews were another example of how I tried to stay true to action research by pursuing both practical and theoretical goals. These interviews progressed slowly, as I chose carefully which EKCS community members would be best to interview. I did not use a random sampling method but rather identified a selection of individuals with different skills and insights to contribute, and ones who were interested in contributing. In addition to five teachers, I also interviewed three individuals involved with curriculum design at EKCS in various capacities. The last interview I conducted was in May 2007 with a focus group of students who had participated in gardening at the EKCS, either students with whom I had worked or those who had worked at Boreal.

In addition to interviews, I also attempted to stay involved with the staff interested in planning for gardening the following summer. I hoped to take an active role in garden planning in part so that I could tailor my curriculum to dovetail with whatever plan the teachers came up with. I also knew that it was unlikely that any of the teachers on staff would have the time to do all of the planning work that I was offering to help with. Again, this was a key point in my field work in which I attempted to take as much of an insider position as possible by helping with the practical work that I thought needed to be done. I still envisioned myself designing the ideal gardening program for the EKCS with Boreal's school garden program fully integrated into the school's curriculum. I again attempted to try to find a way to meet mutual goals by facilitating a series of three garden planning meetings in the fall of 2006, forming a de facto garden committee, which was one of the things I knew Boreal wanted from the school in order to be able to work with them. However, Boreal remained uncomfortable with my role as a facilitator, and eventually I stepped back from the garden committee meetings. Over the next three months, I had time to reflect on the direction my research was taking and to re-evaluate my goals. I had put myself in the awkward role in which EKCS welcomed me to take on the responsibility I was shouldering while Boreal did not approve of the level of responsibility I was assuming. I was not employed for either organization, but I did have an official agreement with EKCS and not with Boreal. Had I put myself in an impossible situation?

In order to illustrate why I felt as though my approach with EKCS was viewed as valid by my collaborators, I include in Table 4.7 some excerpts from some EKCS teacher interviews that reassured me that my work was seen as valid, at least in terms of democratic validity as

described by Herr and Anderson (2005). These were often comments made at the end of an interview with an EKCS teacher, when I asked my interviewee if she had any final questions or thoughts. Perhaps these people are simply kind-hearted, and so I include a final, unsolicited example of approval for my collaborative approach. One day when I arrived at the school, a woman working at the front desk who often saw me coming and going and helped me with various logistical issues stopped me to tell me that she appreciated the professional way that I had conducted my work with the school. I was pleasantly surprised, and I still have no idea whether some specific interaction with me or with someone else prompted this comment. I share these comments at the beginning of this section specifically in order to highlight the different nature of my communication and collaboration with EKCS than I had had with Boreal Farm.

Table 4.7 Comments from EKCS Collaborators Indicating Democratic Validity

"I appreciate your commitment not only to the gardening program but to the school because you've been very involved. You jumped in and you haven't been just doing the gardening stuff. You've been in here in the classroom, doing a lot of volunteer work. It's so neat to see people make that commitment. We don't see that here very much. I think everybody in the school feels comfortable with you, and it's been neat working with you."   "I like what you're doing. I appreciate what you've done with us so far."   "Just keep coming back, man. You rock! I really love it when you come in. That helped us so much, just being in the potluck, coming that Wednesday. That was great."   "[I]f you're patient enough to do what you've been doing, I think you'll arrive at something everybody's got a hand in making…[P]art of the challenge has been, everyone got handed this Spiral curriculum, whereas you've kind of been working with different teachers and seeing, 'Okay, now here's a module and how can I tie this into this module?'"

4.2.5 Stage Five: Designing Curriculum

The heart of this study has been the development of a gardening curriculum for the EKCS. I recognize this as my most non-traditional, action-oriented research component and what makes my research an action research study. For many social science research projects, a local report or a curriculum is considered an "outcome" of the research rather than a key component. I wanted curriculum development to be the heart of the research process, the action that resulted in research results, not the other way around. Whatever rigor and quality there is in my dissertation comes from this focus on a real-world goal of integrating all my experiences into a gardening curriculum with the participation of my collaborators—the teachers at EKCS. My focus on this curriculum has kept my action intentions honest in the sense that the curriculum has emerged

from a collaborative, real-world context and will be judged in part by the same context, reflecting the second characteristic of action research listed above, *the creation of locally-relevant knowledge is a primary goal and the standard for evaluating quality and rigor of the research*. All of my research methods have been focused on answering my research questions *through* the process of collaboratively designing this curriculum. I have wrestled with the question of whether to separate the "practical" product of the curriculum itself from the "theoretical" product of this dissertation, but I can see no other way to describe the goals and results of this project. However, I have attempted to keep all of my methods and analysis tightly tied to the practical objective of designing a functional curriculum.

When we all returned to school from our winter holidays in early 2007, I was uncertain how to proceed other than continuing with a few interviews. I had hoped to write as much of my dissertation as possible in the spring 2007 semester, but my field work with the EKCS was not really done. I still had at least one more action research cycle to move through. When school resumed in January of 2007, I stepped aside as Boreal began its planning process again for the garden that summer, which appeared to closely resemble the same model that they had been using for the school garden program. I focused instead on designing the gardening curriculum that was taking shape, still frustrated that I could not assume that the curriculum would be implemented in the school garden as I had envisioned. This uncertainty about the status of gardening curriculum at the EKCS is one of the factors that led to my decision to create a broad curriculum that could be implemented and adapted in a variety of educational settings in interior Alaska, not just the EKCS. I discuss other factors that contributed to this decision later. An excerpt from my journal on February 27 summarizes my divided thoughts on creating gardening curriculum (Table 4.8)

In addition, the EKCS board had hired a curriculum consultant to help streamline their Spiral curriculum. The consultant was tasked with creating detailed outlines for the 7th-10th grade modules that would both stay true to the Spiral themes as well as ensure that students were receiving instruction necessary to perform well on the state-mandated standardized tests at those grade levels. One of the changes that came out of her collaborative process with the staff was that the modules shifted from three weeks to six weeks. I was fascinated with this process because it seemed to encapsulate the challenge of place-based education in a formal educational setting, which I discuss more later. However, as the curriculum became more and more structured, I saw less and less opportunity for incorporating gardening into the outline. Another

challenge had always been that the gardening season does not fit within a three or six week module. I felt strongly that for students to gain the most benefit from gardening education, they

Table 4.8 Field Journal Notes on Gardening Curriculum Design

February 27, 2007
As I sit to design a gardening curriculum for the EKCS, I am still unclear as to what my primary goals are. All the interviews and meetings and activities I have done have not clarified a school-wide goal as I had hoped they would. Teachers are interested in different things and have different demands to meet, depending on their grade level and their interests. I set out to merge a gardening curriculum smoothly into the EKCS Spiral in order to meet multiple teacher objectives, but I have come to realize that that task is far too large. But I am still divided on whether to tailor this gardening curriculum as an "ideal" form in which I put my own goals and objectives at the forefront or as a more "practical" form in which I create a product most useful to certain teachers at the school. In the former, I would be able to pretend as though I had complete control of the garden and the students in order to put together my experiences and what I've gleaned from the literature into a package. In the latter, I would focus more on my initial goal of integration of gardening into the existing curriculum. I have to admit that while my "action research" philosophy pushes me to do the latter, I am leaning towards the former, because I think it would be the most educational for me personally to design an idealized gardening curriculum that I could even transport to another place, or publish. I also have significant concerns that try hard as I might to create a useful product for my teacher-collaborators, they're likely to do their own thing anyway, as I have seen them do with the EKCS Spiral modules that are being designed for them now. I suppose I'm wrestling with some of the typical challenges of a curriculum writer; the teacher is always the expert, who knows her students' needs best. So potentially the most useful thing I could design is just a resource book, a package of lessons to draw from. But there are already so many of those out there, and the whole point of this experience is to create place-based curriculum.

should be able to harvest and prepare and eat the food that they plant. Given all of these factors, by March I had decided to create a culturally-appropriate gardening curriculum applicable to multiple settings in Interior Alaska, tailored ideally for a school like the EKCS with its place-based and hands-on focus. I spent the next several months sketching out this curriculum, as well as continuing to visit Cindy's classroom from time to time, including a few trips to help start flower seeds for the garden boxes. In May, I gave my draft of my curriculum to the four teachers I had worked most closely with, asking them to look over it during the summer to give me feedback the following September (Appendix A).

4.2.6 Stage Six: Writing a Dissertation

The final stage of my action research was the writing of the dissertation, characterized primarily by a final round of reflection to draw together all the other stages of research. This stage was far more removed from the collaborative setting than each of the other stages. My last participatory act before devoting my time to writing was to solicit feedback on the draft of the gardening curriculum submitted to four of my collaborating teachers (including Cindy) in May of 2007. I waited to receive their feedback at the end of the summer before moving on to the reflective and analytical stage I entered for the construction of the dissertation. However, the

three teachers who returned to school the following fall had little feedback on the draft curriculum, and so what I present in Appendix A is little changed from what I put together in the spring of 2007. In one sense, I took this minimal feedback to be a vote of confidence in my curriculum, that what I had created was a valid product of the collaborative process. On the other hand, I worried that perhaps the curriculum was too broad to be of immediate use, even though one teacher assured me that she preferred broad to "canned" curriculum that tells her what to do every minute of the day. She reassured me that my work had "planted seeds" that would come to fruition in some way. This comment speaks to the challenges of any kind of short-term educational research. It is incredibly difficult to "measure" the effects of educational processes within a short time period when some effects are not evident until years later.

For the dissertation, my job was to analyze the process leading to the curriculum as well as to draw conclusions from the process related to my initial research questions about how to design educational practices to promote sustainability of a community food system. Of course, my data analysis was ongoing within the context of my field work, but for the purposes of the dissertation, I explain in Chapter 5 how I used the curriculum to construct categories of analysis for my interview data and my observational notes. I would have liked to more actively involve my collaborators in this stage as well, but the teachers were less interested in the theoretical implications of my work than in the curriculum itself. Indeed, when I told one the same teacher cited above that I was asking for her feedback on the curriculum because I was writing my dissertation about it, she teased me by asking if all I had to do to get my PhD was to write a curriculum. This teacher had far more experience than I in curriculum design, and it sounded to her as though I had an easy job for my dissertation, even though I had explained to all my collaborators that my field work had the dual purposes of curriculum design and exploration of educational theory. But I was at a bit of a loss to explain how I intended to use the curriculum to develop sustainability pedagogy.

This disjuncture between me as a researcher and my collaborators as practitioners speaks yet again to the challenge presented by participatory action research to remain grounded in practice while also contributing to theory. Similarly, my continued attempts to find a way to return to the EKCS to present the results of my research have thus far not succeeded. As long as I visited the school with the intention of actively helping teachers and students meet their immediate educational objectives, I had no problem finding ways to engage with the school community. But very few teachers have time to come to a presentation about pedagogy. In the

meantime, the school year and the curriculum at the EKCS have changed so much that the design of the gardening curriculum may no longer be useful for teachers. One of the most challenging aspects of my research has been to step back from my active involvement with the school and have faith that what I have done will have long-term benefits, and accept that the best community for me to share my theoretical insights may by the wider research community engaged in education and sustainability rather than my collaborating teachers.

4.3 Summary

In summary, I demonstrate in this chapter how my research approach reflects the characteristics of participatory action research listed in Table 4.1. As I have said elsewhere, designing curriculum helped me link theory to practice, allowed me to engage with collaborators in making change, and prompted me to create locally-relevant knowledge. Of course, action research also has some limitations. Because it is difficult to lay out a definitive research protocol in advance of extensive collaboration with research participants, it is often hard to find funding for such a research approach. I conducted all of my field work without grant funding and instead kept my project small-scale enough that it could be supported by my own and my collaborators' budgets. In addition, it often takes a long time to do action research well. What I lacked in funding, I made up for in time participating in my research setting. Some would consider it a limitation that because of its focus on the local, action research does not often yield results that are easily generalizable. Despite these limitations and the collaborative challenges I experienced, I remain happy with my decision to frame my dissertation research with this practical research approach. It was the best choice to explore my fundamental interest in creating favorable conditions within a complex adaptive system to foster the emergence of sustainability. In many ways, action research mirrors the process of adaptive learning. Through this process, I created a product that I hope will find use beyond the process that created it, and I managed to draw broader conclusions about educating for sustainability that I present as a pedagogical framework in Chapter 6.

Chapter 5:

The Emergence of the EKCS Gardening Curriculum

This chapter addresses the development of the gardening curriculum found in Appendix A. In a sense, it can be considered the "results" section of this dissertation. The curriculum itself is the practical outcome of this work, while the following discussion provides the background of that outcome, including an analysis of the design process and the incorporation of practical and theoretical rationale. In this discussion, I will refer to some of the six stages of action research presented in Chapter 4, Table 4.4. There are two primary categories of field data that I draw from in creating this analysis—detailed field notes and interview transcripts. The field notes were taken primarily during the summer of 2006 when I gardened with students and teachers at the Effie Kokrine Charter School (EKCS), but also include observations from the preceding summer when I was employed as the a youth garden supervisor in Boreal Farm's school garden employment program. The interview transcripts and meeting notes come from subsequent interviews with teachers, students, and other EKCS community members over ten months beginning in August 2006. Finally, I also draw from literature on place-based education and schoolyard gardening reviewed in Chapter 2, as well as other resources related to curriculum development.

At the beginning of this project, I did not have a clear idea of what kind of product I wanted to generate as the practical outcome of my work. While simply working with students for a summer was a laudable goal and contributed to the school community, I felt that I wanted to create something that would have a longer life at the school than my short term work with students would. In other words, I wanted my work to meet the goals of outcome and democratic validity described above—to achieve action-oriented outcomes that are relevant to the research setting. As described in the previous chapter, I initially imagined collaborating with both Boreal and the EKCS to integrate the existing youth gardening program into EKCS's Spiral curriculum (Appendix C). When that objective did not look feasible, I had to adapt, and my focus instead shifted to creating a more generalize gardening curriculum for use at EKCS and other Interior Alaska schools.

The next sections provide an overview of three primary stages of this action research that contributed to the organization and content of the gardening curriculum—the summer of 2005 when I worked with Boreal, the summer of 2006 when I gardened with EKCS teachers and

students, and the fall and winter of 2006-07 when I conducted meetings and interviews. It is interesting to point out here a theme that I will develop later, which is the congruence between the action research process and the learning process that underpin this work. Both require a systems perspective that views learning as an organic process dependent in part on feedback from the system to the individual processing the information, whether that individual be an action researcher or a student, or both. Indeed, I see myself as a student in this process as much as a researcher. My task has been learning how to collaboratively design curriculum in a way that allows me to investigate my own interests as well as meet goals of my collaborators. (In the following discussion, I use pseudonyms for everyone with whom I worked, with the exception of Howard Luke. Also, because most of the teachers with whom I worked were women, I refer to all of my interviewees and collaborators as women, in part to protect the identity of the few men.)

5.1 Stage One: Pilot Project

In my end-of-season self-evaluation as the Boreal Farm Youth Garden Supervisor, I suggested that one of my strengths was working with the two high school students with whom I spent the summer in the garden. I loved the process of identifying their strengths and weaknesses and figuring out how to make use of their strengths while also helping them grow stronger in their weak areas. In other words, the role I saw myself playing was a mentor rather than a supervisor or teacher. This concept of mentorship became a guiding image for me in the development of the curriculum. While I enjoyed my time with the Boreal students, I was also frustrated by a number of restrictions that the nature of the youth employment program placed on me. As described in Chapter 4, because the program focus was on employment skills, all other educational goals that I had in mind for the students were secondary. For instance, I was bothered by the disconnect between the role the students were playing as gardeners and their lack of knowledge about why growing and eating organic produce is desirable for their own health and the health of their communities. Not only did I not have time to provide the students with background knowledge about sustainable agriculture, but we also had no time to address the skills necessary to prepare the garden vegetables that they took home every week. I saw these issues as an indication of serious weaknesses in the Boreal Farm program, as addressed in this field note excerpt about working with the two students:

> I also had to talk to them about FOOD on Tuesday. I'm concerned about K. not
>
> eating at all…I'm concerned for a number of reasons, but in large part because

this garden is all about NUTRITION, in part. If K. isn't learning about eating

well, then what's the point? And A. says he's going to start bringing in energy

drinks, which are mostly just caffeine. So, they're showing signs of progress in

other places, but if they don't use the veggies or learn about nutrition, where's

the food security in that? A. says his mom didn't like the salad mix, and I get the

impression that a lot of it gets thrown away (Field notes, June 29, 2005).

Similarly, I was constantly looking for opportunities to apply academic lessons to what

we were doing in the garden. There were times when math skills were important, such as

calculating the amount of soil amendments to add to a garden bed; there were opportunities to

develop writing skills, such as in contributing to the weekly newsletter that we gave to our

shareholders. However, usually there was not enough time to significantly develop the students'

academic skills. For instance, I could not work with the young man on our team to improve his

grammar and show him how to construct a paragraph when I had my own chores to do in the

garden. While we were successfully contributing to the availability of sustainably-grown produce

in our Fairbanks community, we were failing to teach these students much beyond the mechanics

of gardening and the importance of a good work ethic for succeeding in a job. I believed that the

students benefited from their experience in the youth employment program, I thought I could

design a better approach to meet what I saw as Boreal's implicit educational goals. I knew that I

shared broad ideals with Boreal in terms of engaging students in the process of creating stronger,

healthier community food systems, but I was forming different ideas about the best methods for

fostering that engagement. However, I had yet to fully articulate what my goals were both in

terms of my research and for a gardening education program. Fortunately, my collaborators at

the EKCS were more willing to give me time and space to experiment with my ideas.

5.2 Stage Two: Getting to know EKCS Community

Because stage two was largely focused on setting up my research project with the Effie

Kokrine School, I do not have much data to report regarding youth gardening education in this

stage. However, one of my primary goals during this stage was getting to know the teachers and

students with whom I would be working. As I have not characterized the school community in

detail elsewhere, I do so here.

The EKCS may be located in a standard one-story school building, but during the two

years of my volunteer work there, the EKCS was anything but a standard Fairbanks school. As I

had also spent time substitute teaching in other Fairbanks schools, I felt qualified to make some comparisons. The EKCS began with a unique vision, articulated in the charter school proposal in Appendix C. Because my field work occurred during the first two years of the school's existence, much of the school community during that time was characterized by staff and students making a first attempt at turning the vision into reality. I was thrilled to be a part of the process of creating a Fairbanks public school with a primarily Alaska Native character. What does such a school look like? Clearly, the school's Academic Policy Committee (APC) could not and did not limit participation to Alaska Native students. The trick was to design a school that would appeal to Alaska Native families as well as remaining open to non-Natives interested in this approach to education. The APC did this by designing the Spiral curriculum to reflect Alaska Native ways of knowing and learning, and by recruiting Alaska Native administrators and teachers.

When the school opened in the fall of 2005 and for the next three years, an Alaska Native woman served as the principal. The school was divided into two wings—a junior high wing and a senior high wing. Initially, there were four teachers in each wing. About half of the first year's teachers were Native, although those ratios changed over time as the student body shifted and teachers turned over. I witnessed fairly high teacher turnover during my time there. The intent was for the teachers at each level—junior or senior high—to work together as a team to implement the Spiral curriculum vision. The Spiral curriculum provided the framework of thematic units that the whole school addressed through three or six week modules at each grade level. When the school opened a year earlier than initially planned, these modules were still being developed. The teachers who stayed on beyond the first semester or year were the ones not only committed to the vision of the school but also comfortable with the initial lack of structure and the necessity of designing their own curriculum to fit within the overarching Spiral.

Students had to apply to be accepted to EKCS. In the first year, the school had no problem recruiting plenty of students who not only were interested in the new school but also met the criteria for acceptance. From my own observations and from what staff shared with me while I was there, I estimated that at least 95% of the student body was Alaska Native, and the remaining non-Native population was a diverse mix of students interested in being part of the EKCS community. However, just as with the teachers and staff, the student body morphed over time as well.

When I entered this milieu, I quickly learned that the best approach was to identify one or two teachers with whom I would work primarily. In Chapter 4, I described much of my

collaborative work with Cindy, an Alaska Native junior high teacher. In many ways, her classroom of about 15 students served as a microcosm of the school community, in both tangible ways such as student body composition and less tangible ones like Cindy's challenge to stay true to the school's cultural vision while also helping students meet State of Alaska competencies. For instance, while the vision was to teach all academic subjects through the lens of culturally-appropriate thematic units, most teachers had a hard time meeting this objective for math in specific. Therefore, Cindy and many of her colleagues spent at least an hour a day on math separate from the rest of the day's lessons and activities related to the module theme. From my initial volunteer work in Cindy's classroom in fall of 2005 through the gardening season the following year, I tried to visit the school an average of once a week. Over time, I developed rapport with a number of Cindy's students. I learned that many of them were from Athabascan families in the Yukon Flats region where I had lived and worked as an intern a few summers previous, and I found myself in the surprising position of teaching them some words in Gwich'in during a unit on the boreal forest that I helped teach in January 2006. During the same unit, I was again surprised when a couple of Koyukon Athabascan girls requested to leave the room when I showed a video on Koyukon hunting and gathering practices because they wanted to honor the traditional restriction on women having anything to do with bears. These were the kinds of interactions that made this school unique. They were also important lessons for me to incorporate into the design of culturally-appropriate gardening curriculum.

Cindy also provided a link for me to the APC, as she was a teacher representative on the board. When it came time for me to create a plan for my educational gardening work at EKCS, Cindy put me on the agenda for the February 2006 APC meeting. I presented the following initial objectives for a gardening program that I suggested to the EKCS board in my action research proposal (Appendix H):

- Enhance student's ecological literacy and gardening skills through experiential education in gardening.
- Provide learning opportunities in science, math, and language that are integrated with the experience of gardening.
- Provide nutritious, local produce for students.
- Perform a service to the community by providing produce for community members.
- Build connections between the school community and the wider community.
- Foster ecological stewardship among students.

- Improve ecological health of regional ecosystem by reducing food imports in favor of producing vegetables locally and sustainably.
- Improve community food security through youth education.

5.3 Stage Three: Gardening with EKCS Students

The summer of 2006 provided me with the opportunity to work with students in a formal school setting to test some ideas for teaching about sustainable food systems through gardening. I have explained elsewhere my attraction to working in the EKCS setting because of its nature as a new public charter school with an Alaska Native focus. I have also shared some details about the nature of my collaboration with Cindy and other EKCS community members. In this section, I highlight the educational activities I pursued with EKCS students and my evaluation of which strategies seemed effective and which did not. Again, the action research cycle of plan-act-reflect-plan will be evident in this discussion. Already, my pilot study as a Boreal Farm intern provided insights regarding both collaboration and educational design that I applied to this next stage. This stage resembles the early teaching experiences of a teacher-in-training, in which I practice teaching techniques to develop my own style and philosophy. In that respect, Cindy acted as a mentor as well as a collaborator, and the following analysis is analogous to a self-assessment essay of a new teacher.

The first primary gardening activity I pursued with EKCS was collaborating with Cindy on designing and teaching a three week module on gardening in the context of US food systems. (Incidentally, this module was scheduled to be three weeks, but a number of logistical factors—such as the Memorial Day holiday and preparing for the EKCS graduation ceremony—turned it into an 11-day period instead.) As explained elsewhere, the overarching Spiral theme for this module was Exploring Horizons, and the 8th graders with whom I worked were supposed to be studying US History and Geography. I kept detailed field notes before, during, and after this module. According to my notes on the day before the module began, I had the following goal for this module: "For kids to understand the context of sustainable, small-scale agriculture in Alaska by investigating both the US food system and the practice of gardening among Native Alaskan communities in Interior Alaska." Immediately following this goal in my notes, I wrote,

> This is a huge goal, of course. And part of the problem is that I don't know
> where these kids are in their understanding already, so tomorrow I have to spend
> some time figuring that out. How do I do that? A group discussion is the most

natural way for me, but maybe that doesn't really allow for different modes of expression. I'm thinking of having them diagram what they know of the food system that underlies their favorite meal (Field notes, May 21, 2006).

My notes over the following three weeks are full of these musings. Indeed, my goal for the module was extremely vague. I realize now that I was attempting to articulate what has become the goal for the gardening curriculum.

My approach to meeting this vague goal during the course of the module was to plan a list of activities related to the overarching goal. Rather than having each day planned out, I could choose from the activities whichever seemed appropriate at the time. Cindy's daily schedule was such that we had about three hours every afternoon to devote to module activities. We knew that we wanted the heart of the module to be our trip to Howard Luke's camp to plant his garden. However, in part because of our attempt to link gardening to lessons on the US food system, we had several disparate activities in mind as well. Other activities that I had sketched out for this module are presented in Table 5.1.

By the end of the module, we had completed some but not all of the above activities and some only partially, as noted in italicized brackets. Rather than going through each activity in detail, I summarize here the most relevant lessons. First, I gained insight into the balance every teacher must strike between planning and flexibility. I thought it worked well to have a smorgasbord of activities from which to choose rather than having a linear approach to completing the activities, and I later designed the units of the gardening curriculum this way. I learned on the first day that my ability to be flexible would be crucial, as it turned out that Cindy had promised her students that they would go for a walk that afternoon as their activity for physical education. (There is no PE teacher at the EKCS; each teacher is responsible for incorporating PE into their students' schedules.) So we shelved the other possible activities with which we had been considering opening the module and instead took the students on a walk to the Georgeson Botanical Garden at the University of Alaska Fairbanks campus. We did not conduct any organized activity at the garden but allowed the students to wander around exploring on their own. On the return trip, the students asked to stop by a convenience store to buy snacks. Again, I thought quickly and suggested that I would agree only if they would save their labels from their snacks to bring back to the classroom so we could look at them together. It turned out to be the perfect opener for the food system module. I wrote ingredients on the board for five separate snacks—Nestle Crunch, Snickers Ice Cream Bar, BBQ Corn Nuts, Vault energy drink, and Jolt

Table 5.1 Activities for May 2006 Food System Module
(Field notes, May 22, 2006)

1. Know-Want to Know-Learned (KWL) activity: This is a chart in which the first two columns are filled out the first day of a new module to review what students know already about the topic and what they want to know. At the end of the module, they then complete the last column to review what they actually did learn. Cindy often uses this activity in her modules. [*We completed this activity.*]
2. Pre-test: This is normally something that Cindy does at the beginning of a module as well, and then gives the same test as a post-test at the end. I created one over the weekend and finished it up this morning, and I tried to design questions that would allow me to truly gauge what these kids know about where they get their food and about Alaska's growing season. I'm not sure I'm entirely happy with it. I'll probably give it tomorrow, but we'll see. [*We conducted the pre-test but not the post-test.*]
3. Vocab: Again, Cindy often gives a weekly vocab list with terms relevant to the module, although as with the pre-test, she said she hasn't been so good about that lately because of lack of planning time. So I created a term list, mostly based on the three chapters from the *Food for Today* text that I borrowed from Cindy, because then they can read through the chapters and define the terms themselves. Again, I'm not entirely happy with the terms, but I'm really trying to find ways to allow them to learn for themselves without me lecturing them, which I could of course do all week. [*We had a vocab list the first week that students completed by the end of the module*.]
4. Readings: As mentioned above, I have three chapters from *Food for Today* picked out, as well as the first chapter of *Native American Gardening*. This is the bulk of the material I have for the food history component, because they talk about the food supply system and the various regional food traditions in the US. Some of this they can read on their own, like to do vocab, and some I'd like to read together. [*We did most of these readings together at different times throughout the module. We acted out one of the traditional stories from Native American Gardening*.]
5. Michael Pollan interview: I made up three pages of questions based on his Talk of the Nation interview on NPR [National Public Radio]. I'd like to listen to 30 minutes of it together in class and have them answer the question as we go, and I can also stop it for questions. [Note: Pollan, an investigative journalist, has written several books about food, the most recent bestseller being *An Omnivore's Dilemma: A Natural History of Four Meals*, the subject of his NPR interview.] [*We completed this interview assignment*.]
6. Vegetable history assignment: I'm going to assign a particular Alaska-grown vegetable to each student so they can research the history and growing information about it. This is something they'll be able to do with their hour of library time on Tuesday and Thursday. Then they'll also sort of be in charge of that vegetable at Howard's garden also. [*Each student did have a vegetable that they were in charge of learning about, but we did not have as much research time as needed for them to put together a final product*.]
7. Moose fence: On Wednesday, we're already scheduled to help Boreal folk put up their moose fence. I'm going to try to integrate it into what we're doing. [*We did help with the moose fence*.]
8. Fred Meyer field trip: On Thursday or Friday, we'll take a walk to Fred's to interview the produce manager about their vegetables. I have to get one of them to call tomorrow to set it up. [*We did go on this field trip and met with the produce manager*.]
9. Elder visit: On Thursday or Friday, an elder will visit the classroom to talk about gardening in the village. [*We did not have an elder visit the classroom, but we did go to Howard's camp*.]

energy drink—and I pointed out that high fructose corn syrup was a primary ingredient for each one. Later, we would listen to an interview archived on the National Public Radio website that discussed the place of corn in our US food system, especially the use of high fructose corn syrup.

However, when a teacher is this free-form, there seems to be a trade-off involved in evaluating whether one has met the goal for the unit in terms of imparting necessary knowledge to students and then assessing that knowledge. A practiced teacher who has taught a specific unit more than once will have more skill in designing appropriate assessments and rubrics used in evaluation, which involves more intentional planning. In our food system module, Cindy and I did not have an assessment in mind for evaluating whether the various activities we did with the students allowed us to meet our overarching goal. I had a preliminary idea involving oral presentations from the students about their assigned vegetables at the end of the module to pull together the background information they researched about the vegetables as well as the skills they learned to plant the vegetables. We were willing to put aside this possible assessment idea in part because we did not have the time I anticipated for library research, but also because we both prefer a flexible approach and were willing to allow a practical assessment to emerge with which we were very happy.

As it happened, in the first week of the module, we unexpectedly had materials for building new garden boxes donated by the spouse of an EKCS teacher and a parent of an EKCS student. The week after we took the students to Howard's camp and taught them how to plant their assigned vegetables, we asked the students to plant the same vegetables in the new garden boxes outside of the Elder's Room. This was not an assessment we had in mind at the beginning of the unit, because we were not expecting to have the garden boxes ready in time. One of the high school teachers volunteered his students to build the boxes, and Cindy's students filled the boxes with the donated top soil, then planted the four boxes with a their assigned vegetables. The integration of the garden boxes into our assessment demonstrated the importance of taking advantage of community-based opportunities, a key component of place-based education (Sobel, 2004). Their ability to demonstrate the knowledge and skills they had developed in this applied way offered an excellent assessment opportunity. This activity was also a piece of evidence for my working hypothesis that my goals for educational gardening and the goals associated with gardening for profit are somewhat mutually-exclusive. In gardening this way, we had to allow students to make mistakes, mistakes that may not be permitted in a production-oriented garden

such as Boreal's, where the primary goal is to grow produce for shareholders. This is what makes "the real world" different from "the educational world" for students.

Our time at Howard's camp was also a beneficial "experiment" for me in making use of community resources. The Gaalee'ya Spirit Camp (described in Chapter 2) is more than just a community resource for the EKCS; it is a cultural resource that offers students a tangible way to connect with a more traditional Alaska Native way of life, including how to learn from elders. I hoped to facilitate a process of EKCS students learning from Howard Luke, ideally concerning gardening knowledge. However, the most important thing for me was to allow Howard to interact with the students however he best saw fit. This was an approach I witnessed during my week as a student at the Old Minto Cultural Heritage and Education Institute, in which students enrolled in two separate summer college courses spent a week living at the Old Minto camp on the Tanana River and interacting with elders there for the week. The college professors had some objectives in mind for our time there, but they were secondary to allowing us to learn from the elders simply by interacting with them in a culturally-appropriate setting. Hence, I was interested to see how our time at Howard Luke's camp with a dozen 8th graders would unfold. Table 5.2 presents excerpts of my field notes from our trip to Howard's camp on June 1, 2006. We did successfully plant his garden during our first afternoon there, but he never came to the garden area himself. He was busy directing other students in other chores and left the gardening to me. I was also hoping that he would share stories about his own gardening experiences with the students. This was not to be either. Howard seemed to move into storytelling mode in the evening after the day's work was done, but by that time we had released the students to their own pursuits during some free time, and none of them voluntarily came to listen to Howard. I was disappointed that I had not anticipated this, which prompted me to think about how to integrate learning from Alaska Native elders into a gardening curriculum.

Much later, in the spring of 2007, when I had moved on to a different phase of my project, I decided to attempt another method for involving Howard with EKCS students. Again working with Cindy's students—the second group of 8th graders that I worked with—I invited Howard to the classroom to share stories. This time, I prepared the students by reading with them a letter to the editor that Howard had recently submitted to the local paper (Figure 5.1), and I assigned them the task of coming up with two questions to ask Howard. I prepared Howard by suggesting that the students might like to hear about gardening in preparation for the upcoming gardening season. I also obtained Howard's permission to videotape this session in the hopes

Table 5.2 Field Journal Notes on Gardening at Howard's Camp

[T]he boat ride to Howard's was pleasant and uneventful. When we got to camp, the water was so low that the boat had to land about 200 yards upriver from camp, which the drivers had figured out the day before in preparation for the trip. Howard met the first group with carts, and they'd taken everything except the two trash barrels full of bags of soil. Our group followed. When we finally all gathered at the cook tent, Cindy took charge and organized the students into three work groups, one to help with lunch, one to help with whatever I needed, and one to help with whatever Howard needed…

We all gathered [at the cook tent] again after about a half hour, and ate lunch… Always looking for teachable moments, and wrestling with the disconnect between what I am I trying to get across to these kids about eating locally and sustainably-grown food and what we were eating for lunch, I waited until everyone was eating quietly and then said I wanted to talk about where the food we were eating came from. So I asked them about each item individually—the beef, the flour for the bread, the apples and bananas. I explained how we may be able to tell where an individual apple comes from, but we will never be able to tell where one hamburger patty comes from because it may be meat from many different cattle from many different places. I think it was a worthwhile activity. They listened to me, at any rate.

After lunch, we split into work groups again, some working with Cindy to clean up lunch, which didn't take long, the boys going with Howard to do some brushing and pole-cutting, and some girls coming with me to start working in the garden. For the next 3 hours, we got the garden planted, with some of the girls working there with me the whole time, some coming a bit later, and most of the boys showing up only long enough to plant their designated vegetable….I had [Christina] measure the length and width of the rows in preparation for adding amendments…I passed around the box of amendments and asked them to read the instructions, and figure out how much we needed for each row based on the measurements that [Sarah] took. They estimated much more quickly than I thought they would. They really are competent students. They realized that they could use the directions of 2 cups for 25 row feet and apply 2 cups to the 21-foot rows and it would be fine and easy. They were right, of course. So the next step was going back to the garden and adding the amendments and raking them in. Oh, and of course I reminded them of the three primary plant nutrients NPK, which I've been driving into them over and over again.

I had a rough garden plan sketched out, but we sort of winged it. Each student had a vegetable assigned, most of whom had had the same vegetable for multiple assignments now. I just suggested a spot for each to plant in based on who was ready to go first, assuming that we'd have plenty of space.. [Alisa] did two rows of potatoes, and she directed some other folks to help her. [Anna] had zucchini, which were much too easy for her, and she had two cucumbers too. We picked a spot for hers. [Beth] had had beets for her original assignment, but since I thought Howard might not like beets, I gave her cauliflower instead. I had her, [Sarah] (broccoli) and [Jenny] (cabbage) work together to plant their brassicas, explaining what they needed to know about spacing. I also let them put some worm castings in the hole with their plants, as I had a limited amount of castings and know that brassicas are heavy feeders. [Stacy] had peas, so I told her to look for the special instructions on her package (soak the peas overnight) before starting her row. The boys joined us later. [Brent] planted kale, [Chris] lettuce, [Kurt] carrots, and [Ed] spinach. They all did fine, although I suspect that the spinach and carrots are going to need some extreme thinning.

So, the planting itself was of course over pretty quickly, and the boys wandered off again to work on other jobs as soon as they were done. But many of the girls hung around long enough to make sure everything was watered in pretty well. It all went smoothly, really, and looked really nice when it was done. We finished right about 3:30, at which point Cindy let them go for free time, since it was technically the end of the school day.

Elder's advice

Jan. 14, 2007

To the editor:

I was at Shirley D's potlatch. We lost a great leader. She went all the way down the Yukon River working to solve alcohol problems. Nobody else would do it on their own like that. It is a great loss for everybody no matter who. We have two good leaders now and I hope that they stay there, Jerry Isaac and Steve Ginnis.

I worry about the young generations right now after the elders pass away. Most of the leaders are not leaders but are just there for the money. What gets me right now is they talk about global weather all the time. We are going against nature right now and that is why it is happening now. Mudslides, tornadoes, it is happening so much. People don't listen. What are they going to do if a depression comes really fast. It is here right now.

Leaders who are after the dollar now are not paying attention to us. I hope that somebody hears me and supports me on these things. I hope someone pays attention and says that I am right. Our leaders should look into these things. Somebody has to speak up. I am not going to give up. We have to do something about this. The young generation should take the step and listen to the elders but they are not. Our old-time chiefs knew. The first president to come to Alaska stopped at Nenana. Harding talked and talked and told Chief Thomas to talk to the people. Chief Thomas got up and said that you lie to the people. Use common sense. Chief Thomas never went to school but he wanted him to use common sense. That is the reason right now you and I do not get along.

People use high words and don't know their meaning. I talk in my Native tongue, when I was growing up they never said God or Jesus but just our Father. Take the young and lead them the right way.

Howard Luke
Fairbanks

Figure 5.1 Howard Luke's Letter-to-the-Editor, printed in
Fairbanks Daily News-Miner, January 25, 2007

of having a product to share with EKCS, perhaps as part of the gardening curriculum. When he arrived at the classroom, I positioned him in a chair at the front of the room and had students sit around a table in a semicircle in front of him. He spent an hour talking to them about his opinions on education and other current issues that he touched on in his letter to the editor and finished up by telling them some traditional stories. We did not have time for all of the students to ask their questions, and in the end, very little about gardening was mentioned. Again, while I believed that the most important benefits from the exchange probably happened regardless of the exact topics Howard discussed, I was disappointed that my second experiment on facilitating the transferal of gardening knowledge from an elder to students had not succeeded. I still do not have a clear idea of how to facilitate this process in an Alaska Native setting. Again, these are issues I continued to wrestle with throughout the curriculum design process.

Returning to May of 2006 and our food system module, another opportunity to make use of an entirely different kind of community resource appeared to me in the form of Cindy's students helping Boreal build a moose fence around the EKCS schoolyard garden. This had been

an unfinished project that I had been involved in during the previous summer, and I had suggested to Boreal staff that Cindy was an EKCS teacher who might be interested in having her students do work in the garden separately from the Boreal Farm program. They had contacted her independently, and they just so happened to schedule a workday in the garden during the first week of our module. I thought the timing would be ideal for allowing the students another hands-on opportunity to learn about gardening in Alaska during our module on food systems. I was also excited to play a different kind of role in the Boreal garden, in which I would get to be the teacher that I was not able to be while working as the Boreal Farm youth garden supervisor. Indeed, on the afternoon of the workday, before we went to work in the garden, I gave a brief lecture to the students about the importance of protecting our Alaska gardens from moose, our primary garden pest. When we went to work in the garden, I was able to circulate among the students—who were working on a variety of jobs not limited to fence construction—and give them brief lessons connected with the chores they were doing. For instance, with a group of students sifting compost to put on the garden beds, I explained what kinds of nutrients we wanted our compost to have and why. At the end of the work session, I asked the current Boreal Farm youth garden supervisor to give a wrap-up talk concerning the next stages of prepping the garden to be planted. She declined this impromptu invitation, so when we returned to the classroom I again spontaneously tried to incorporate academics by asking the students to write a paragraph on what they learned in the garden that day. We later used this paragraph as one of the assessment pieces for the students' performance in the module.

During this trial module, I also tried to vary the types of activities so that there was a mix of book learning with hands-on learning. One of the original goals of the EKCS curriculum was to be accessible to a student body that represented multiple learning styles (Dunn & Dunn, 1978) and intelligences (Gardner, 2004). I observed how different teachers identified individual learning styles and incorporated them into their teaching approach. Some teachers were more rigorous than others in administering a learning styles assessment and then building their lesson plans with multiple options for assessment depending on the student's style. Others seemed to address multiple learning styles by varying the techniques and assessments that they used in each module so that each student's learning style would be addressed by at least one module activity. I mimicked this less rigorous approach, primarily because I did not feel I had the time or skills to plan a more careful approach to learning styles, and because Cindy had not been using a rigorous approach in her classroom.

One example of this integration of more classroom-based learning with hands-on learning was the afternoon that the students filled the garden boxes with soil. We split the students into two groups. While half worked outside with wheelbarrows and shovels, the other half stayed in the classroom to listen to the NPR Michael Pollan interview online and answer questions about it. Then the groups switched, and the second group to listen to the interview picked up in the questions where the first group had left off. When the second soil group finished filling the boxes, they returned to the classroom to find a partner from the second interview group, and the pairs of partners shared each other's answers to the interview questions. Cindy later told me that she thought the online interview was one of the best activities that I had planned because it exposed the students to using the internet to listen to interviews, and required them to use listening skills. A similar example of integrating learning styles occurred at Howard Luke's camp. We spent most of our time there doing a variety of chores with Howard, including but not limited to planting the garden. During some down time on our second morning, we pulled out reading packets I had prepared from the *Food for Today* (Kowtaluk, 2005) text and read some of the material together. I hoped that by alternating these practical versus more academic learning methods, the students would begin to "get" the connection between growing food locally and the US food system. However, I again did not successfully assess whether they "got it" or not.

At the end of our food system module, Cindy and I sat down for a wrap-up conversation about strengths and weaknesses of the module. I shared my fear that "I hadn't done a good job planning the module and linking the activities together," and she assured me that my planning skills would improve, that a loose plan was par for the course both for a new teacher and for a new curriculum like the EKCS Spiral. In addition, as I wrote in my notes, "One of the things we agreed didn't work so well was trying to incorporate the US History theme into this gardening work. I asked again whether my job was then to try to find better ways to incorporate the history stuff, or whether her technique would be to do away with the "history" theme and instead focus on gardening in the future. She said the latter" (Field notes, June 7, 2006). Finally, we talked about the next directions I could take with my work with EKCS in terms of designing a gardening program or curriculum. At this point, we thought that my "product" would have two components—a module based on this spring planting module that we would call "Alaska Gardening" and a second module to be taught in the fall as a garden harvest module. I planned to continue to work with Cindy and her new group of 8th graders when the new school year started

in July, as well as continue to look for opportunities to engage with other EKCS teachers and students.

The first opportunity arrived in July when all the junior high students went to a nearby camp for an overnight retreat in their first few weeks of school in August. Cindy invited me to come out and spend a day with them. At this point, some of the early vegetables in the garden boxes were ready to be harvested, so I volunteered to harvest some to bring to camp to incorporate in meals. When I arrived on the second day, they had already eaten some of the produce, and I did not stay long enough to see what they ate for dinner. I was curious to see if the students reacted positively, negatively, or not at all to the garden produce, but I did not get to witness that. However, I did get to work with several boys in the garden at the camp. Unfortunately, it was in a punishment situation. They were in trouble and waiting for their parents to come pick them up from camp, and Cindy asked me to keep them busy, so we weeded the garden, a space that did not look as though it had been used very recently but looked in good enough shape that it may have been used again soon. I feared that the boys learned to associate weeding—an already unpleasant task for some—with punishment. Indeed, during the rest of the school year when I visited Cindy's classroom, one of the four boys could be counted on to say something like, "Hey, you're the lady who made us pull weeds!"

Another opportunity came up to work with a different teacher and students on some food system lessons. A new high school teacher had been hired in July, someone I happened to know from taking the college course at Old Minto together. She told me she was planning on focusing on the food system for her module in August on urban and rural issues in Alaska. I explained the work I had been doing with Cindy's class and volunteered to contribute however she might want to make use of me. Jennifer invited me to be a guest presenter on the US food system one afternoon, and then invited me to participate in a potluck at the end of the module. I also shared some of the curricular materials on food systems that I had come across. On the afternoon that I presented to her 11th and 12th grade students, I had three primary activities planned—an introductory discussion on components of the US food system, an activity involving food items that pairs of students would use to brainstorm the origins of various ingredients, and the online Michael Pollan interview and questions that I had used in Cindy's class. I felt I had mixed success with these activities. Jennifer and her partner teacher, Sheila, felt that my introductory discussion was a little long and unfocused, and I felt that the brainstorming activity was not challenging enough. In later conversations, Sheila gave me more specific feedback about how

she might have structured the discussion and brainstorming activities. We all agreed that the Pollan interview was a good activity to develop listening comprehension skills and expose students to the politics of food, and I felt that it may have been a better activity for high school students than for junior high.

Jennifer's plan for her end-of-module potluck was to ask students to bring in a favorite family recipe and ingredients so that they could cook together in the Elder's Room before eating together. Part of her module had involved nutrition lessons as well, so this potluck was her attempt to bring together various themes in her food system module. I saw it as a perfect opportunity to put more of the produce from the garden boxes to use. Cindy acquiesced to letting me use some of the produce from her students' work, since we had not yet planned a way to harvest the garden boxes with her new group of 8th graders. So on the day of the potluck, I harvested potatoes and kale to use in my own recipe as well as for one of the high school students to use in her mother's recipe for potato salad. We also harvested peas and carrots and kohlrabi for Cindy's students and anyone else who wanted to try them. Jennifer was so impressed with the kohlrabi that she walked around the school offering it to anyone who was interested. Finally, we later used some produce in some of the dishes that I helped prepare for the annual EKCS open house. The coleslaw made with cabbage and carrots from the garden was a hit. These uses of the garden box produce felt successful simply because they involved the EKCS community. However, I did not attempt to develop an outline for a coherent "harvest module" as Cindy and I had talked about earlier to implement in 2006. Instead, I generated ideas from these other disparate experiences to apply to the emerging curriculum.

At this point, I was moving into the next stage of my research, which involved interviewing teachers and holding garden planning meetings in order to garner feedback into what the next stage of my project should be, as described in Chapter 4. Before beginning the next section, I reflect on some final thoughts regarding my own hands-on learning during the summer. It is important to re-emphasize the emergent process that was giving shape to the goals and content for my final product. For instance, one theme that emerged from my summer's work was the issue of "delivery." As an EKCS teacher told me recently, "It's all in the delivery." The implications of this cliché make it difficult to design a one-size-fits-all curriculum, as every teacher has her own methods for delivering content knowledge to students. Any given "curriculum" can only suggest these methods, as each teacher will implement a curriculum in her own style in her classroom. Earlier, I mentioned that my style with students involves mentoring.

I would suggest that many of the teachers with whom I worked at EKCS also have this approach, and so my audience for the curriculum became teachers like myself, those who see themselves as mentors.

As I moved into the next phase of my work, I made another decision about the character of the emerging curriculum. Earlier in the spring and summer, I was undecided about what age student I would be targeting with the curriculum or gardening program. I worked primarily with Cindy in part because we worked well together but also because I was most attracted to working with junior high age students for personal reasons as well as for philosophical reasons. Besides simply enjoying the age group, I think that junior high students are at the age when they can start thinking more critically about their own education and their place in cultural and ecological systems. I knew I wanted to introduce students to more intellectual concepts through the gardening curriculum than would normally be addressed at the elementary level, which is the age targeted by most gardening curricula and programs already existing in the country (see Chapter Two). It had been suggested to me that I think about creating a module with a focus more at the high school or even college level, but that age group seemed too old to me. Indeed, as I conducted interviews with teachers over the next few months, at least one high school teacher agreed that the kind of curriculum that seemed to be evolving would be most engaging for junior high students. And yet the curriculum could still be useful to a high school teacher, for instance to a teacher with training in a specific subject area like science, who would be potentially adept at using a gardening curriculum as a framework from which to make links to specific subject areas. These emergent themes helped guide some of my conversations with teachers in the next stage of my research.

5.4 Stage Four: Conducting Teacher Interviews and Meetings

In August 2006, I began conducting semi-structured, one-on-one interviews with EKCS teachers. My hope was to interview all the teachers on the staff at some point, but I first focused on those teachers with whom I had already worked most closely or those with whom I had had casual conversations about gardening and teaching. As it turned out, I never interviewed the "entire" faculty, in part because there was fairly high turnover among the members of this group during my involvement at EKCS. Indeed, of the eight teachers on staff at the time that the EKCS school board (APC) approved of my project in February 2006, only three remained at the beginning of the school year in 2007, the point at which I was gathering a final round of feedback

on the draft of my gardening curriculum to incorporate into my data analysis. I consider these three to be my primary collaborators, but the rest of the interviews that I conducted in the fall of 2006 also contributed to the project.

In addition to these interviews, I participated in several group meetings with teachers interested in an EKCS gardening program. In the brief report that I presented at a staff meeting in September 2006, I included the following items in a summary section on what I saw as decisions that I encouraged teachers to make:

1. Whether to integrate gardening education into the Spiral, operate it as a separate project (such as an after-school club or as an employment program like Boreal's program), or allow it to evolve as a teacher-driven initiative, such as Cindy's garden boxes.

2. Which garden space to use and how to coordinate with Boreal, if necessary.

3. Whether/when to build a greenhouse.

4. How to prioritize the possible uses of garden produce.

5. How to identify someone to manage the program.

6. How to fund future garden projects.

7. What kind of report/resources would be most useful from me at this point.

In subsequent meetings, I invited teachers who were particularly interested in gardening to further discuss these topics. As explained earlier, these meetings turned out to be politically contentious in terms of my and the school's relationship with Boreal. Indeed, it is a bit disheartening now to read back over the transcripts and notes from some of those meetings to see how much time was spent discussing perceived problems in collaboration with Boreal. However, I also obtained some valuable input concerning how I might best put my gardening experiences with students into a final product for the school.

The interview protocol approved by the IRB can be found in Appendices F & G. However, because I used a semi-structured interview format, I did not follow this protocol to the letter. I generally started each interview by explaining that I had two purposes—to gather input on structuring a gardening program or curriculum for EKCS and to explore ideas of community food systems and sustainable agriculture for the purposes of my dissertation. My first question was often to ask the teacher to share her own gardening background, both in her personal life and also in any educational settings. This question helped me not only understand how to communicate with the teacher about gardening and to generate any ideas about gardening

education, but also to garner information about the place of gardening in Alaska Native communities from those teachers who were Alaska Native. I had a lot of fun with these interviews and gathered a lot of interesting information.

By November, I had conducted six interviews with teachers who had expressed an interest in my work and in gardening education. Upon initial consideration of the fall meetings and interviews, by February 2007, I decided that my primary contribution would be the creation of a gardening curriculum that EKCS teachers could decide whether and how to implement and collaborate with Boreal themselves on the logistics of how such a curriculum would integrate with their youth garden program. Hence, my plan for the spring of 2007 was to produce as complete a draft as possible of the gardening curriculum by May, so that teachers could review it over their summer break. Then I would garner feedback to incorporate into a final version the following fall, at about the same time I would be writing my dissertation. I was relieved when I returned to visit EKCS in February to find that a new teacher on staff had agreed to serve as the new EKCS staff liaison with Boreal, since Jennifer had left. I had many informal conversations with this new teacher, Darlene, over the spring and offered to help in whatever way was appropriate, but I never officially interviewed her. As it turned out, Darlene too left after the end of the spring term, which ended in June of 2007.

I did conduct a few more interviews in the spring. Two were with people who had worked with EKCS in various capacities concerning curriculum design, one was with Howard Luke, and several more were with students as part of a focus group in May. The focus group was my attempt to elicit specific input from students on gardening education, as I had not yet obtained consent to interview any students directly. By May of 2007, with Cindy's help, I was able to put together and obtain informed consent from a representative sample of EKCS students who had worked in some capacity in one of the school gardens over the last two years. Some of them were from Cindy's class that went to Howard Luke's camp; some were from her current class; and some had worked in Boreal's program. I thought a focus group would be an efficient and fun way to bring these students together to discuss their gardening experiences so that I could identify what types of gardening education activities worked for them. This was my first attempt at running a focus group with students, and I knew that the mixed age group and social dynamics would play a role in the expressiveness or lack thereof of particular individuals. I had my misgivings about whether 13-15 year old students would be interested in or able to articulate the things I hoped they would. However, I trusted that the rapport that I seem to be able to develop

with students that age would enable me to draw input from them. I also knew that the students who had worked for Boreal had had a much deeper exposure to gardening than I had thus far been able to give students in the context of classes, and so I suspected that the focus group discussion would be biased towards those students' experiences.

As it turned out, the students were overall even less interested in talking about gardening than I had predicted, and indeed the most talkative was the oldest student, a young woman who had worked for Boreal the previous summer. Perhaps I would have been more successful with the younger, quieter students in a one-on-one context. Also, I was most interested in hearing from the students with whom I had worked with most extensively in Cindy's class, but that had been over a year ago and they did not remember many of the details of what we did, except that they enjoyed spending the night at Howard's camp. I was of course disappointed that I had not managed to make more of an impact, but I was not surprised. This lack of impact from isolated gardening activities is precisely the challenge I wanted to overcome by designing a comprehensive gardening curriculum. Overall, then, the focus group was a disappointment. I could have followed up with individual interviews, but at this point I knew that the EKCS teachers would be the most useful individuals for me to focus on. I had already witnessed that the teachers with whom I was working usually had a better sense of what was "working" for their students than the students themselves did. This observation has all sorts of implications regarding student assessment and self-directed learning that I will not discuss in detail here but are relevant to curriculum design. Indeed, I was beginning to feel as though perhaps my gardening curriculum was as much about educating teachers as it was educating their students.

I stayed in contact with my primary collaborating teachers throughout the spring, garnering feedback throughout the curriculum design process. In order to stay immersed in the school community, I continued to volunteer at the school, and took a few substitute teaching jobs again as well, which I had not done since the previous January. I agreed to help Cindy start seeds with her class again, even though I was hoping that at this point she would not rely on me to bring gardening into her classroom. Finally, at the end of May, I submitted a draft of the curriculum to my three primary collaborating teachers, as well as the fourth mentioned above before I knew that she would not be returning. I let them all know that I would be traveling out of town all summer and that I planned on getting in touch with them upon my return in September to ask for their feedback on the curriculum draft. They too were out of school for most of the time I was gone. When I returned in September, in addition to meeting with my three collaborators, my other big

job was analyzing my interview data for the purposes of the dissertation. As I have explained, the curriculum as a process and a product served as a way to structure my analysis. The next section addresses more explicitly the themes in my data.

I was quite nervous about sharing the curriculum draft, as I had never designed curriculum before and honestly felt like a bit of a fraud, despite all the positive feedback I had received in my interviews with the teachers. I predicted what weaknesses the teachers would point out in it, such as its lack of explicit links to Alaska State Standards and Grade Level Expectations (GLE's). I had been told by curriculum writers that teachers generally do not implement curriculum unless it is clear to them how it can help them address standards in their lesson plans. I had attempted to incorporate junior high GLE's in some of the units of the curriculum, but I struggled with this process. Overall, I simply expected them to say that it was too vague to be readily useable in their classrooms or in EKCS generally. If so, I hoped that they would give me direction on how to make it more useable. Hence, when I met with each of the three of them in late September and early October 2007, I was rather surprised by the lack of criticism from any of them. I had decided not to ask explicit questions because I wanted to see what they would come up with on their own. None of them had much specific to say. Typically, one had looked at the curriculum early in the summer, one had set it aside and had not looked it over until just before I met with her, and one had only glanced over it because she was in fact a high school teacher and did not think that she would have much input. I could have pushed each of them for more detailed feedback, but it had already been difficult finding time to talk with each of them during their busy work and personal lives, so I held off. It appeared that I had been my own worst critic anyway, and I knew to whom I could go for help outside of the EKCS faculty for specific guidance on finalizing the curriculum, if necessary. Therefore, my final task concerning the curriculum for EKCS was incorporating the little feedback I got from Cindy and doing a final revision of my own, resulting in the curriculum presented in Appendix A.

5.5 Stage Five: Designing Curriculum

As I began putting together the framework for this curriculum in February of 2007, I had not yet figured out how I intended to "analyze" my field data for the purposes of the dissertation. My primary focus was on designing the curriculum. I knew I wanted to filter all of my field work through the curriculum before attempting to scale my analysis out to larger theoretical issues regarding community food systems and education for sustainability. I started by creating

categories that I wanted to address with the curriculum. As I fleshed out these categories by drawing from field data and literature, it dawned on me that through this process of structuring the curriculum, I was also allowing categories of data analysis to emerge. In other words, creating the curriculum became an elegant and practical way to "code" my data through real-world application. Perhaps this was an example of "grounded theory" at its best, in which categories of analysis are supposed to emerge from the data (Charmaz, 2000).

My task in this section is to portray the process by which these interviews and meetings contributed to the collaborative design of the final gardening curriculum. This was not a linear process in the sense that "Because A told me X, I incorporated Y into the curriculum." There are some examples where the process was this straightforward, but they are rare. It is also important to clarify that I am clearly the author of the curriculum. None of my collaborators would consider themselves to be co-authors. I gathered and evaluated and organized disparate information into the structure and content of the curriculum, while repeatedly checking myself with my collaborators. Several categories emerged during my data analysis process, specifically from interview transcripts and meeting notes (Table 5.3). I discuss the emergence and application of each of these categories below.

5.5.1 Module Content Themes

I begin with this category because I initially conceived of the primary purpose of my interviews and meetings to be the identification of thematic content that teachers felt was most important to include in one or more gardening modules. It was through analyzing their answers that I realized that they were expressing many more layers of meaning than simply identifying topical content themes; hence, many of the other categories of analysis emerged. Indeed, this category could be completely subsumed by the others, but focusing on module content did help me later in structuring the units of the curriculum. During my time working with Cindy during the summer of 2006, we had identified at least two potential gardening-related modules that I could develop—a planting module and a harvesting module. However, I wanted to garner more input from other teachers on what kind of gardening program and curriculum they would find most useful or appropriate. To foster this discussion, as part of my brief report to EKCS staff in September 2006, I put together a list of five possible uses for garden produce, including *school lunches, cooking and preserving, potlatch/potluck, selling,* and *family gardening*. Most of these ideas I had already heard teachers express an interest in. In subsequent meetings and interviews with teachers, I asked for specific feedback on which of these uses of produce they would most

Table 5.3 Categories of Data Analysis Relevant to Curriculum Design

Category	Description
1. Module content themes	This is the level at which I focused many of my interview questions. I asked teachers specifically what kinds of themes they would prioritize in a gardening curriculum and what they would recommend I include as components of the curriculum. However, their thematic answers still helped me identify the types of units I would later create as the backbone of the curriculum.
2. Teacher Understandings of Sustainable Agriculture and Community Food Systems	In my interviews, I included a question about either the concept of sustainable agriculture or community food systems in order to gauge teachers' understandings or opinions of these concepts. Their responses were all over the board. This divergence is relevant to the curriculum in terms of what background information I chose to include and how to present it in each unit. However, their responses are also potentially more relevant to my concluding discussions about sustainability pedagogy than any of the above categories.
3. Appropriateness of curriculum to meeting broader school goals	Some of these broader school goals are articulated by official EKCS documents, but some are implicit among the staff. In part, this category teases out some of those goals, specifically those that can be addressed by the gardening curriculum. It also includes more explicit comments on how a gardening curriculum is appropriate to help meet those goals.
4. Teaching philosophies and approaches	This category is a thematic category that cross-cuts all the categories above. Many times, teachers made comments that related to their own teaching philosophies or approaches.
5. Curriculum goals	This category is similar to outcomes but is both qualitatively distinct and a bit more explicit about the types of objectives that the curriculum sets out to meet. In my use of the words, outcomes can be tangible, school-wide products, whereas goals explicitly relate to student learning.
6. Learning activities	Many teachers shared input about specific activities they would include in a gardening curriculum. I asked for feedback from the teachers with whom I had worked on various classroom activities during the summer of 2006, and other teachers often offered examples from their own experiences as well.
7. Standards	I usually asked my interviewees how they would recommend incorporating standards into the gardening curriculum. I realize now that I assumed that they would want to see a curriculum that made explicit links to standards. Because I asked the question, many of them answered it, so I include their comments here. However, I discovered later, when gathering feedback on my first curriculum draft, that the teachers who looked over the curriculum were perfectly content that I had not included explicit links to standards in each unit. I include this later feedback in this category as well.
8. Projected outcomes	I began this project with my own vague sense of the goals and outcomes I wanted to pursue with the curriculum, but my conversations with teachers helped me think about how to express these. This category includes the comments from teachers most relevant to the outcome level of curriculum.

like to see incorporated into gardening modules. Every single teacher I spoke with agreed that having students eat the garden produce was a top priority. Many of them linked this objective to a nutrition or health unit. Below are some quotes most relevant to linking the eating of garden produce to an educational objective:

"I think with our curriculum where we have the Food and Nutrition and Preservation module. Somehow I'd like to work it around so that's part of it and the garden is growing…food preparation and preservation."

"You could look at what we did with nutrition stuff, but also with the preserving of food and how it changes and all of that, chemical composition. And then tie that into the garden."

"I think one important part we could add is the nutritional value. You know, natural foods versus, um, the more commercial food package stuff. Teaching them that it has many more nutrients and that it's healthier and, you know, teaching them, finding ways to get veggies for snacks or something, finger food type vegetables…And then if we could do some preserving where we dried stuff and have little things where they take packaged dried vegetables home to add to their soup or something so they get something… they share it with their family. That would be neat. Or potlucks here or something."

"[A] lot of these kids come here not knowing how to eat healthy. They really don't know because they were never taught. And if you can teach them that at this age, it's something they can take with them, you know, into their adulthood, and they can pass it on…I would love to see some kind of vein, even if it's only for the summer months, into the fall, some kind of like, culinary prep, you know."

Other module content themes that came up included simply learning how to plant and harvest a garden.

"I like your idea of having a garden module for the garden prep, like getting the planting and everything, getting the garden ready. Because I think that would align well with when we are leaving school and then the harvesting when we come back. Along with that, I'd like to see maybe a module for—well, it could go with the same thing—harvesting and preserving."

"[L]earning how to grow your own food, cause that's an important skill, once
you learn that, I mean, no one can take that away from you…"

Finally, the idea of providing students with background information is expressed well by the
following:

"I think if we just said, oh, we're going to go work in a garden, like it wouldn't
have any value, that I felt we needed that background scaffold."

The idea of students selling produce deserves special attention because it was perhaps the
least-agreed-upon objective, and the discourse about it illuminates several other themes. I already
had my opinions about whether selling produce was an appropriate objective for the students at
the EKCS, as mentioned in previous sections. First of my concerns was my observation that the
goal of making a profit can easily trump other educational objectives, and second was my feeling
that such a commercial enterprise did not fit with the overall philosophy of the school to teach
through an Alaska Native approach, which is more traditionally rooted in subsistence practices of
sharing rather than in economic gain. However, because I knew I had this bias, I was careful to
ask for feedback from teachers on this topic without letting them know immediately that I had my
doubts about the appropriateness of the approach.   First of all, only one teacher voluntarily
brought up the idea of selling produce without me explicitly asking about it first, which is an
interesting piece of evidence. Interestingly, this was a non-Native teacher. And yet she too
acknowledged that sharing in Native culture was more important than selling, and so she
suggested that maybe students could give away garden produce to Native elders and sell it to
white people. Other teachers also contradicted themselves on this issue, sometimes appearing to
support the idea of selling produce because it might be a way to "hook" students into gardening,
but then later articulating why selling does not square with subsistence. Some of the following
quotes illuminate this last point well:

"Because subsistence really is not about selling. It's about harvesting the food
and using it for your own purposes. You should never be, like, you know, going
out fishing and making strips just to sell."

"Most of us don't gravitate towards selling. It's like, you know, contributing or
to share, when it comes to sub… you know, gardening or subsistence. But you
know, there's entrepreneurs that might, especially with this age group, that might
find something that they [like]."

A final piece of conversation between me (*L*) and an interviewee (T) perhaps summarizes the
heart of this conflict well. The teacher is referring to learning to live successfully in a consumer
society.

*L: But in terms of which values to hook onto with kids. I mean, they're living in
this world where they have values from their Native culture, but then they also
have all the stuff that they want from—*

T: And a world they're heading into that's going to require them to be able to do
that. And a lot of their parents are doing that. You know, most of their parents…
the ones whose parents are educated are working and, you know, paying bills and
doing all that kind of stuff.

I include this discussion on an economic component of gardening in this section on
module content for two reasons—first, because it illuminates deeper issues regarding appropriate
curriculum design than simply what content to include, and second, because in the end I did
decide to include an "economics of gardening" unit in the curriculum. However, this unit has a
caveat in that I do not see it as integral to meeting the overarching goals of the curriculum.
Rather, I offer it as a framework for teachers interested in linking business with gardening. For
instance, I witnessed that a 7th grade class conducted a module on preparing a business plan
during the year I was working closely in the school. If learning business skills is an objective of a
teacher, gardening could be one type of business to model, if the teacher feels it is appropriate for
her students.

Finally, there were a couple of "outlier" suggestions made by some of my interviewees
on what kind of curriculum to develop or what to incorporate that I decided not to include in the
curriculum directly but are important to note here. One teacher suggested that we work on

creating a college summer course based at the garden, saying, "[W]hy can't we design a college class, and everybody who enrolls gets university credit? That's doable. It's some class and then lab. That is so doable, right there. I mean, we could create anything at this school, I think." She was not the first person to suggest this link to college courses, as the school has recently implemented an Early College program in which EKCS students can enroll in college courses and receive dual credit as well as mentoring support from their EKCS teachers. This may be an excellent opportunity to develop in the future. While I decided to focus on developing a curriculum targeting junior high students, it also presents a framework that could be adapted to a college course as well. Second, another interviewee suggested that a garden program at EKCS include a way for families to be involved, such as through offering family garden plots in the school garden. Again, this is an excellent idea, but I did not take on the task of offering logistical recommendations in the curriculum connected with integrating family in this way. This is one of many connections that teachers can make themselves.

5.5.2 Teacher Understandings of Sustainable Agriculture and Community Food Systems

This category most closely parallels what I originally saw as the second intention of my interviews, which was to gauge teachers' understandings or opinions of concepts concerning sustainable agriculture and community food systems, as I suspected these rather specialized frameworks may not be immediately accessible to my collaborators and yet I wanted to use them as guiding frameworks in the curriculum. I tailored the way that I asked the question and which concept I focused on depending on what I knew of the background of each interviewee. It was challenging to not define the concept for them right away if it was immediately clear to me that they were not familiar with the phrase I used, but I often did eventually share my own understanding of the concept and then asked what they thought of it. Indeed, their responses were all over the board. The first series of quotes below is from my first attempt to ask a teacher about her understanding of community food systems.

> L: *What's your understanding of a community food system? Does that term make sense to you, and how would you define it?*

> T: Community food system. I guess, um, you mean like in a city?

> L: *Here in Fairbanks.*

T: What I guess it would be, like in different cities, if there's, you're talking about gardening, there are gardens, like Boreal and other gardens around that you can buy shares and get their food, or there's other community gardens and people take turns with their lots. I'm thinking that's what happens, but I don't know since I don't live in Fairbanks.

L: I guess I'm thinking more broadly than that. I'll tell you where I'm coming from with that. Part of what I'm interested in is understanding how education…educating kids about local food, all the things you've said, that kind of education can strengthen a food system. And if by food system I mean the growing, harvesting, processing, preparation, eating of food. The industrial food system is one where food tends to be processed far, far away from us and takes lots of inputs and lots of transportation to get it to the consumers. A local food system, or a community food systems has more of those components that are locally integrated.

T: Oh, okay, well I understand that. Kind of like the subsistence cycle.

L: Yeah, but it's a different way of thinking about subsistence versus… I don't like setting them up as different, as versus non-subsistence.

T: Well, I like that aspect of that and these students really need to have some sort of education about where the food comes from that they're eating because we get so many students who are just like, you know, not… they go to the store and they think that's where their food is supposed to come from so they have no connection to what they're eating. Vegetables come out of a can. Or... although there's nothing wrong with that because I grew up eating that. Vegetables come from the grocery store. Meat comes from the grocery store. And I don't even have one students of my 14 right now who has ever been hunting, so. They've been fishing but they haven't been hunting. They just eat all this processed food and um, they don't even know what they're putting in their bodies.

Below are more examples of responses to this type of questioning.

In response to the idea of organic gardening*:*

"I think *organic garden* is a good garden. We see so many pesticides and other herbicides and stuff put into gardens and it… after a while, it breaks down the soil and the nutrients and things and it's not healthy. I think if we could, you know, years ago, that's how our ancestors did gardening. They didn't have all the pesticides and things… I think natural foods are a plus."

In response to the idea of a community food system*:*

"Well, a food system for our family, a Native family, is we have our own diet, and a lot of it is based upon fish, meat, and vegetables. You know, we try to maintain… we try to bring in food that's not processed and that we're really looking at healthier foods, you know, staying away from a lot of the high carbs and fat and everything and with the gardening, you know, you have a lot of protein, and we want… I think that, you know, going as naturally as possible…"

In response to the idea of sustainability*:*

"You know…part of education is to teach our kids to be good citizens, and that's what they need to know, because, you know, the shit's going to hit the fan…"

In response to the idea of sustainable agriculture*:*

"Um, well, absolutely, sustainable, I just think about, I think about, okay, this may be kind of morbid or whatever, but I think about, like, what happens when there's no more electricity and there's no more fossil fuels and all that? Yeah, when I think about, will I have the skills to be able to feed my family, because that's, you go back to your basics—food, shelter, clothing—and I'm learning how to sew, so I've got that one. But food, if you can grow your own food, or if you can get your own food or harvest your own food, if you have those skills, then you're so far ahead of the game, I mean. Not only just growing it, but being able to preserve it. I mean, you think about, it just means a lot to me. It means

that you can survive on your own, or at least take care of your own, if you had to."

In response to the idea of a sustainable food system*:*
"A sustainable food system. It makes sense. It's so broad. A sustainable food system would be … it's just… I just see a big garden. Cause it's not like hunting, because eventually, I mean, right now we see it in my cultural group in my home, people aren't getting their moose anymore that they grew up with because they're competing with people from Anchorage, from Montana. You know. They have these cheap rinky-dink outboard motors and they're competing with people that have air boats that can get to places they can't get. And they're just stripping apart the land. Therefore, it's no longer a sustainable food thing, and it's being regulated to where, you know, before they could just go out and get the meat when they needed it. Now, you have one week or two weeks or three weeks, if you're lucky, that you can go out and get it. But you're competing with all of these other things. So that's no longer sustainable. And the same thing is happening with fishing. And with the global warming. You can no longer depend on king salmon coming round the fourth of July using the regular calendar anymore because now it comes at all different times. It can come really early; it can come really late. So there's no way to prepare for it anymore, like, you know, it used to be when the leaves are starting to uncurl, you start getting this thing ready. You can't do that anymore because you can't follow nature's signs, or the cotton blowing from cottonwood. You can't follow those signs anymore. So, it's no longer sustainable in that way. And nowadays we have to have jobs, and you can't just leave your job and go out there and do that, so it's not sustainable that way anymore, for a cultural person."

Two cases in one interview when the word sustainability *was used spontaneously:*

"But food is real powerful, and, um, so that's an in. That's a hook. And I think food is also, if we're talking in kind of our global level, it's a huge issue in the

> "world in terms of sustainability and all that. So there's a very strong connection there."
>
> "Yeah, you know, from a curriculum planning perspective, I guess what I would say is, I think you'd plan a very different curriculum for these guys, if you wanted it to be… if your ultimate goal was to teach these kids the value of sustainability, you had these kind of overarching goals, and you wanted to teach them that in the context of their… their daily lives and their choices, then I think it would look different than how you would plan a curriculum for inner city Detroit."

I probably share the closest cultural and academic background with this last speaker, and so I was not surprised to hear her voluntarily use the concept of sustainability in our conversation in a way that we both implicitly understood and agreed upon.

I wrestled with whether to even use some of these concepts in the curriculum when there was so much uncertainty about what they meant. However, no one appeared turned off by the terminology. Also, in part because of my academic background, this realm of theoretical knowledge is where my own expertise is most well developed, and one of my challenges as an action researcher is translating these more academic constructs into appropriate usage. I argue that the ideas of sustainable agriculture and community food systems are a natural fit with a school like the EKCS, for reasons that I start to articulate in the next category. Also, they are frameworks that are getting more and more press in popular culture. Hence, in some of the introductory units in the gardening curriculum, I include much background information on these ideas as much to educate the teachers as to educate their students.

5.5.3 Appropriateness of Gardening Curriculum to Meeting School Goals

To begin this section, I first share some items from the original proposal submitted to the local school district and to the State of Alaska to create the Effie Kokrine Charter School (relevant sections of the proposal can be found in Appendix C). These will help illuminate the official EKCS goals as a prologue to discussing how the gardening curriculum can help meet these goals. First and perhaps most relevant are the following components constituting the "Basis for the [EKCS] Curriculum:"

- Teaching methods based in Native ways of instruction and learning

- Active, project-based learning

- Curriculum based in Native knowledge of the world

- Presence and involvement of Native elders

- Use of broad community as a learning context

- Building students' pride in Native culture as an element in success

- Academic success   (EKCS Proposal, Appendix C)

The above provide scaffolding for the vision of the school, some of which is excerpted below:

> In the vision of its founders, all children choosing to attend the Charter School
> will be successful…They will be active participants in learning Alaska Native
> heritage and culture – well on their way to becoming dynamic leaders. In this
> vision, school is a place of support, development and learning for the whole
> child…On this foundation, the school helps to develop each child into a fully
> contributing member of his or her cultural community. In this vision, students
> enter the school understanding its special mission and wanting to be a part of it.
> When they leave, they leave as successful students, proud of themselves, hard
> working, and responsible. Charter School students will be able to perform well
> academically and interact constructively with their community (EKCS Proposal,
> Appendix C).

It is important to note here that the charter school is not limited to Alaska Native students, but is open to any student interested in learning through these approaches. The educational philosophy of the school is…

> ...for students to achieve their educational goals, their learning must connect, or
> resonate, with them. To resonate, the students' learning must be embedded in a
> meaningful context. To achieve a meaningful context, the learning must be based
> in who the students are and where they come from – their homes and their
> culture. Therefore, the school makes extraordinary efforts to relate curriculum,
> teaching methods and every aspect of the school experience to the homes and
> social communities from which the students come (EKCS Proposal, Appendix
> C).

The proposal goes on to discuss several realms through which this philosophy is addressed, including *cultural values as school organizing principles, family, tribe, community*, and *the school*. Finally, the express educational goals of the school are stated as follows:

Relying heavily on a strong network of community members, program and organizations, the school will develop students who 1) enjoy and stay in school; 2) acquire the knowledge and skills stipulated in the Alaska Cultural Standards for Students, as adopted by the Alaska State Board of Education and outlined below; 3) take pride in themselves and their cultural heritage; 4) contribute to community and benefit from belonging to community; and 5) perform at acceptable levels of academic achievement as measured by state assessments (EKCS Proposal, Appendix C).

Appropriately-designed gardening and food system education clearly dovetails with many of these themes. Certainly, it can be "active, project-based learning" and makes "use of broad community as learning context." However, it had been expressed to me by people outside of EKCS that perhaps gardening was not a culturally appropriate educational activity because gardening was not a traditional part of Alaska Native cultures. From my own observations of and interactions with Alaska Natives, I disagreed with this critique, yet I was concerned enough about it that one of my objectives in my interviews was to discern if anyone within the EKCS community had similar opinions. I was relieved to learn that everyone agreed that gardening education was an appropriate activity, provided that it was properly designed. In addition, all of the Native teachers I interviewed had had gardens in their families growing up. Granted, my "sample" may have been biased because the teachers I interviewed were ones specifically interested in gardening education, but I include here some quotes most relevant to the cultural appropriateness of gardening.

"Oh, I think [gardening curriculum is] a wonderful idea, just because a lot of the students that we're trying to meet the needs are Native kids who live in the city who don't necessarily have that tie to their culture or have the village sort of life, so it would be great if they don't have a garden at home, which a lot of kids live in apartments and can't have a garden, and we have space here, then I think we should incorporate it, because why not? Space for a garden, kids need to know how to garden. You know… Well, I think it's part of their tie-in to their culture, you know, sort of the getting back to the nature, and having some sort of a tie to the land rather than just living in a concrete area. They have to realize that as

part of the respect for nature value, some…one of that comes from learning how to, um, use the resources wisely. Gardening is a big element."

"I think teachers who are at the school seem to be teachers who are interested in tying students to the culture and work close to, not living off the land, but connected to the land, so you'd naturally get people who are more interested in gardening, or hunting, to the building things."

"I mean, it [gardening] ties into subsistence. Whether it's a new form of subsistence than what's been practiced, it's still subsistence… Maybe that's the… I don't want to say evolution…the transformation, you know. We used to be nomadic traditionally and hunt this way, but circumstance now means that if we want to live close to the earth or whatever, this is the way to do it, by gardening."

"I think it should have a place. I think we're all about subsistence here, and that's what one of our focuses is in the summer. I mean, a lot of these kids for the first time cut fish this year. They had never even cut fish."

"Right, having it [gardening] across the SPRIAL because food gathering, the survival, basically, you have to have food for survival; it goes all the way across…"

Finally, I identify another theme related to the vision of both EKCS and the goals of gardening curriculum that underpins much of the work of the EKCS community. This school is in many ways developing a new model for Native education based on integrating Native ways of knowing with Western epistemologies, as discussed in Chapters 2 and 3. This role of the school and its staff and students as educational leaders for Alaska Natives in Interior Alaska is one of the reasons I was attracted to working with it, because I also see gardening education as a potential model for how to maintain the link between Native students and communities and their local food systems. In a handful of my discussions with teachers, I found ways to draw from my interviewees their thoughts on how EKCS students themselves are expected to be leaders in

figuring out how to maintain links to their cultural values while also living successfully in a world undergoing rapid ecological and socio-economic change. I quote two teachers in specific—one Native and one non-Native. In the first excerpt, we had been talking about how traditional food sources such as moose hunting are not as reliable as they once were.

> "And then again too, you're changing your whole diet, especially as an Alaska Native person. You have to change your diet. I mean, it's not the high protein anymore."

> *"L: I just think this school is just at the crux of figuring out how to adapt to all this and how to be proactive for the future of the students here and families and communities."*

> "Yeah, uh huh. And they have to learn how to recognize it. They have to have a voice also, learn to have a voice to deal with these issues. I mean, hey, my time, my people and my kids hunting, they're now young adults—it might be over for these 7th graders. You know, when they're adults, it may not be there for them. Who knows?"

In the second interview, another teacher said,

> "I think if these kids are going to grow up and be healthy productive people with all of the different constraints in the world placed on them, um, part of what we have to be in the process of doing is defining what it means to be a modern-day Native person. They have to. I can't define that. But really, ultimately, like, being Native… it can't be what Howard thinks it is. That has to be a part of it. But their lives are too different now than his."

These quotes barely scratch the surface of the concept that I am trying to articulate, but for me the take-home message is a call to design curriculum that gives students some of the knowledge, skills, and values they will need to meet this extraordinary challenge of being leaders for their communities in these times of change.

5.5.4 Teaching Philosophies and Approaches

In this section, I elaborate on the types of teaching philosophies that are common among EKCS faculty and how they have influenced the gardening curriculum. These are difficult to build into a curriculum because each teacher will implement a curriculum differently according to her own philosophy and approach, and yet they are insights I took into consideration in the design. During my field work, I have witnessed the comings and goings of a quite a progression of teachers. I have heard many people say that the success of this new school will depend in large part upon putting together the right community of teachers and staff, which is taking some time. While this dynamic is not of central concern to my research interests, it is nonetheless relevant for a few reasons. For one, I need to know the audience for my curriculum, as a key component to the successful authoring of anything is the knowledge of one's audience. For another, there are lessons embedded in the process of developing the EKCS community regarding institutional sustainability connected with human systems dynamics on which I will elaborate in my conclusion chapter.

First, I address the concept of learning styles, a delivery approach that the EKCS was initially designed to implement (EKCS Proposal, Appendix C). One EKCS teacher has mastered the art of teaching through individual student learning styles, and much of my initial understanding came from talking with her and observing her curriculum planning. For instance, she designs at least four different performance tasks to assess student learning in each of her units and requires that each student choose the task that is designed for his or her learning style preference. Each of her students has been assessed so that she knows which are *auditory, visual, tactile,* and *kinesthetic learners*. I recently took a standardized test to assess my own learning styles, so I gained more insight into the framework. Early in the design of the gardening curriculum, I had envisioned incorporating learning styles in tangible ways. Hence, I asked several teachers for recommendations on how gardening education could address multiple learning styles. I present some of their feedback here, but in the end, I decided that developing the expertise to effectively integrate learning styles into the curriculum would take more time than I had to devote to it. In addition, each teacher has her own ideas and skills related not only to learning styles but to other delivery methods as well.

"What I'd like to see happen here is the idea that we all arrive at, first, a philosophy of methods, and then, kind of a menu of methods that we that we

keep using over and over again because we know they work. Because the literature says they work and we've experienced them working. Learning styles being one of them. Let's add to it, though. Journal writing, portfolios, Socratic seminars….So when you look at putting together a module on gardening, I think it's really important that you balance, "Okay, here's the content that I want to get across, and here's the method that I'm doing it, and the different skills I'm teaching…"

"Oh, a garden would be excellent for those that are kinesthetic and tactile and have to move around and even visual, if you're looking at things, like all the research material and stuff we had were colorful pictures of vegetables… And then with the auditory students, just listening to the directions and when you're walking around describing things. I think there's something for everybody."

With one teacher in particular, I had a long discussion that related to the teaching philosophies of the types of teachers who are attracted to working at a school like EKCS. This was an especially difficult interview from which to extract pieces of relevant information, but some of it concerns the "mentoring" approach to teaching that I mentioned above. For instance,

"I think it's totally unproductive to enter into a situation like this or a situation of implementing a gardening program, and say, well, we're just teaching kids, so we're going to apply these kind of universals about kids, because at least, from my short experience, and it's certainly not, you know, other people are going to have a lot more to say about this, but in my short experience, it is different. There is a whole cross-cultural element. There's obstacles that you're going to face that you just need to acknowledge on the outset rather than try to gloss it over as 'we're all people.' That's kind of what I meant by saying that, and um, but also that you're going to get a lot more out of them, ultimately, if they trust you. Now, how does that relate to curriculum design? I've always been really a proponent of trying to get to the point where the kids are really working independently in their classes or on work. Maybe they're not in a traditional

> class; they're working independently on a project, and you act much more as a
> facilitator and an advisor…like a coach…"

The teachers who have a long tenure at EKCS seem to be the types who make personal connections with students as part of their teaching approach.

Another component of teaching philosophies concerns how much to dictate to students versus how much to allow them to direct their own education based on their own interests. This same teacher above seemed to contradict herself a bit in the course of our interview concerning this issue, indicating how difficult it is for teachers to develop and articulate and implement their own teaching philosophies. Specifically, she expressed concern that gardening may not appeal to high school students in the following:

> "So, um, I mean, the thing I wrestle with about the gardening is, I totally
> understand how it's a perfect example of hands-on kind of applied learning, and
> it's a context where you can see these different concepts that you're trying to
> teach in the classroom, and you can teach different kind of social skills and stuff
> like that. What I wrestle with is, they're just not that interested. And, I think that
> has more to do with now than it does with these kids. It has to do with what life
> they live in and the society they live in, and stuff like that. I do think,
> particularly for the high school kids, like, they're not going to buy into the
> political stuff. That's, high school kids are just too, they're too kind of
> internally-focused. You can put it all in front of them, but you know what, they
> just don't really give a shit, if they're pesticiding the hell out of California. It's
> just not a big deal for them, and we're not going to change that."

On the other hand, later in the conversation, this teacher pointed out that "you know, one of those funny things, as you get older, some of the things you had to do as chores as a kid, you find yourself now really enjoying. I think gardening was one of those things." So this relates to the philosophy that teachers have to involve students in topics that they may not appear to be interested in because of the long-term benefits to the students. This is of course a fundamental philosophy of our formal education system in the US with which I do not disagree; the question is who decides what is important for students to know and why, a question I will explore in more

depth in chapter 6. Here I am simply trying to flesh out the different philosophies expressed by the EKCS teachers. I present a final comment relevant to this issue concerning long-term benefits to a student from gardening education.

> "So, I think [gardening is] something that I'd like to see resurge and I'd like to see, if nothing else, this generation of kids learn it, so that somebody has it, and then they can do what they want with it, but at least it's being taught and they can continue on with it or just keep it up in their little brains or whatever they want to do, you know. So I think it's really important."

The take-home message for me in terms of designing gardening curriculum is simply to acknowledge that while gardening will not appeal to all students on either personal or political levels, it is still a worthwhile endeavor to expose them to it.

5.5.5 Curriculum Goals

As mentioned previously, I had vague ideas about what goals I had for students when I first began designing educational gardening activities with EKCS students. Both my hands-on activities with them and conversations with teachers helped me refine those goals. I rarely asked teachers directly what their overarching goals for a gardening curriculum would be because when I first started the interviews, the structure of the curriculum was still so uncertain. But by asking teachers what priorities they had for the gardening program or curriculum and how these priorities related to the school's mission, I was eliciting feedback that I would later build into the goals. Also, I knew that in the end, I wanted to be the author of the curriculum goals, as I did have some ideas that I was committed to integrating. After all, part of this action research experiment has been about testing the workability of my own ideas in a collaborative, applied setting. For instance, it was through my participation at the EKCS that I learned about the model of Teaching for Understanding (Wiggins and McTighe, 1998) in curriculum design. In the summer of 2006, a consultant was hired to help create specific modules to fill in the framework of the Spiral curriculum, a job the teachers had been doing mostly themselves prior to that. This consultant shared a template for each module that she was creating, and my subsequent development of the gardening curriculum was influenced by some of the techniques she used, such as the prominence of "understanding goals" in both the design process and in the curricular product. An early idea of mine had been to work closely with this consultant to integrate

gardening activities into appropriate modules across the Spiral curriculum; however, as I witnessed her get deeper into the design process, I realized that she had enough of a challenge building Alaska State Standards into each thematic module in a culturally-appropriate way and that I did not need to complicate the job by introducing gardening topics as well. Also, as technical outsiders to the EKCS community, we did not have the authority to make the decision to incorporate gardening without a clear mandate from the EKCS board, which we did not have. These considerations played a significant part in my eventual decision to build a stand-alone curriculum that the EKCS teachers themselves could choose whether and how to integrate. Hence, I chose instead to model the units of the gardening curriculum on a similar framework to the Teaching for Understanding model developed by the consultant.

In the Teaching for Understanding model, the design and implementation of each educational unit—whether it be an entire module or a one-day lesson plan—begins with identifying a clear *understanding goal*. This is the knowledge or concept that the student should understand upon completion of the unit. From this goal, the teacher or curriculum writer then creates an appropriate *performance task* that the student will be required to complete in order to demonstrate understanding. All other activities in the unit are then designed to give the students the knowledge to understand the concept articulated in the goal and the tools they need to demonstrate their understanding. I applied this framework to the development of the gardening curriculum by phrasing the overarching goals of the whole curriculum as understanding goals, and then creating more specific understanding goals and performance tasks for each of the ten individual units of the curriculum. I believe it would be difficult for students to meet the understanding goals of the entire curriculum without going through the complete series of units through an entire gardening season. Even if they did understand many of the components with only piecemeal exposure to the curriculum, the potential outcomes of the curriculum might be different, as I will discuss in a later section when I address curriculum outcomes.

Although I refer to this curriculum as a "gardening curriculum," the goals I had from the beginning for such a curriculum were broader than simply focusing on gardening. In fact, these broader goals are what make this curriculum so different from many of the pre-packaged gardening curricula already on the market, many of which focus primarily on the science and skills related to growing plants—in other words, horticulture for young students. I knew I wanted to use gardening as a window into food systems. Hence, a component of the overarching goal for the curriculum relates to understanding food systems. While teachers I spoke with may not have

used the term food system, I did hear a lot of positive feedback for the idea of including knowledge of where food comes from as a goal for a gardening curriculum. For instance,

> "[T]hese students really need to have some sort of education about where the food comes from that they're eating because we get some may students who are just like, you know, not… they go to the store and they think that's where their food is supposed to come from so they have no connection to what they're eating."

On the other hand, one of the interview excerpts included in the previous section is relevant here too. This speaker emphasized that adolescents are generally so focused on themselves that they often do not care about the ramifications of the food choices that they make on the local and global communities of which they are a part. There is much to discuss about this observation, but for now I highlight the idea that this teacher and many others thought that one of the understanding goals that would most speak to students related to their own personal health and well-being, as the following quotes indicate:

> "I see [food] affecting their lives so directly. Their nutrition… I can't tell them what to eat. I can't dictate, but at least I can try to give them some more information so they're aware, you know, because it's seriously affecting them, the way they learn, for some of them. Yeah, and it's going to cause major health problems for some of them, in the future…I would ask them, 'Why is it important?' Cause they all agreed. It's better to eat locally. It's better to eat, you know, fresh food, with good nutrients. But I didn't ask them why, and I think if you could hook that, hook them with that, like get it across to them, that this is why it's important. Not just the economics of it, but like, your well-being."

> "[T]hese kids, a lot of them have absolutely no idea what they're putting into their bodies. They have no idea about even reading labels or anything. They think that Gatorades are good for them. Gatorade the drink and the Rock Stars. I mean, they don't even think about that stuff, so as an educator, my goal would be

to just educate them on growing their own food and the whole process and what does it mean when you're putting in empty calories versus, you know, these fruits and vegetables, and how does it affect your body, and how's it going to affect your health when you're older, and just getting them to think about mind-body-food connections, and, um, energy…I just think that the more you can expose kids to a healthy lifestyle and sustaining a healthy lifestyle, I think that that's a great thing…"

There was also agreement that simply teaching students the skills of gardening was a worthwhile goal too.

"[L]earning how to grow your own food, cause that's an important skill, once you learn that, I mean, no one can take that away from you… And if you can teach them that at this age, it's something they can take with them, you know, into their adulthood, and they can pass it on…And it's kind of like the whole, you know, you give a person a fish, you're always giving them a fish. I'm kind of paraphrasing that, but if you teach them to fish, they can eat forever. And that's what I think about sustainable gardening…"

In conclusion, in the creation of the learning goals for the curriculum, I tried to incorporate my objectives with what I heard teachers say both about these broad goals as well as more specifics such as those comments I included in the section regarding thematic module content.

5.5.6 Learning Activities

Learning activities are any of the specific activities that were suggested to me to include in the curriculum. I discussed above in Action Research Stage 2 the specific activities that I created and tested with Cindy's students. Many of these I later built into the curriculum. I also tried to include many of the teacher's suggestions below. This is the most specific category yet in terms of the level of detail at which this is addressed in the curriculum. Rather than including full quotes as before, I present in the following lists specific activities suggested by teachers. The first list comprises those activities that I had already conducted with students that teachers in later interviews specifically mentioned as good activities.

1. Listen to Michael Pollan interview on National Public Radio website

2. Take field trip to Fred Meyer to learn about produce

3. Read seed packets to follow instructions

The second list presents other activities suggested by teachers.

1. Use Romanesco broccoli from the garden to conduct a lesson on Fibonacci sequences

2. "Burn" cabbage or other vegetables and also some "junk" food like Doritos in order to demonstrate the amount of energy in a calorie

3. Create a personal food pyramid using a resource like www.mypyramid.gov

4. Watch movie like *Supersize Me*

5. Take field trip to Boreal

6. Work in the garden in the morning to see what's ready to harvest and then plan a lunch menu around that

7. Plan a balanced meal using Native foods

8. Use journal questions as prompts to start each unit or lesson

My goal in creating each unit of the curriculum was to include as many of these suggestions of activities as possible in appropriate units to help meet the understanding goal of those specific units. For instance, activities like creating a personal food pyramid or planning a balanced meal might be in a nutrition unit, while a field trip to Boreal Farm might be more appropriate in a unit on sustainable agriculture in Interior Alaska.

5.5.7 Standards

This category addresses the issues surrounding the inclusion of specific Alaska State Standards in the curriculum. I usually asked my interviewees how they would recommend incorporating standards into the gardening curriculum. I realize now that I assumed that they would want to see a curriculum that made explicit links to standards. Because I asked the question, many of them answered it, but few of them cited specific standards that I could address. Rather, they made more broad statements like, "Big writing. This could be just a really big writing component. A little bit of math in there. But I think the other component would be social studies. If you're talking about doing a global food system, tracing food and where it goes. Oh, yeah. Technology." These educational categories referenced here are not specific standards but rather content areas into which standards are organized. More specific examples include:

"You were talking about history, gardening, I mean, I was just thinking about all

these different units you could do with, like, storytelling. I had…I taught

storytelling last year. There's so many stories that I have that concentrate around

food in my family…"

"[O]ne of the science…standards is understanding how organisms work together

in an environment. Just the simple things where you taught us about how there

are some plants you would naturally plant next to others because they repel bugs.

I had no idea about that. And just, things, ideas on how to make things work

together naturally. That would be a good science thing."

I did not know much about standards when I began this project, not having been trained
as a teacher myself. I had been told casually by colleagues before that the only way teachers will
use a curriculum is if they can see how it will help them meet standards. Indeed, it is the trend
now in environmental education to link classic curriculum like that of *Project Learning Tree*
(American Forest Foundation, 2005) to specific national and/or state educational standards. Even
the new edition of my favorite gardening curriculum—*The Growing Classroom* (Jaffe & Appel,
2007)—links activities to California State Standards. So, as with other education-related topics
like learning styles, I set out to educate myself about the Alaska State Standards. Again, the
EKCS curriculum consultant helped me in this job. My eventual goal was to include in my
individual curriculum units specific standards and associated grade level expectations (GLE's)—
the even more specific pieces of knowledge that students will be expected to know in each
content area when they are tested with standardized exams at various grade levels. I saw it as one
of my personal challenges to incorporate standards into my curriculum because I hypothesized
that an effective incorporation of standards would indicate a successful merger of formal Western
education with the holistic, place-based Alaska Native approach to education reflected at the
EKCS from which I was trying to draw.

As I began working on incorporating standards and the GLE's associated primarily with
science, math, and English into the various emerging units of the curriculum, I quickly started
having problems. Basically, the level of detail expressed by some of the GLE's and that of the
goals of the units of the gardening curriculum were mismatched. The best way to link specific
GLE's seemed to be to design specific activities to address them, but that seemed counter to the

purpose of designing activities around the understanding goal expressed as the goal of the unit. I eventually gave up on the process, assuming that I was simply unskilled at this component of curriculum development and hoping that I would get more guidance from teachers when I shared the curriculum draft with them for feedback. However, I discovered later—when gathering feedback on my first curriculum draft—that the teachers who looked over the curriculum were content that I had not included explicit links to standards in each unit. One teacher expressed that it was her job to make the links to standards (which I had secretly been hoping was the case), as teachers know the needs of their students better than anyone else. She said she did not like using pre-packaged curriculum, which I took to mean the type of curriculum that presents step-by-step activities designed to meet standards. Another pointed out that some curricula that incorporate standards go so overboard by including so many standards that the suggested links to standards become meaningless.

My frustration and confusion over standards indicates much larger scale concerns about the purpose of formal education. Because the EKCS is a state-approved charter school, they are required to address state standards in their curriculum. But can they do that while teaching through a curriculum that prioritizes Alaska Native culture over Western culture? Federal and state educational standards are driven by different agendas than that of EKCS. It is not within the scope of this dissertation to investigate all of the components of this tension, as such would take at least another entire dissertation. However, for me the standards have become symbolic of some of my concerns about formal education. I decided early on that I wanted to conduct my work within a formal school setting to test different ways to introduce sustainability pedagogy into the monolithic system we have in the United States, and my preference is to work at small scales to make change. However, small scales in this system have very little power to change standards that are mandated at distant loci of power.

An exception to this generalization would be the Cultural Standards approved by the State of Alaska Board of Education as one of the outcomes of the work of the Alaska Rural Systemic Initiative mentioned in Chapter Two. These standards articulate the ways in which schools, teachers, and students should be culturally literate. While the creation of these standards was driven in part by the need to find ways that the State of Alaska school system can more effectively meet the needs of Alaska Natives, the Cultural Standards are not limited to understanding Alaska Native culture or other indigenous or minority cultures (personal communication, EKCS interviewee). It is one of the express goals of the EKCS to make use of

the Cultural Standards in their educational approach and curriculum (EKCS Proposal, Appendix C). Again, this is why I feel as though the school itself is a demonstration project. While I laud this goal, it only begins to address the power issues associated with who determines educational agendas. Students are not tested on cultural standards, just on science, math, and English content, and these test scores are what tie schools to federal funding through policies such as those in the No Child Left Behind Act.

There are certainly many ways to incorporate Cultural Standards into the gardening curriculum. These standards articulate some of the issues I explored in the above section on "Appropriateness of Curriculum to Meeting School Goals." Some of the following quotes from teachers speak most closely to Cultural Standards:

> "Self-sufficiency. Big. The self-sufficiency, um, learning responsibility. You don't take care of a plant it'll die. Ultimate death. I mean, come on, that can eventually tie in to raising children and a family. Ah, the recycling. Being more aware of your environment and appreciating what's there. It's just numerous…And, self-sufficiency, being responsible. Respecting ecology. Preserving food, how to prepare for the future instead of just looking at today. So many of our cultural values can tie into this that I'm seeing."

> "But to make something like what you're trying to do in the gardening thing more, um, consistent with those value systems, you have to at least think about that on the outset. So, giving… And I think… so you say, 'Okay, I'm going to do a module on gardening. Well, I'm going to take my understanding of that part of the value system and I'm going to say, okay, at the tail end of this, I'm going to…we're going to give baskets of fresh vegetables to, um, I don't know… elders, or we're going to give it to… we're going to send baskets out to families in Hooper Bay who lost their houses in the school fire.'"

These quotes indicate a key component of the Cultural Standards, which is giving a place to cultural values in formal education. It is common to think of conventional educational content standards as value-free and focused instead on knowledge and skills perceived as necessary to leading a successful life in a Western culture. However, the qualities associated with success in a

consumerist culture are dependent upon values. Many critics of formal Western education have dealt with this issue in great detail (references—lots of them). I return to this discussion in the next chapter. To conclude here, I did not directly incorporate Cultural Standards into the first draft of my curriculum, but plan to make more explicit links to both Cultural and other standards in any final published curriculum.

5.5.8 Projected Outcomes

I conclude these data analysis categories with one on curriculum outcomes, as this category in some ways brings together all of the above to summarize the main themes addressed by the curriculum as both a process and a product. Rather than drawing a definition from literature, I have attempted to evolve my own understanding of what I mean by the term *outcome*. I see it as different from how I have used *goals* in this analysis. Goals are the specific understandings that I expect students to have at the end of the process, whereas outcomes involve not only the students but also other members of their human and non-human communities. Outcomes offer a chance to articulate the links between students and these communities. They can serve as indicators of the success of the curriculum in meeting not only the explicit learning goals, but also the implicit intentions of implementing a curriculum like this in the first place. I use the phrase *projected outcomes* because this curriculum is still too new for me to assume that I know what all the outcomes are or will be. Yet there have been several outcomes of this action research project that relate closely to my projected outcomes for the curriculum. As usual, the objective of this final section is not to articulate a list of outcomes at this point, but rather to present data relevant to the emergence of my projected outcomes. And so again, here are some quotes from teachers that indicate to me their desired outcomes for a gardening curriculum. The first several relate to uses of garden produce that go beyond simply leading students to attain their understanding goals.

"I personally would love to see garden greens be brought into the cafeteria. I would love to see the food being brought into the cafeteria. Even on a small scale to start, but if it grew into something bigger, that would be phenomenal."

"[W]e're always having potlucks here, and we're always ended up bringing stuff from home, making soups and stuff, and it would be nice if we had carrots and turnips and celery, already pre-packaged in the freezer to pull out to use…"

"But as far as the product, I mean, I think to have the kids produce food and then, you know, using it in the lunch room would be really amazing."

"But, even still I'd like to think of ways to take it a step further, like actually have them change their diet. Terrible diet. These little girls are all going to have osteoporosis. Seriously."

"Healthy salads, if we're having summer sessions, to, you know, have a section for salads and really promote salads and healthy eating. Have it active part, because that's where I think a lot of our kids… they eat of lot of junk."

The next few quotes indicate desired outcomes more related to a community health level.

"And I think when you grow your own food, and especially as a community, you're depending on one another for certain things, and it's your food, I think it's just a really good feeling of accomplishment when people have come together and worked for a common goal, and it's food. And food brings people together, and to have gone through all that with a group of people, I think it's a really good experience and it really makes you think about your connections with the earth, your connections with your family, your friends and community, so."

"Well, even one of the grandparents (names some names of students)… one of the grandpas' fondest memories was coming in every Friday to have lunch with his granddaughter." (*Note: This teacher was referring to her experience gardening with students at a different school.*)

"Potentially the Native community [would benefit] if they got more involved, if we had more parents involved, if we could have little plots or something, where community, family community, family garden…"

Finally, a couple of teachers indicated benefits associated with students' self-esteem and pride.

"Well, you know, one of the things that I've seen, with the Boreal Farm and the garden with the kids that were involved here is that you saw kids that were kind of withdrawn or were bashful or that didn't, weren't comfortable sharing in the classroom. When they got up there and they were free to just get involved and to watch things grow and things, they were proud of themselves. Their self-esteem just grew so much…"

"They were kind of surprised when the plants actually came up."

"[T]hey still enjoy coming by and seeing what they created, or what they helped to create in the garden, and it's an actual, you know, gratification there that you can see what you've built with your hands."

5.5.9 Summary: Curriculum as Product

The curriculum that emerged from this process is presented in Appendix A. Here, I summarize some of the main characteristics of the curriculum. The overarching understanding goals for the curriculum are the concepts that I would expect students to understand upon completion of the entire curriculum. Students will understand the following:

1. The basic skills required in the gardening process
2. The characteristics of their local food system
3. The role that eating locally plays in improving their communities and ecosystems.

The expected outcomes for the curriculum relate to these goals but are broader in nature than student understanding. The suggested outcomes include the following:

1. Students will plant and maintain one or more gardens through a complete gardening season.
2. Students will acquire academic skills through hands-on learning about gardening and food systems.
3. A genuine connection between students and their community will be fostered.

The guiding methods employed in this curriculum include hands-on gardening in culturally and ecologically appropriate ways, classroom-based activities and field trips to examine local and global food systems, and practical student assessments.

Each gardening curriculum unit has several standard components, including title, understanding goal, performance task, background information, terms, activities, and standards (Table 5.4). I also hoped to include suggestions for assessment, such as rubrics, but this addition will have to depend on more experienced educators than I.

Table 5.4 Gardening Curriculum Unit Components

Title	i.e., *Sustainable Agriculture*. Each unit is named based upon its unifying goal and content. There are ten total units.
Understanding Goal	Articulating an understanding goal at the beginning of each unit is a technique drawn from an educational design framework known as Teaching for Understanding (Wiggins et al), which has been employed in the design of other modules in the EKCS Spiral curriculum.
Performance Task	The performance task is the suggested culminating task required of each student to demonstrate that he or she has met the understanding goal. This is a good place to incorporate different learning styles of individual students.
Background Information	This section provides background information for the teachers, consisting of the content knowledge I suggest that they need to know in order to help students meet the understanding goal.
Terms	These are suggested vocabulary that students should know at the end of their unit. Most of them are defined for the teacher in the background information.
Activities	These are suggested activities for teachers to use to deliver the content knowledge and skills necessary for students to accomplish their performance task and meet the understanding goal.
Standards	These are the suggested Alaska State Standards that could be addressed in this unit.

Table 5.5 presents a suggested framework for implementing the units, although they are designed to be flexible enough to be shifted around. These two tables capture the structure through which I incorporated my own extensive participant observation data as well as the input from teachers.

Table 5.5 Organization of Gardening Curriculum Units

Theme	Curricular Units	Time of year	Approx length of time needed
Intro to Gardening	**Unit 1:** Sustainable agriculture **Unit 2:** Gardening in Interior Alaska **Unit 3:** Garden planning and seed starting	April-May	2-3 weeks
Garden Planting	**Unit 4:** Soil preparation **Unit 5:** Transplanting, seeding, and cultivating the garden **Unit 6:** Pest management	June-July	2-3 weeks
Garden Harvest	**Unit 7:** Food systems **Unit 8:** Nutrition, cooking, and preserving **Unit 9:** Composting	August-September	3-4 weeks

5.6 Stage Six: Drawing Conclusions

Finally, I again conclude with the sixth stage of my action research, a final reflective stage in which I draw conclusions about my research questions for the purposes of writing a dissertation. As the curriculum design phase of my research drew to a close, I returned to my question of how this kind of education can promote sustainable food systems. Because my research approach focused on design rather than evaluation, what broader conclusions could I draw and share in my dissertation? Through designing curriculum, I realized that the broader applications of my research concerned pedagogy—the design of educational practices.   Not only did the collaborative design of the gardening curriculum serve to organize my research methods, but it also served as the window between local context and broader application. What should pedagogy for sustainability look like? The next chapter lays out this emergent pedagogy.

Chapter 6:

Pedagogy for Sustainability

There is currently a significant movement around the globe to promote changes in socio-economic practices to reflect a paradigm of sustainability (Edwards, 2005). One set of these practices concerns education. For instance, the United Nations declared the decade of 2007-2016 as the Decade of Education for Sustainable Development. We need to articulate what pedagogy for such education looks like. This concluding chapter discusses theoretical implications of my research and puts my fieldwork and curriculum design into a framework that I call *sustainability pedagogy*. I began this research to investigate ways in which education practices in Interior Alaska can strengthen links between students and their bioregion in such a way as to promote the emergence of sustainable food systems. Initially, I intended to pursue this research goal in part by evaluating whether or not the community food system that includes the school garden at the Effie Kokrine Charter School (EKCS) did or did not become more sustainable after implementation of various kinds of educational activities. However, I soon realized that collecting such evaluative data would not be possible without an appropriate framework; hence my research came to be more about developing this framework through action research. As I deepened my understanding of sustainability, my objective became to articulate a philosophy about how to educate youth in a way that cultivates sustainability in social-ecological systems that includes the students in question. This research evolved into a design project with sustainability pedagogy as the outcome framework. Pedagogy addresses the question of *how* to educate.

6.1 Goals and Components of Sustainability Pedagogy

During my participatory action research project, core themes related to sustainability pedagogy emerged. Indeed, I created my working definition of sustainability (presented in Chapter 1) while conducting my field work and analyzing the process of curriculum design. Again, that definition is *the capacity of a complex adaptive system to maintain and nourish its primary functional characteristics over a long period of time. In the context of social-ecological systems, sustainability is a property that emerges when human activities occur within the appropriate spatial and temporal scales determined by the limits of their natural and cultural support systems.* In conjunction with developing this definition, I also integrated insights from

my literature review of different models of place-based and gardening education with those from my own field work to formulate a rationale for sustainability education, which follows: *the role of sustainability education is to facilitate the creation, maintenance, and exchange of knowledge, skills, and attitudes necessary for human communities to live within the limits of their natural and cultural support systems and hence maintain the conditions needed for sustainability of those systems*. This collection of knowledge, skills, and attitudes within a particular system can be considered a community's culture. The intended outcome of sustainability pedagogy is to foster a community culture of sustainability.

Integration is a consistent theme in all of this research—such as the theoretical integration of social-ecological systems, the methodological integration of theory and practice through action research, and the practical integration of students within their community food systems. While many of the educational models reviewed and discussed in Chapter 3 served as useful guides for this sustainability pedagogy, one broad framework in particular integrates multiple themes into a coherent whole in the way that I intend for this pedagogy to do. Indigenous epistemologies and pedagogies tend to be far more integrated than those of the Western, Euro-American world. While the research is not about indigenous epistemologies per se, I conducted my work within an Alaska Native educational context—both with the EKCS and with Athabascan elder Howard Luke—in part to provide me with models of a more holistic approach to education than those with which I was more familiar, i.e. the disciplinary-based educational institutions of the US public school system. I am not proposing that my sustainability pedagogy reflects an entirely indigenous approach to education; rather, it integrates appropriate elements from both indigenous and Western approaches (Barnhardt, Bowers, Stephens, and Takano). For instance, one of the primary components of indigenous approaches to education is inter-generational transfer of knowledge, skills and values, a theme that cross-cuts many of the components of sustainability pedagogy as well. A guiding question for me was, how can educational initiatives in sustainability facilitate inter-generational education within each of these components?

My framework for sustainability pedagogy includes the following five core components: *systems thinking*, *place-based and problem-based learning*, *eco-cultural literacy*, *eco-justice values*, and *appropriate assessment*. The first two of these components actually served as guiding concepts from the early stages of my research and became more refined throughout the research process. The remaining components were less well-developed to begin with and emerged more

from the research process as ways to describe the themes regarding sustainability education that begged for definition. While my work has involved formal K12 education, this framework is intended to be applicable to any educational initiative with a goal of promoting sustainability. However, I include an addendum for sustainability pedagogy in higher education, which addresses the role of participatory action research in sustainability education and research. I include in my portrayal of this pedagogy a component that addresses community-scale indicators of sustainability. In the following discussion, I first review and explore these concepts and then conclude by showing how the gardening curriculum in Appendix A demonstrates these components.

6.1.1 Systems Thinking

One of the most crucial components of sustainability pedagogy is the incorporation of systems thinking in designing and implementing curriculum. Systems thinking is embedded in multiple ways throughout this dissertation, as described in Chapter 1, where there is also a review of systems thinking that I will not repeat here. Here, the focus is on the role of systems thinking in sustainability pedagogy. If sustainability is a property of a system, then an understanding of the characteristics of systems generally and of one's own systems specifically are prerequisites for being able to think and teach with a systems perspective. One goal of sustainability education should be to foster the ability to think systemically in students as well.

A systems approach can be applied not only to organizational learning but also to individual learning, as each individual human is in fact a system as well. A systemic understanding of learning at the individual human scale is perhaps most relevant to designing pedagogy for sustainability because it concerns not only *what* students need to learn but *how* they can best learn it. Capra (2002) and Bateson (1972) both deal with this topic in their discussions of mind and consciousness, but one of the best articulations of the relationship between learning and internal psychological development is presented by Vygotsky and Cole (1978). Vygotsky postulated the concept of the *zone of proximal development*, which is "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (p. 86). In other words, learning is stimulated by being challenged by another person. Learning is in large part a social phenomenon that occurs when the individual learner can function as one component of a complex system. A teacher in a formal

setting needs to recognize and build upon this dynamic by creating a learning community in her classroom.

There are some curricular resources for educators that address systems thinking (e.g. American Forest Foundation, 2005; Sweeney & Meadows, 1995). Certainly, there are challenges to such an approach within our public school system, which emphasizes a linear learning process focused on the independent development of students rather than on fostering learning communities within classrooms. I suggest that one of the most effective ways to teach a student about systems is to help her understand her own role in the systems of which she is a part. This identification of role has been my own challenge as an action researcher within a complex social-ecological system as well. Indeed, participatory action research simply parallels systemic learning processes in many ways.

6.1.2 Place-based and Problem-based Learning

When I began my field work with the EKCS, I used the framework of place-based education to design gardening activities with students. I was inspired by David Sobel's (2004) assertion that place-based education improves "community vitality and environmental quality…through the active engagement of local citizens, community organizations, and environmental resources in the life of the school" (p. 7). His choice of words—*vitality* and *quality*—echoed my own early attempts to define *sustainability*. However, I grappled with the challenge of evaluating whether and how place-based education actually fostered sustainability. As I looked for theoretical frameworks with which to explore this question, I eventually came to agree with David Gruenewald's (2003) observation that the theory behind place-based education is still evolving. The practice of place-based education is driving the development of theory. Gruenewald proffers good suggestions about drawing from critical theory and pedagogy to flesh out place-based pedagogy in what he calls a "critical pedagogy of place."

To review the main points of the discussion of place-based education (PBE) in Chapter 3, PBE is simply the practice of teaching and learning about a student's local place in the world. "Place-based learning is rooted in what is local—the unique history, culture, environment, and economy of a particular place. The community provides a context for learning, student work focuses on community needs and interests, and community members serve as resources and partners in every aspect of teaching and learning" (Williams, 2003; p. i). As a teaching philosophy, it is distinct from conventional education that teaches content knowledge without any connection to local context. PBE occurs in formal education when a teacher uses features of a

student's home place, including its natural and cultural elements, to teach such content knowledge. While the emergence of PBE as a unique approach is often credited to The Orion Society, an education and outreach organization focused on healing relationships between humans and nature (Sobel, 2004), there has been a burgeoning in PBE literature in the last decade (Elder, 1998; Gruenewald, 2003, 2006; Gruenewald & Smith, 2008; Sobel, 2004; Williams, 2003; Woodhouse & Knapp, 2000).

Education for sustainability has many goals in common with place-based education. However, rather than using place-based education as an overarching framework for developing pedagogy for sustainability, I suggest that place-based education is a key component *of* such pedagogy. Focusing on *place* in educating for sustainability reflects the premise that the concept of sustainability is only useful when grounded in specific places. Many environmental educators hold that people will act as environmental stewards if they develop caring relationships through a sense of place (Louv, 2005). While this emphasis on sense of place may be an important goal of environmental education, fostering an attitude of stewardship is not sufficient to cultivate sustainability of a complex system of which students are just a part. Place-based education should build tangible links between youth and their home places so that their own well-being is interdependent with the well-being of their places.

A complementary approach to place-based education that I learned more about through my fieldwork is problem-based learning (PBL), in which the student's learning process is facilitated by the identification of a specific problem to work on (Barell, 2007). "The students' tasks are to identify the current state of their knowledge, identify what further information is needed, seek out that information, analyze and evaluate the information, and make plans for action vis-à-vis the case study" (Askell-Williams, Murray-Harvey, & Lawson, 2007, p. 240). A teacher educating about sustainability of students' places using PBL would identify a specific challenge to sustainability within the community for students to work on. For example, Mark Sorensen (2007) writes about his experience teaching for a small, rural school called Service to All Relations (STAR), based in a primarily Navajo community. The school is committed to serving the needs of its local community as well as those of its students through involving students in community problem-solving.

> The purpose of this approach is to provide students with both the skills to get
> along in the world and to develop values that encourage self-confidence and a
> desire to learn so that young people can create productive lives capable of

sustaining themselves and their families and communities. At the STAR School, "sustainability" refers to the relationships and resources that provide for the continuity of people and the environment from generation to generation. (p. 50)

Two philosophers of education who contributed to the evolution of place-based and problem-based learning were John Dewey and Maria Montessori. Dewey is linked to the birth of pragmatism and progressive education in the United States (Dickstein, 1998; Gardner, 2004). The central concept in such progressive education concerns linking the formal education of students to a context relevant to the students themselves, placing "the child's activities at the center of the educational agenda" and favoring "rich projects through which children could come to know their world, achieve a fuller understanding of themselves, and begin to secure a feeling for the skills and concepts that lay at the heart of formal disciplines" (Gardner, 2004, p. 193). Dewey modeled the educational process after the scientific method, which is fundamentally the same process as problem-based learning. Maria Montessori was the founder of another alternative form of education that came to be known as the Montessori method, in which elementary and middle school students direct much of their own education by choosing among carefully-designed sets of developmental activities (Chattin-McNichols, 1992). Montessori also believed in the value of outdoor education (Montessori, 1964). She even suggested that the concept of *Erdkinder*, or "land-children," be used for structuring programs for young adolescents (1974, p. 107). She advocated that children of this age be educated in boarding schools in rural areas where farms could be an integral part of the schools. Dewey's and Montessori's theories of education unite place-based and problem-based education in a way that can enhance the adaptive capacity of entire communities by educating youth to master such problem- and place-based skills.

6.1.3 Eco-cultural Literacy

Regarding content knowledge necessary for sustainability education, ecological literacy and cultural competence are two arenas that call for greater attention in conventional formal education. I merge these two concepts into the single term of eco-cultural literacy to emphasize the need to integrate ecology and culture in sustainability work. Ecology and culture address the three components of popular portrayals of sustainability—environment, economy, and society—if one takes culture to include both economic and social relationships among people. These two content areas reflect the interdisciplinary nature of sustainability pedagogy as well. Sustainability does not belong to one discipline alone. Regarding ecological literacy, when the concept of

literacy, or the ability to read and write, is applied to ecology, the result is competence in "reading" ecological relationships in the natural and human worlds (Orr, 1992, 1994). Cloud (2005) outlines the following components of ecological literacy:

> [A]n understanding of carrying capacity; basic facts about how the planet works…; the resilience and yet the vulnerability of the Earth's self-regulatory systems and cycles; the values and irreplaceable nature of biodiversity; the management of renewable and non-renewable resources; the reliance of humans upon precious and irreplaceable ecosystem services; and the interconnectedness of humans and the earth's systems (p. 1).

Both Cloud and Orr emphasize the importance of ecological literacy to sustainability, and vice versa. "[E]ducation relevant to the challenge of building a sustainable society will enhance the learner's competence with natural systems" (Orr, 1992, p. 92).

The links between sustainability and cultural competence are not as clear, just as cultural competence itself is a murky concept. Cloud (2005) includes the need for "multiple perspectives" in content of education for sustainability; however, *perspective* does not capture the depth of an entire culture's relationship with the natural world. Just as with ecological literacy, cultural competence requires not just knowledge of a specific culture but also an understanding of some of the general principles of how human economies and societies function. While the emphasis in multi-cultural education is often on the responsibility of the teacher to be well-versed in the multiple cultural traditions of their students (Heath, 1983; Freire, 1970, 1995), Ray Barnhardt (2008) offers a definition that focuses on student competency:

> Culturally responsive education is directed toward culturally knowledgeable students who are well grounded in the cultural heritage and traditions of their community and are able to understand and demonstrate how their local situation and knowledge relates to other knowledge systems and cultural beliefs (p. 128).

This competence should be an outcome of well-designed place-based education. Regarding sustainability, the emphasis of cultural competence resides specifically on cultural relationships with the natural world, which include material interactions such as obtaining food from the land as well as more intangible connections such as spiritual beliefs about the natural world. Such competency on the part of both teachers and students allows for a deeper understanding of the history behind current challenges to sustainability and ways in which different economies and societies have addressed similar challenges.

In a pedagogy for sustainability that effectively integrates cultural practices with natural systems, acquisition of ecological literacy should go hand in hand with the development of cultural competency, creating eco-cultural literacy. Many indigenous cultures offer models for this kind of integration because such cultures throughout the world often lived—and in some cases continue to live—in long-term balanced relationships with bioregional environments (Berkes & Folke, 1998; Kroeber, 1953; Rappaport, 1984; Redman, 1999). These cultures offer many lessons about living well in natural places that should be included in education for sustainability (Armstrong, 2005; Bowers, 2001; Cajete, 1994). Such lessons involve sustainable ways to extract food and other resources from the environment, such as through intricate common property arrangements (e.g. Feit, 2001), detailed knowledge of local landscapes (Basso, 1996), and educational practices tightly wedded to these social-ecological relationships (Kawagley, 1995; Kawagley & Barnhardt, 1999).

6.1.4 Eco-justice Values

One of the primary ways that sustainability pedagogy is different from traditional environmental education is that it explicitly incorporates values. The field of environmental education has been attacked from its beginning by supporters of mainstream education who hold that environmental educators are simply environmentalists in disguise and are subversively indoctrinating youth with environmental values (Dawson, 1995; Jickling, 1992, 2003; Palmer, 1998). Rather than face these attacks head-on in support of so-called subversive values, the environmental education movement has by and large backed down and portrayed itself as a value-neutral approach to teaching youth about environmental issues without telling them how to think (American Forest Foundation, 2005). Education for sustainability cannot skirt this debate about values and instead must foster a discussion about what kinds of values are appropriate in education that is focused on fostering more sustainable communities that do not exploit natural systems beyond their limits. In fact, sustainability itself can be considered a value. Also, pedagogy for sustainability directly challenges supporters of formal education systems to defend the values implicitly embedded in our schools. For instance, many education theorists have critiqued public education for blindly supporting mainstream cultural assumptions concerning the appropriateness of the role individuals play as consumers in capitalist economies (Bowers, 2001; Kelly, 1999; Orr 1992). Shapiro (2006) summarizes,

It is a strange thing indeed that at this time of extraordinary human challenge our vision of education should seem so little related to the questions and concerns

that beset us as a society and as a community…where is the concern over the
absence of a critical and questioning attitude among young people towards the
violent, and often dehumanizing, world they are inheriting? Where is the
concern that our graduates lack a passionate commitment to eradicating poverty,
or making our world more just? Where are the public questions about whether
education is helping our young people to resist the materialism and greediness of
consumer culture? Where is the apprehension that young people are not finding
in their education some understanding of what it might mean to live an ethical
and purposeful life? Where are the public voices that wish to hold schools
accountable, not for failing to ensure requisite levels of test scores in math or
reading, but because education has lost all connection to nurturing democratic
beliefs, values, and behavior among young people? (p. xv)

Sustainability pedagogy addresses these ethical and moral questions as well as those regarding
how we are preparing our students and ourselves to evaluate our social systems in the face of
environmental crises such as those resulting from global climate change.

The field of critical pedagogy offers one way to address the place of values in
sustainability education, especially when combined with place-based education (Gruenewald,
2003). While there exists a variety of angles on critical pedagogy, most of them are rooted in the
work of Paulo Freire, who himself drew from Marxist ideology concerning liberation of the
masses from oppressive cultural forces (1970, 1995). Critical pedagogists focus on the role of
education in liberating or emancipating individuals through teaching them to be critical of all
assumptions and traditions (Giroux & McLaren, 1989), a process Gruenewald calls "cultural
decolonization." He suggests that place-based education complements this decolonization by
offering a way to "reinhabit" local places and encourages theorists and practitioners to work
together in creating a "critical pedagogy of place."

However, Bowers (1987, 1995, 2001, 2005) has strongly critiqued the framework of
critical pedagogy as a way to reform education to meet ecological challenges facing our society.
He asserts that critical or emancipatory pedagogy is rooted in the same Enlightenment
assumptions that it claims to critique, including the following: that the individual is the
fundamental social unit that processes information and makes decisions, that truth can only be
found through abstract, rational reasoning and can be generalized across societies and cultures,
that change is always progressive and leads to better societies, and that nature is simply a

backdrop to human societies. Because of these assumptions, critical pedagogy automatically rejects all forms of tradition as impediments to the liberation of the individual. However, for the purposes of living sustainably with Earth systems, there are many traditions embedded in indigenous cultures that we would be foolish to ignore for the sake of a misguided Enlightenment sense of progress. Bowers outlines what he calls eco-justice pedagogy to address the place of such traditions and values in educational systems (2001). Such a pedagogy should not automatically throw out any traditions in the belief that liberating the individual student will create a better society. Rather, it should provide a framework for evaluating which traditions are worthwhile and which ones should be modified or discarded.

While Bowers does not address the concept of sustainability in his pedagogy, his "educating for eco-justice and community" (2001) has much to offer sustainability pedagogy. Eco-justice brings an ethical component to pedagogy for sustainability. As an ethical concept, eco-justice links social justice with environmental justice through a moral framework, echoing the way in which sustainability links cultural and ecological systems. Eco-justice forefronts the ways in which exploitation of minority human populations has occurred hand-in-hand with exploitation of natural environments. Bowers explains, many

> …advocates of educational reform fail to recognize that any definition of social
> justice that does not take account of how human demands on the natural
> environment are affecting the lives of future generations is fundamentally flawed.
> Indeed, it seems incomprehensible to write about social justice for women,
> minorities, and the economic underclass without considering the ways in which
> the Earth's ecosystems are being rapidly degraded. Nor should any discussion of
> social justice be framed in a way that ignores how achieving greater access to the
> material standard of living that is today's measure of personal success depends
> on market forces that are appropriating the resources of non-Western cultures and
> displacing their traditional forms of knowledge… An extensive body of research
> shows that the victims of long-standing patterns of marginalization are the most
> adversely affected by the toxic by-products of consumer society (pp. 3-4).

In summary, not only does sustainability pedagogy need to address the types of values expressed by cultures other than mainstream industrial cultures; it also needs to incorporate some of those values, especially those of indigenous cultures with long relationships with the land.

6.1.5 Appropriate Assessment: Sustainability Standards and Indicators

One of the biggest challenges in sustainability pedagogy is appropriate assessment of learning. Scott and Gough (2003) differentiate between assessment and evaluation. "In essence, if assessment has a learner-learning focus, evaluation has a course or programme focus and is concerned with the measurement of effectiveness or quality" (p. 87). Typically, educational evaluation is limited to whether students have acquired a pre-determined understanding of content. In addition to addressing knowledge students need to create more sustainable ways of life, I am interested in how sustainability pedagogy can attend to the links between student understanding and community and ecological sustainability. Scaling from individual student understanding to community well-being could be considered an "educational footprint," a concept borrowed from Wackernagel and Rees's (1996) idea of an ecological footprint, or the ecological impact an individual's activities has on the planet. What kind of footprint does the education of an individual student have at larger ecological scales?

The challenge of authentic assessment is especially difficult given today's climate in formal education of standardized assessment, which has been institutionalized across the United States by the federal No Child Left Behind Act (NCLB). We measure student learning in this country by creating educational standards within different content areas at particular grade levels and then administering standardized tests to evaluate whether students have acquired this content knowledge. While critiques of this assessment process are abundant, the amount of government support for the majority of public schools is currently dependent on the results of such testing. Any pedagogy for sustainability intended for formal school settings must wrestle with this policy. When I began designing the EKCS gardening curriculum, I was advised early on that I should incorporate Alaska State Standards, especially for reading, writing, and math—the content areas currently being tested by the state—because teachers will find it more appealing to implement curriculum that clearly articulates how it will help their students meet state standards. However, I struggled with incorporating standards and associated grade level expectations into a curriculum designed with different goals in mind than teaching content knowledge mandated by extra-local policy agencies. This struggle illuminated the crux of the problem with depending on formal education systems to educate for sustainability.

In the components of sustainability pedagogy outlined above, there are several themes that are contrary to the way in which much of formal education is conducted. For instance, formal education treats individual students as the unit of analysis for evaluation, such that each

student is expected to master the same content knowledge. As Bowers (2001) points out, in many traditional societies, the individual is not the fundamental social unit. Also, content knowledge, such as ecological literacy, is only one component of sustainability pedagogy. Perhaps students can be evaluated individually for their mastery of such content knowledge, but how do we evaluate whether community-wide goals concerning sustainability are being addressed through education? This question is relevant not only to public education but also to sustainability education outside of formal schooling. Within formal K12 education, problems in assessment arise when the policy goals implicit in standardized testing are at odds with sustainability goals. Ideally, each school or district would set its own educational standards for sustainability. The remainder of this section provides examples of ways other organizations are attempting to develop educational standards and assessment for sustainability and then explores the possibility of using sustainability indicators for community-wide educational assessment.

Chapter 3 presented some examples of ways that two organizations have attempted to design sustainability education competencies—the non-profit Center for Ecoliteracy (Table 3.1) and the State of Vermont (Table 3.2). These initiatives have made a good start at articulating individual student knowledge and skills required for sustainability. However, they still rest upon the assumption that if individual students master these skills, the expression of these skills at the individual level will translate upscale to the level of communities and integrated social-ecological systems. The question remains of how to design and implement appropriately-scaled educational assessment for sustainability.

One example of an integrated attempt at multi-scale assessment is that of *The Place-Based Learning Portfolio* created and published by the non-profit Rural School and Community Trust (Williams, 2003). Portfolio-based assessment of student learning is being used as a complement to standardized assessments already at the EKCS and other schools as well. *The Place-Based Learning Portfolio* extends this concept of portfolio-based assessment to evaluate multiple aspects of place-based learning projects conducted in individual schools. It recommends three different "entries" for such evaluation—one at the student level, one at the community level, and one that assesses the long-term sustainability of the initiative. A completed portfolio includes a number of different types of "evidence" to demonstrate that certain project goals have been met. The authors are careful to distinguish this kind of evidence from legal evidence and also explain that evidence is not limited to quantitative data, though hard data such as test scores can be included as one piece of evidence in a portfolio. They write, "What matters is that the evidence is

relevant, representative, substantial, and easily understood. The evidence is meant to affirm your narrative and the impact of your work and it must support questioning, analysis, and reflection" (p. 6). Table 6.1 lists specific place-based themes and aspects requiring supporting evidence within the two entries of student learning and community learning. The appeal of *The Place-Based Learning Portfolio* is that the same project can be evaluated at multiple scales rather than being limited to student learning. However, it does not directly relate to pedagogy for sustainability but rather is focused on the place-based component of such pedagogy.

Table 6.1 Evaluative Themes at Student and Community Levels
(in *The Place-Based Learning Portfolio* Williams, 2003)

Student Themes for Evaluation	Community Themes for Evaluation
Student Intellectual Growth • Promotes deep learning about important content • Promotes student ownership and control	*Connections between School and Community* • Builds school-community connections • Addresses a community problem, issue, or interest • Honors the local culture
Academic Rigor of Project • Engages students in investigation, inquiry, and problem solving • Establishes clear and challenging learning goals • Enhances student learning through materials, resources, and support	*Process* • Welcomes the questions and complications that arise from the work • Builds access, communication, and trust
Authenticity of the Project • Addresses a real community need or interest • Helps students take on community roles • Engages students in real work that produces results • Develops students' appreciation and understanding of place	*Roles, Relationships, and Power* • Supports adults to take on new roles • Cultivates new leadership • Nurtures new relationships • Promotes shared responsibility and accountability
Assessment • Involves all participants in assessing learning • Relies on multiple sources of information to assess learning • Uses the results of assessment to facilitate learning	*Community Learning* • Leads to new community understandings • Engages adults in learning • Fosters a culture for learning

An evaluative framework that has emerged in recent decades to appraise the success of community-level sustainability initiatives is that of *sustainability indicators* (Bell & Morse 2000). Such indicators are either quantitative or qualitative measures of the sustainability of the system in question. For instance, if one is interested in the ecological health of a particular watershed, one indicator may be the level of contaminants in the groundwater. Similarly, if one is interested

in the economic health of a small town, an indicator may be the employment rate in the town. In the arena of education, indicators such as high school drop out rate are often employed as a measure of the success of a particular school or district. Indicators are most useful when they are implemented in a long-term monitoring program, because the change in value may be indicative of a system moving towards greater or lesser sustainability. This concept of indicators could be a useful way to approach the multi-scale evaluation of initiatives in sustainability education. For instance, Scott and Gough (2003) write, "[A]ssesment outcomes should be expected to feature as part of evaluation reports. One indicator of the quality of any intervention intendd to result in learning is how well the pupils, students, or trainees did" (p. 87). Using sustainability indicators in education would require that a representative group of stakeholders—such as teachers, administrators, parents, and students—collaborate to identify relevant indicators that sustainability education is meeting its goals. These indicators could fall within the components outlined above—systems thinking, place-based and problem-based approaches, ecological literacy and cultural competence, and eco-justice values.

6.2 Sustainability Pedagogy and the EKCS Gardening Curriculum

In this section, I again return to the action research project that I conducted with the Effie Kokrine Charter School and discuss how the gardening curriculum demonstrates this sustainability pedagogy. Designing the curriculum and identifying key components of a guiding pedagogy were concurrent processes. These pedagogical components emerged as I struggled to find a way to articulate a rationale and framework for why I designed the curriculum the way I did.

Systems thinking is reflected in multiple ways in the gardening curriculum, just as it is in the Spiral curricular framework for the EKCS as a whole (Appendix C). My dual objectives regarding systems thinking were to both integrate students within the system under consideration—the socio-ecological food system of Interior Alaska—and teach students how to think systemically. I tried to meet both of these goals at once by designing activities to teach students about their own role in their food system. Chapter 2 of this dissertation characterizes the food system from my perspective. In a curriculum to teach students about this food system, I included activities in which the students themselves start to characterize this system from their perspectives. Many of these activities are drawn from a curriculum designed by researchers at Cornell University called *Discovering the Food System* (available at

www.foodsys.cce.cornell.edu, Accessed November 2007). In addition to learning about their food systems, students undertaking this Interior Alaska gardening curriculum also learn to be agents of a complex adaptive system, in which they work together as a learning community to plan, plant, and harvest a garden. Not each student has the same job and learns the same content knowledge; rather, they learn together.

The EKCS gardening curriculum also draws from both place-based education and problem-based learning as components of sustainability pedagogy. The curriculum offers a way to connect students with their places through food that they grow themselves and then prepare and eat together. What we eat is one of the most fundamental interactions humans undertake with the natural world. There are several examples in the EKCS gardening curriculum (Appendix A) of how place is used, such as taking students to Howard Luke's camp or a similar community site to conduct gardening activities and asking students to conduct research on their local food systems and growing conditions. Similarly, gardening education is problem-based education. How do we feed ourselves, our families, and our communities without taxing the limits of our local food systems? These are sustainability challenges that students learning through a place-based gardening curriculum can take on as part of their learning process.

In this Interior Alaska gardening curriculum, eco-cultural literacy is a key learning objective. Gardening provides an excellent way to learn ecological principles generally and those of specific areas particularly, as students must become familiar with local climate and ecosystems, especially characteristics concerning soils and potential pests. Organic gardening and sustainable agriculture are especially apropos for learning about local ecology because a gardener using principles of sustainable agriculture must have a deep understanding of how to reliably produce quality crops with minimal damage to the local environment. In Interior Alaska, the primary indigenous culture is Athabascan, though many others are also represented at the EKCS, as is Euro-American. But because this curriculum is intended to be culturally appropriate in addition to creating sustainable food systems, special attention is given to local Athabascan culture. My fieldwork involved working with and learning about the gardening experiences of local elder Howard Luke, which I incorporated into the design of the gardening curriculum. There could be many other ways to incorporate Native knowledge of gardening and food systems into this curriculum as well. However, beyond just including the content about Howard's experiences, the curriculum also attempts to teach using an Athabascan approach to education, which emphasizes practical skills and an intimate knowledge of local environments.

Eco-justice values are expressed multiple ways in the EKCS gardening curriculum. First of all, one of the objectives of the curriculum is improving community food systems in a way that pursues greater food security for students and their families. Food security is fundamentally an eco-justice issue. Just as with the impacts of many other environmental abuses that Bowers mentions, food insecurity is often most prevalent among underprivileged communities, such as many rural Alaska communities with high percentages of Alaska Natives. Second, this gardening curriculum provides a way to address cultural values associated with indigenous Alaskan cultures. One of the goals of the EKCS as a whole is to teach through a culturally-appropriate curriculum, which includes students learning and implementing cultural values. The school is supporting the process recommended by Bowers in which the EKCS community is evaluating which Alaska Native cultural values are still relevant in today's world. Elders play a primary role in this process, as the cultural standards adopted by the Alaska State Department of Education and Early Development were developed by a team of Alaska Native Elders and educators from around the state (Boyer, 2006). This incorporation of cultural values is reflected in the EKCS gardening curriculum through the involvement of Athabascan Elder Howard Luke in the curriculum as well as through the correlation of various units and activities to cultural standards.

The current EKCS gardening curriculum does not fully address multi-scale evaluation. The assessment style suggested within each unit is based upon a framework known as *teaching for understanding* or *understanding by design* (Wiggins & McTighe, 1998), in which students are asked to perform authentic performance tasks to demonstrate their understanding of the learning goal for the unit. I also had the original goal of incorporating Alaska State Standards within the gardening curriculum in order to attempt integration of Western and indigenous pedagogies. However, because I designed the units based upon broader goals for the entire curriculum, standards were difficult to incorporate in the appropriate places and at appropriate scales. Some of the standards, such as those in the content area of science, are extremely specific, while others, such as cultural or technology standards, are broader and therefore easier to apply to a wider range of learning activities. The draft curriculum presented in Appendix A includes incomplete, preliminary attempts to incorporate standards. Besides more fully incorporating standards, the next step for planning how to evaluate this curriculum as effective sustainability education would be to outline sustainability indicators, which could also be thought of as outcomes. This would be an important arena in which to conduct additional research on sustainability pedagogy.

6.3 An Action Research Addendum for Higher Education

Because this pedagogy emerged primarily from the process of collaboratively designing a junior high level curriculum, it is most relevant to a public K12 school setting. This addendum suggests some considerations necessary for applying sustainability pedagogy to higher education, specifically regarding teacher education and sustainability research. I suggest that graduate students in these types of programs should receive training in action research. This pedagogy has already been influenced by my own participation in two separate graduate programs with focuses in ecological sustainability but with different approaches, the first being my Master of Arts program in Earth Literacy at Saint Mary-of-the-Woods College (www.smwc.edu) and the second being my current PhD program in Resilience and Adaptation (RAP) at the University of Alaska Fairbanks (UAF) (www.rap.uaf.edu). Broadly, the Earth Literacy program is based at a small liberal arts college, while UAF is a research institution. The Earth Literacy program attracts a wide variety of professionals, many of whom already have careers in education or other social service field and are looking to expand their own ecological literacy. On the other hand, RAP is designed for academics and researchers interested in conducting research on sustainability issues. Both programs include such techniques as team-teaching of interdisciplinary courses, but the resulting masters and PhD projects are quite different.   For instance, I did not write a thesis for my master's project but rather wrote a manuscript for young adults on the natural history of the Appalachian Trail. My research involved hiking the Appalachian Trail and employing naturalist skills in observation and interpretation.

Both of these programs already employ some but not all of the above suggested components of sustainability education. Additional potential components should be considered in programs of higher education depending on the other goals of such programs. One of the most relevant applications of this pedagogy in higher education would be in teacher preparation programs. A teacher preparation program with a sustainability focus should train teachers not only on concepts of sustainability but also on how to educate for sustainability. The Earth Literacy program is a good example of this approach. However, at the graduate level, teachers should also be exposed to the framework of action research, and anyone doing sustainability research should consider participatory action research as a way to approach their work. Action research has become an accepted approach in education research, especially concerning teachers as researchers in their own classrooms (Sagor, 2005; Spindler & Hammond, 2006).

As a research framework, action research reflects many of the same philosophical orientations as those delineated above as components of sustainability pedagogy. For instance, action research employs a systems focus, especially in terms of human systems dynamics (Eoyang, 2001). Both the primary researcher and other participants in action research are involved in a learning community that operates as a complex adaptive system. Action research also focuses on specific problems in specific places, mirroring the place-based and problem-based components of sustainability pedagogy. Action research may not always require ecological literacy and cultural competence from each of the participants; however, because it often focuses on complex problems rooted in specific places, an understanding of the ecological and cultural context of the problem on the part of the primary researcher may be appropriate. Certainly in research related to sustainability issues, the transdisciplinary nature of action research becomes attractive because it is not rooted in natural or social science specifically. Regarding eco-justice values, action research is also appropriate to sustainability research because it embraces and employs the reality that researchers have subjective values that they bring to the research context (Greenwood & Levin, 1998). Many times, action researchers are interested in improving quality of life for underprivileged communities in much the same way that sustainability pedagogy must include a justice component. Finally, in much the same way that sustainability education must develop appropriate assessment and evaluation techniques, action research requires a careful consideration of what constitutes rigor and validity in research (Herr & Anderson, 2005). In conclusion, I recommend action research as a component of higher education programs focused on sustainability education and/or research.

6.4 Conclusion

This conclusion chapter presents a preliminary framework for sustainability pedagogy that emerged out of the process of curriculum design. I intend to continue to develop both the gardening curriculum and the pedagogy for sustainability in my work. Because there are both practical and theoretical components of this work, there are many directions it could take. For instance, the next cycle of this research might involve developing an evaluation protocol for the EKCS gardening curriculum based upon this pedagogy. This protocol would also require the identification of sustainability indicators for the integration of education and food systems in Interior Alaska. More broadly, this pedagogy could be used to suggest sustainability standards for local Alaska school districts or for the State of Alaska.

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Appendix A
EKCS Gardening Curriculum

Introduction
by Laura Henry-Stone

The following gardening curriculum is a design that emerged from working collaboratively with EKCS teachers and students in 2006 and 2007 on educational gardening and food activities. This process included my volunteering and substitute teaching at the school, as well as interviewing teachers and students and some other community members involved with the EKCS. I also worked extensively with Howard Luke at his camp, from taking students there to plant his garden to maintaining his garden for him to inviting him to the school to share stories with students.

Hence, the curriculum is tailored for a school with EKCS's educational philosophy and methods as well as its student body. Specifically, it reflects a place-based learning approach that emphasizes diverse intelligences and learning styles among students. These are characteristics of an Alaska Native approach to education as well as those of an emerging field known as sustainability education, or education for sustainability, which my research concerns. I believe that a gardening curriculum is an ideal way to integrate the goals of place-based, culturally-relevant, and ecological education. For instance, gardening can teach students caretaking skills that they can apply to their own families and communities. The flexibility in the curriculum of a charter school like EKCS has offered the opportunity to explore what is possible with such a gardening curriculum, but I hope that it can be adapted to any junior high school in Interior Alaska with similar goals concerning Alaska Native and/or sustainability education. The curriculum reflects an approach to sustainable agriculture in Interior Alaska, for reasons explained in the background sections of some sections of the curriculum.

The vision I had for this curriculum has changed multiple times since the time I first became interested in the project. In the summer of 2005, I worked for [Boreal Farm] as the Youth Garden Supervisor at the former Howard Luke Academy. When this school became the site for the EKCS, I was excited to work with the new charter school, which I had been following with interest. I initially thought I would focus on integrating Boreal's youth gardening program into the new school's Spiral curriculum. However, that initial vision changed with time as I began volunteering in Sheryl Meierotto's classroom and working with her students in the fall of 2005. In January 2006, I helped her design and teach a three-week module on the boreal forest to gain experience and insight into how the new EKCS curriculum was being put together. I began envisioning designing my own gardening curriculum rather than integrating gardening with the Spiral curriculum.

The EKCS Academic Policy Committee approved my proposal to work with EKCS on gardening curriculum in February 2006. In the spring and summer of 2006, I continued to work with Sheryl and her students on various gardening activities, integrating some of them into her module in May 2006. As part of this module, we went to Howard Luke's camp to plant his garden and then planted new garden boxes behind the school's Elders' Room. Later in the summer and in the fall, I also volunteered and presented in some of the high school classes on gardening and local food systems. In the fall of 2006, I followed up with interviews with EKCS teachers and others asking

for input on a gardening curriculum design for the school. I also held two garden meetings to talk about garden planning priorities for the next year. Finally, in the spring of 2007, I interviewed a selection of EKCS students who had gardened at the school in various capacities, including some of the students I had worked with as well as some who had worked for Boreal Farm. I shared a draft of the curriculum with three EKCS teachers in the summer of 2007 and got feedback from them. All of these activities, as well as periodic conversations with Sheryl and other teachers about my work, have led to the design of this curriculum.

Another changing situation that has affected the development of this curriculum has been the shifting school year calendar at EKCS. Because the students' school year at EKCS initially included six weeks during the summer, I was excited about the ability to work with students during the gardening season as part of their class work. However, after the 2006 summer, the EKCS board decided to eliminate the six weeks of classes during the middle of the summer, hence changing my initial ideas for this curriculum as well. Because the EKCS school year now reflects a more traditional school year, the curriculum has had to adapt as well. This has had multiple effects, in some ways forcing the curriculum to be more flexible and hence more accessible to other teachers, but also helping me realize that the traditional school year in Interior Alaska offers real impediments to school gardening, making creative programs like Boreal's more favorable.

There are many different forms that a curriculum can take. One of the hardest decisions for me to make was to pick what kind of curriculum this would be and who would be its audience. Some suggested that I put together a series of gardening and food system activities that could be taught as a three-week module. However, gardening does not fit into three weeks. I could have instead designed a curriculum resource that mimicked other types of popular environmental education curriculum such as *Project Learning Tree* that any teacher could adapt into their classroom. But there are many such garden curriculum resources out there already, though most of them are not tailored to Alaska's growing context. What I settled on was creating a curriculum for an idealized gardening program in which I and/or another teacher(s) could work with a particular group of junior high students through the entire gardening season. The audience for this draft curriculum is any teachers in Interior Alaska or elsewhere interested in place-based or environmental education.

The curriculum includes several units involving garden planning, planting, maintenance, and harvest, as well as "bigger picture" topics such as community food systems and sustainable agriculture, and related skills such as nutrition and food preservation. Hence, the curriculum does not detail specific activities to be conducted in a linear order, but rather provides annotated resources for each topic area.

Overarching understanding goal for curriculum

Students will understand that gardening not only produces high quality food for themselves and their families and communities but also teaches important lessons about living in a healthy relationship with the land.

This curriculum is designed to use gardening as a vehicle for giving students the knowledge and skills they need for fostering healthy, sustainable communities through making informed choices about food.

Suggested timeline for implementing gardening curriculum

April, Intro to Gardening (2-3 weeks)	*Academic emphasis*
Unit 1: Sustainable Agriculture	History, Social Studies
Unit 2: Gardening in Interior Alaska	History, Social Studies
Unit 3: Garden Planning and Seed Starting	Biology, Ecology

June, Garden Planting (2-3 weeks)	
Unit 4: Soil Preparation	Biology, Chemistry, Math
Unit 5: Transplanting, Seeding, and Cultivating	Botany, Ecology, PE
Unit 6: Pest Management	Ecology

August-September, Garden Harvest (3-4 weeks)	
Unit 7: Food Systems	Social Studies, Geography
Unit 8: Nutrition, Cooking, and Preserving	Skills for Healthy Living
Unit 9: Composting	Ecology, Chemistry

Resources

The following resources have been extremely helpful in putting together this curriculum. There are many more, but these are these are the ones I would recommend for using in a school garden program.

Curriculum:
- *The Growing Classroom,* 2007 edition, published by a California-based program called Life Lab. Available for $39.95 at www.lifelab.org. Targets grades K-6 but can easily be adapted to junior high level. An excellent resource for multiple topics, not just gardening.
- *French Fries and the Food System,* published by Boston-based program called The Food Project. Available for $24.95 at www.thefoodproject.org. This book evolved out of their work employing youth in gardens during the summer, so it targets older students but can be adapted to younger ages.
- *Discovering the Food System,* an online curriculum published by Cornell University's at http://foodsys.cce.cornell.edu/. This is a free curriculum downloadable as one large PDF file or several smaller ones. It targets high school students.

Local:
- Calypso Farm and Ecology Center, 451-0691, www.calypsofarm.org.
- University of Alaska Cooperative Extension Service (CES) and Master Gardener Program; http://www.uaf.edu/ces/ or (907) 474-1530 for the Tanana District located in Fairbanks. CES Publications list (many free PDF's available): http://www.uaf.edu/ces/publications/anrpubs.html#fsg
- Nurseries and greenhouses in Fairbanks, such as The Plant Kingdom (457-5268), Ann's Greenhouse (479-6921), and Holm Town Nursery (451-8733). Of these, The Plant Kingdom is the only one that grows organic plants and hence reflects a philosophy of ecologically-sustainable agriculture.

Internet:
- National Gardening Association has a special site devoted to gardening with kids, called KidsGardening (www.kidsgardening.com). It has multiple online articles and resources, as well as a store with a variety of curricula and other supplies.
- USDA has a website on Sustainable Agriculture Resources for K12 Teachers at http://www.nal.usda.gov/afsic/AFSIC_pubs/k-12.htm.

Background Reading:
- *How to Grow More Vegetables*, by John Jeavons, 6th edition, Ten Speed Press: Berkeley, 2002. This is a good how-to guide for gardening using a sustainable agriculture method called "biointensive." Calypso Farm uses many of these techniques. It includes background information that could make good reading material for students as well.
- *The Unsettling of America*, by Wendell Berry. This is a classic from 1977 in which Berry discusses the ecological and cultural problems with industrial agriculture. It is probably not accessible for junior high students, but teachers may find it good background material.
- *The Omnivore's Dilemma*, by Michael Pollan, 2006. This book quickly became a bestseller and has helped stimulate much of the current interest in food systems. In this book, Pollan defines and explores four different types of food systems. Much of this material is suitable for junior high students, and whole sections of his book can be assigned for reading.
- *Bringing the Food Economy Home: Local Alternatives to Global Agribusiness*, by Helena Norberg-Hodge, 2002. This is a clear and concise book examining the problems with global agribusiness and ways to promote local food systems.

Videos:
- *The Living Land*, by John Jeavons. Distributed by Foundation for Global Community. 1999. 27 minutes. This one would be appropriate for showing to junior high students.
- *The Future of Food,* www.thefutureoffood.com. 2004. $25. From the website: "Shot on location in the U.S., Canada and Mexico, THE FUTURE OF FOOD examines the complex web of market and political forces that are changing what we eat as huge multinational corporations seek to control the world's food system. The film also explores alternatives to large-scale industrial agriculture, placing organic and sustainable agriculture as real solutions to the farm crisis today."

Additional:
- Please see attached table of resources, also available at www.kidsgardening.com.

Unit 1: Sustainable Agriculture

Understanding Goal:
Students will understand that there are different kinds of agriculture, and that sustainable agriculture takes into account cultural, ecological, and economic characteristics of the specific place where it occurs, in this case Interior Alaska.

Performance Task:
Students will work together to create a model of a small-scale farm or garden appropriate to Interior Alaska and describe how it is different from a large-scale corn field or cow farm in the US Midwest.

Background Information:
Sustainable agriculture is an approach to growing and producing food and fiber that has emerged as a movement in the last several decades. It provides an alternative to the model of *conventional agriculture* pursued by large *agribusiness* ventures. Many people are concerned that *large-scale industrial agriculture* has exploited environments beyond a healthy state through occurrences such a loss of top soil through *erosion* and contamination of water and soil through overuse of chemical *fertilizers*, *pesticides*, and *herbicides*. There are many names for or versions of sustainable agriculture, including *organic agriculture*, *ecological agriculture*, *permaculture*, and *small-scale agriculture*. While these all have slightly different emphases, the unifying goal of sustainable agriculture is to produce food through agriculture that maintains or improves the health of local and global environments. Sustainable agriculture relies on a concept of *sustainability*, in which human activity exists in appropriate balance with the ecological systems of which it is a part and takes into account impacts on future generations of humans and their ecosystems. Organic agriculture tries to accomplish this balance by eliminating the use of synthetic fertilizers, pesticides and herbicides but does not necessarily take into account other concerns of sustainable agriculture, such as excessive energy use and soil erosion.

What constitutes sustainable agriculture depends on the characteristics of a specific place. Alaska has its own interesting agricultural history, and sustainable agriculture in Interior Alaska must take into account unique *ecological*, *economic*, and *cultural characteristics*. In this and the next unit, students will develop an understanding of the goals of sustainable agriculture generally and apply those to agriculture in Alaska. This will in part require an examination of the history of agriculture in Alaska to explore what has worked and what has not both ecologically and economically. Students will also need a basic understanding of the ecology of Interior Alaska, especially concerning factors such as climate and soil characteristics that most influence agriculture. Cultural concerns regarding appropriate agriculture will be addressed more thoroughly in the next unit on Gardening in Interior Alaska. This unit provides background information to prepare students for understanding how their school garden relates to a sustainable approach to agriculture.

Terms:
1. Agriculture
2. Sustainability
3. Sustainable agriculture
4. Organic agriculture
5. Permaculture

6. Industrial or conventional agriculture
7. Fertilizer
8. Pesticide
9. Herbicide

Activities:
1. Read about the American Dust Bowl. Summarize the reasons why this ecological disaster happened and how it contributed to the Great Depression.
2. Conduct a brief investigation into the history of specific types of agricultural products as a window into the history of agriculture. Students can use the internet or other resources to put together a timeline of the development of a specific type of food or fiber that is grown in Alaska. The University of Alaska Cooperative Extension Service has a list of plants that can be cultivated in Alaska. Questions to explore could include the following: What is the plant or animal's original source from the natural environment? Where is it most commonly grown now? What kind of climate does it like, especially growing season, temperature, and rainfall requirements? Brainstorm other questions with students related to the ecology, economics, and history of producing their food or fiber item.
3. Visit Calypso Farm and Ecology Center for a tour of the farm or arrange to have someone from the farm visit the classroom and guide students on a tour of the EKCS garden. While Calypso is not the only sustainable agriculture initiative in Fairbanks, they are the only non-profit with the mission of educating the public about this form of agriculture. They have regularly-scheduled field trips for elementary students. For a junior high group, a special tour with a focus on sustainable agriculture should be arranged. Students should come prepared with questions about why Calypso grows food the way it does. One idea could be to assign each student or pair of students a specific vegetable to investigate and then report findings back to the rest of the class upon return to the classroom.
4. Conduct a group discussion on the climate and ecology of Interior Alaska, focusing on limiting factors such as light and temperature that restrict how plants and animals survive here. This activity can draw upon other lessons from other units in which students may have learned about the ecology of Interior Alaska. Students can pretend to write an email to a pen pal in another state or country in which they describe the ecological characteristics of their home. What trees grow here? What animals live here? How do they adapt to the long winters and short summers? What are some of their favorite outdoor places and why?
5. Watch *The Living Land* video or PBS videos on sustainable agriculture.
6. Read about sustainability (in John Jeavons' book).
7. Explore health risks from pesticides in the food chain by using an activity such as "The Pesticide Banquet" from *French Fries and the Food Syst*em.

Unit 2: Gardening in Interior Alaska

Understanding Goal:
Students will understand the role that gardening has played in Fairbanks and other Interior Alaska communities over the last hundred years, and what the status of gardening is now.

Performance Task:
Students will work in teams to present a written or oral report (or PowerPoint or iMovie) on a topic concerning local gardening. Topics could include Calypso Farm and Ecology Center, the Fairbanks Community Garden, Howard Luke's (or another elder's) garden, Creamer's Dairy, gardening in the villages from which the students' families come.

Background Information:
Small-scale gardening has been a part of home and community life in Interior Alaska for a long time. Cultivating home garden plots may not have existed among Athabascan communities before contact with Euro-Americans; nomadic family groups gathered their fruits and vegetables from the land instead. In the late 1800's, gold miners and missionaries brought the practice of home gardening with them to Alaska. As more permanent Athabascan communities grew up around missions and trading posts, many Native families took up gardening to supplement their wild harvest as well. For many decades, before shipping became affordable and stores began stocking fresh produce, wild harvest and gardening were the only ways for rural Alaskans to procure fruits and vegetables.

In this unit, students will learn about the practices of wild harvest and gardening in Interior Alaskan communities, both in rural villages and in Fairbanks. If agriculture can be considered a commercial enterprise, gardening can be considered more similar to a traditional subsistence activity, as it is usually done for home or community consumption. School gardens can be an opportunity to teach traditional Athabascan values, such as self-sufficiency, hard work, care and provision for the family, sharing, village cooperation, respect for the land, and respect for nature. In order to make this cultural connection, many activities suggested below involve interacting with an Athabascan Elder. All of the activities are primarily hands-on.

Terms:
1. Interior Alaska
2. Growing season
3. Climate zone map

Activities:
1. Interview a local Athabascan Elder about gardening. Brainstorm questions with students beforehand, focusing on how the elder learned to garden, what kinds of things he or she grows or used to grow.
2. Assign students different books written by Alaska Natives and ask them to find information about harvesting wild plants or gardening in various stories. There is not a lot of documentation of the practice of gardening in Alaska Native communities, so this activity will give students a chance to investigate the historical record for the few existing references.
3. Help an Elder plant his or her garden. In Fairbanks, visit Howard Luke's camp to help him plant his garden.

4. Invite an Elder or other community member to take students on a nature walk to identify wild plants that have different traditional uses, and if appropriate, harvest some samples. Assign a specific plant to each student or pair of students for them to research in greater depth, including the various Native, English, and scientific names for the plant.
5. In Fairbanks, visit the Fairbanks Community Garden or invite the garden manager to give a presentation in class about how the community garden works.
6. Invite a Master Gardener to class to give a presentation on the practice of gardening in your community.
7. Create a climate zone map of Alaska based on USDA plant hardiness map at http://www.usna.usda.gov/Hardzone/alaska.html. See "Frost and Planting Dates" in *French Fries and the Food System* for more an activity related to this.

Unit 3: Garden Planning and Seed Starting

Understanding Goal:
Students will understand how to plan a garden, including choosing what to plant, getting the supplies, and starting seeds.

Performance Task:
Students will work together with teachers to plan the garden, buy supplies, and start seeds.

Background Information:
This is a challenging unit to schedule according to what else is going on in the school's curriculum because the timing of garden planning and planting has to correlate with what is going on outdoors rather than what is happening in the classroom. In addition, the basic activities of planning and planting are probably not comprehensive enough to generate enough material as a stand-alone academic unit without supplementary material. Hence, these activities could either be integrated into other units at appropriate times, or they could be supplemented with material and activities from other units in this curriculum, such as those in the background units, or with plant and soil science activities, to make a more complete module. The main goal of the activities in this unit is practical—the planning of a garden.

In the spring, garden planting is generally determined by the last *frost date*, which is the date that on average marks the latest occurrence of overnight frost, after which plant starts can safely be transplanted outside. In Interior Alaska, common wisdom holds this date to be June 1st. However, there are local variations in climate, or *microclimates*, that may make some places colder longer or warmer earlier. For instance, on a south-facing slope, especially if garden beds are protected by plastic, the frost date could be much earlier. But to be on the safe side for schools in Interior Alaska, teachers can use the June 1st frost date.

For starting seeds in classrooms, garden planning happens backwards from the frost date. Most vegetables that can be grown in Interior Alaska need at least 4-6 weeks to germinate and grow to a suitable size to transplant to gardens. These include broccoli, cabbage, cauliflower, kale, kohlrabi, summer squash, winter squash, and head lettuce. Other vegetables that teachers may want to plant are best procured as starts from commercial farms or greenhouses because they need more time in a greenhouse, such as tomatoes, peppers, and onions. Finally, there are several vegetables that can be started as seeds directly in the ground after the last frost date. These include leafy greens such as spinach, leaf lettuce, and other salad greens; root crops such as radishes, carrots, beets, turnips, and potatoes; and peas and beans. (Much of this information can be found in documents published on the website of the Cooperative Extension Service at the University of Alaska Fairbanks.)

The basic supplies needed for starting seeds include the following: seeds, seed-starting soil (can purchase or make your own if you have ingredients), plastic or peat starter packs, flats or trays, growing lights (these are not absolutely necessary if you have direct daylight for 8-10 hours, but they help immensely), watering spritzer and can. If your goal is to emphasize ecologically healthy and sustainable gardening techniques, then you should try to obtain organic seeds and soil; however, this may not be feasible for you and your school, and the main goal is, after all, to plant a garden. You can discuss trade-offs with students and make it a learning activity.

Students can be involved in garden planning in a number of different ways. Ideally, they will be involved in every stage so that they learn necessary planning skills for their own garden and so they can understand the process from beginning to end. This kind of involvement increases student ownership in the garden as well. However, there are probably some elements of infrastructure and curriculum planning that are above the level of the students. At the least, students can help plan what to plant in the garden each year and where to plant it. Unfortunately, most school districts in Interior Alaska end their school year before June 1, which means that students may be able to start seeds in their classes but cannot be easily involved in school garden planting as part of their classes However, some ideas and initial preparation relevant to planting are discussed here.

Terms:
1. Frost date
2. Seed pack
3. Flats
4. Plant starts
5. Transplant

Activities:
1. There are several activities in *The Growing Classroom* and other curricula that involve planning, such as ordering seeds in "Zip Code Seeds" and planning a garden in "Inch by Inch, Row by Row." Zip Code Seeds describes a process for ordering seeds from a catalog, which is a good choice if you want to use organic seeds, but it requires ordering seeds several weeks in advance of seed-starting.
2. *French Fries and the Food System* also has an excellent unit on garden planning, leading students through several lessons, called "Garden/Farm Planning Unit."
3. Students can also research the average late frost for Interior Alaska, such as using data from the National Weather Service or by interviewing local gardening experts, in order to plan when to start seeds and plant outdoors.
4. If there are other community members involved in the school garden, they could be invited to the school to work with the students in planning the garden, especially Elders or family members.
5. Seed starting: Again, there are several good activities in *The Growing Classroom* that provide detailed instructions for leading students through seed starting, such as "So What? Sow Seeds!" The UAF Cooperative Extension Service also has a publication on seed starting online at http://www.uaf.edu/ces/publications/freepubs/HGA-00032.pdf. Before buying supplies, allow students to provide input in what they want to plant and then allow them to research what supplies they need for planting.

Unit 4: Soil Preparation

Understanding Goal:
Students will understand how to prepare soil as the necessary foundation for a healthy and sustainable garden.

Performance Task:
Students will demonstrate how to prepare garden soil while explaining how each step relates to soil fertility.

Background Information:
Soil health is key to a fertile and sustainable garden. In conventional agriculture, soil is often treated as nothing more than a medium for growing a monocrop, or a place to put the chemical fertilizers that contain the nutrients that the crop needs. Irresponsible soil management can result in such problems as erosion of topsoil, the thin layer at the top of the earth that contains many nutrients and organic material, or humus. In sustainable agriculture or small-scale gardening, the soil is treated as a living system that supports the plants that grow in it. The role of a responsible gardener with a long-term perspective is to nurture the health of this living system. In addition, in a school garden setting, treating soil as an ecosystem allows students to learn principles of ecology, such as interdependence.

Soil fertility in Interior Alaska is a special challenge because most local soils are of poor quality for gardening. Topsoil is usually very thin and low in nutrients and humus. It can also be cold and acidic, thanks to the permafrost underlying much of the region. Hence, gardeners in Interior Alaska almost always have to add something to their soils to improve their health and use creative means for warming up the soil. Rather than adding chemical fertilizers that do not have a long life in the soil, a gardener can use many options for sustainably improving soil fertility. These include composting and adding soil amendments from natural sources. For instance, rural gardeners often added fish scraps to their gardens to add nitrogen to the soil.

The primary purpose of this unit is to give students the skills and understanding they need to be garden soil caretakers. Many of these activities can and should be done in the spring to prepare the garden beds for planting. However, building your own compost for your garden is one of the best ways to improve soil fertility. Composting can be done any time of the year, but the process for making it will vary depending on the time of year. More specifics of composting will be discussed in the fall composting unit.

Terms:
1. Soil fertility
2. Topsoil
3. Humus
4. Erosion
5. Soil amendments
6. Clay
7. Sand
8. Silt
9. Macronutients
10. Micronutrients

Activities:

1. First, students should learn about the composition of soil through some hands-on activities. Two good soil activities in *The Growing Classroom* are "The Nitty-Gritty" (learning about soil components—sand, silt, and clay) and "Living in the Soil" (making a soil mixture). From *French Fries and the Food System*, "The Great Soil Puzzle" also teachers about soil components.

2. Being a good gardener means becoming very familiar with the contents of your own soil. Students should not only examine the visible components of their soil but also conduct a soil test for nutrient composition. As part of this activity, they should research what kinds of nutrients plants need. After testing their own soil, they can then make a plan for how to add necessary nutrients to their soil. A good resource to guide students through soil testing is "Soil Doctors," from *The Growing Classroom*. Any soil testing requires a soil test kit. For more extensive analysis, you may also send soil samples to labs. For more information, contact the Cooperative Extension Service.

3. Once soil exploration and testing is conducted, students are then ready to think about how to improve their garden's fertility. This can be done in several ways, including adding compost and amendments to the soil, as well as through rotating crops from one season to the next so that nitrogen-fixing plants such as peas can add nitrogen to soil around the garden.

    a. While composting can be done any time of the year, the best time to build an outdoor compost pile is in the summer or fall, when there are plenty of fresh green plants from weeds or garden harvest waste to add to a pile. However, for composting in the winter and spring, worm composting is an excellent option. Students can make compost in the spring unit and add it to their garden before planting. The UAF Cooperative Extension Service has an excellent publication on composting with worms.

    b. *The Growing Classroom* has an activity called "Compost Bags," which leads students through the process of making compost through anaerobic decomposition, which is different from the aerobic process used outdoors. Students mix ingredients into a garbage bag, seal it shut, and leave it for a month to decompose.

    c. Even with good compost and crop rotation, Alaskan soils may still need additional soil amendments, especially in the early years of a garden. There are many traditional ways that rural people used to fertilize their gardens, such as burying fish scraps in their gardens for nitrogen. Students can explore these traditional methods by interviewing an elder or other local gardening expert and then creating a report or an instruction sheet on using a particular method. They can then try these methods in their garden.

    d. There are also commercial soil amendments available in Fairbanks. These are similar to chemical fertilizers but come from natural sources. Commercial chemical fertilizers always contain the three macronutrients of nitrogen (N), phosphorous (P), and potassium (K). Many amendments are sold with all of these nutrients as well, but some offer primarily one of these. Students can compare chemical fertilizers to natural soil amendments and make a plan for how to add these to their soil and in what proportions. This can be a math lesson. It can also be a science experiment, if students want to compare different types of fertilizers and amendments.

4. Students can explore methods of warming soil, which is necessary in Alaska's cold climate. Various methods exist, such as raised beds, boxes, cold frames or tunnels. The UAF Cooperative Extension Service has publications and resources on each of these methods. If they do not already have boxes or raised beds, students can make a plan for building them.
5. Bed preparation.

Unit 5:
Transplanting, Seeding, and Maintaining the Garden

Understanding Goal:
Students will understand how to plant a garden through both transplanting seedlings started indoors and through seeding directly in garden beds, and then how to maintain a garden during the growing period.

Performance Task:
Students will work together to put in and maintain their garden.

Background Information:
Many times, gardening with students gets no farther than showing them how to plant things in the ground. However, actually putting plants and seeds into the ground is an intellectually small component of the whole gardening process. At the junior high level, students can and should be given more responsibility for planning and planting the garden. Hence, all of the preceding units have been preparation for this moment, while this unit focuses primarily on the practical objective of putting in the garden. The amount of time needed for this objective varies depending on the size and variety of the garden and on the number of students involved. Once the garden is planted, maintenance involves watering and weeding and re-seeding when necessary. The teacher and students will have to work together to create a maintenance schedule for this time period. Additional suggested activities during this unit include botany and ecology lessons that provide students with more in-depth understanding of plant biology through gardening.

Teacher background knowledge required for this unit is primarily practical knowledge of gardening. But if a teacher does not have this knowledge, there is probably someone close at hand who does and who would be happy to help. The UAF Cooperative Extension Service has some information as well. Again, if you are embracing a sustainable or organic agriculture model, there are some additional things to know about what kinds of techniques are better, such as using seeds that have not been treated with fungicide, as most commercial non-organic seeds have been. Many of the suggested resources on sustainable agriculture and organic gardening give helpful background.

Terms:
1. (Gardening tools, i.e. spade, trowel, rake, broadfork, etc.)

Activities:
1. *Garden Planting*:
    a. This is an ideal time to invite a local expert to the classroom to guide students through the planting process. Local resources could be family members who garden or other volunteers such as Master Gardeners, who can be identified through the Cooperative Extension Service. Students should take notes or otherwise document the steps necessary for transplanting so that they have something to refer back to when they go through the process themselves.
    b. For teaching students how to transplant and seed, an ideal process would be to demonstrate the process to them and then to allow them to practice the technique on their own. To demonstrate their mastery of the technique, they can teach the process to someone else. For instance, if each student is responsible for one type

       of vegetable, then after planting half of the designated area or amount, they can teach a partner how to do the rest.

    c.   Another possibility for teaching students first and allowing them to demonstrate their mastery is by having them work in a different garden first. For instance, they could help an elder or other community member plant his or her garden and then plant their own student garden using the skills that they learned.

2. *Garden Maintenance*:

    a.   During the growing season, garden maintenance involves primarily watering and weeding, and perhaps adding additional nutrients to the soil along the way. Different crops will grow at different rates and be ready at different times, so depending on the teacher's flexibility, careful planning may be needed.

3. *Additional Activities*:

    a.   In conjunction with starting the garden, there are many possibilities for teaching botany and ecology lessons. They could be simple projects, such as using empty CD cases with a piece of wet paper towel to germinate seeds and watch root growth. They could be more complex scientific activities, in which students could conduct different experiments with their garden plants, such as testing different varieties of the same vegetable, or growing plants in soil prepared in different ways, such as with or without compost. *The Growing Classroom* section on "Growing" has many good activities along these lines.

    b.   Garden journal. Students should keep a journal in order to record regularly what they do in the garden. They should also use the journal to make detailed observations about their crops and about the weather and other environmental factors. If they notice any insects or other creatures in their garden, they should make note of them, perhaps even sketching them in order to identify them later.

Unit 6: Pest Management

Understanding Goal:
Students will understand that gardening involves employing appropriate methods for keeping other animals from eating your plants.

Performance Task:
Students will each do research on what methods are available for managing a specific animal or insect pest in Interior Alaska and demonstrate a chosen method to his or her classmates.

Background Information:
The understanding goal includes the phrase "appropriate methods." Again, in sustainable and organic agriculture, the methods used for pest management are different from those in traditional industrial agriculture. Organic growers do not use chemical pesticides, although they may use repellents from natural sources. Employing a sustainable agriculture philosophy for teaching students about pest management allows students to learn about ecological systems in a way that simply showing how to kill unwanted animals does not. Students will learn that their actions have consequences in the ecological systems around them, and that appropriate actions take into account these consequences. Rachel Carson in writing *Silent Spring* opened the world's eyes to the dangers of using chemical pesticides in the environment. Students can learn about this relationship through gardening.

In some ways, we are lucky in Interior Alaska because the climate reduces the variety of garden pests. However, we have moose, which can completely destroy an entire garden in one night. While some farmers in other places design elaborate systems of integrated pest management, primarily targeting insect pests, gardeners here have to construct hardy moose fences or motion detectors with sirens to protect their gardens. There are certainly also some insect pests and small mammals that need monitoring in a garden as well.

Terms: Pest management, Invasive species, Weeds

Activities:
1. Read all or part of Rachel Carson's *Silent Spring* and discuss the effects of pesticides in the environment.
2. Research invasive plants in Alaska. Each student can do a report on a specific invasive. The UAF Cooperative Extension Service is a good resource for this.
3. Research various local methods for keeping moose out of a garden. If appropriate, choose and implement a method in the school garden together.

Unit 7: Composting

Understanding Goal:
Students will understand the skills and science necessary for composting organic matter at their school or home.

Performance Task:
Students will work together as a class to build a composting system, either a compost pile outside or some kind of indoor system such as a worm box.

Background Information:
While composting is addressed a bit in the unit on soil preparation, it really deserves a separate unit because there is so much that can be taught in composting. Building good compost is an art and a science, and students with bents in either direction will find something to enjoy in making compost. The primary goal in this unit is practical—building compost—but many subsidiary objectives concerning science can be pursued through additional activities.

Building compost is simply the process of putting together the right organic materials in the right proportions to foster the natural decomposition process and create soil. There are two types of decomposition—aerobic and anaerobic—which depend on two different types of bacteria to enact decomposition. The first—aerobic—occurs with bacteria that need oxygen. Anaerobic bacteria do not use oxygen. The latter is the type of decomposition that occurs when food spoils and starts smelling unpleasant. Most gardeners do not want compost that has been anaerobically decomposed, but rather prefer aerobic decomposition. This means building compost bins or piles that allow for enough oxygen flow to foster the growth of aerobic bacteria. Another possibility is to compost with worms, in which worms eat organic material and discharge casings that are very nutritious for plants.

For preparing compost for gardens, it is important to have the right mix of organic materials with a high carbon content and those with a high nitrogen content. Carbon (C) is the element that is found in all living organisms, while nitrogen (N) is one of the primary plant nutrients, along with phosphorus (P) and potassium (K). For instance, for building a compost pile, common ingredients with high carbon content include straw or brown leaves, while nitrogen comes from any fresh greens, such as grass clippings or green leaves or vegetable waste from the kitchen. A pile with a good mixture of these two different types of ingredients usually creates good compost, if it is also given enough oxygen. This can be done through regularly turning the pile, or by building it in such a way from the beginning that it composts quickly.

Depending on the teacher's level of expertise, there are many ways to approach composting in the classroom or in the school garden. Worm composting is an excellent way to compost kitchen scraps. Also, there are many commercial composters available, in which kitchen scraps are added and then mixed regularly. Local gardeners and farmers can be excellent resources for this activity as well.

Terms:
1. Aerobic decomposition
2. Anaerobic decomposition
3. Decomposers

4. Organic material

Activities:
1. Many activities from *The Growing Classroom* on composting.
2. Research the process of decomposition and report on it.
3. Research the different possible ingredients for a compost pile and what primary nutrient(s) they may contribute.
4. Attend a composting workshop at Calypso Farm.
5. Build an outdoor compost pile together.

Unit 8: Nutrition, cooking, and preserving

Understanding Goal:
Students will understand the nutritional value of fresh garden produce and some basic methods for cooking and/or preserving garden produce.

Performance Task:
Students will each prepare one vegetable in a recipe and preserve at least one type of vegetable, creating documents for each that reflect nutritional value of the recipe and the vegetable.

Background Information:
There are many ways to learn about nutrition, cooking, and preserving, but having fresh produce is an excellent hands-on way to introduce the concepts of meal preparation and food preservation to students. Preparing the food that the students grew in the garden completes the seasonal learning cycle. Learning how to prepare and preserve ones own food also reflects a subsistence philosophy.

Terms:

Activities:
1. Another good resource for this unit is the textbook *Food for Today*, 2006, from Glencoe.
2. Many nutrition activities in *The Growing Classroom*.
3. Both of the above have versions of a food label reading activity, as does *Discovering the Food System*. In this activity, students practice reading nutrition labels.
4. Each student can do a report on the nutritional value of a chosen or assigned garden vegetable. They can compare and contrast a processed food label with their own vegetable nutrition report.
5. Invite an Elder or other community member to class to demonstrate traditional food preservation techniques. The UAF Cooperative Extension Service is another good resource for food preservation information.
6. Hold a class potluck in which students bring in a family recipe that includes a vegetable from the garden.

Unit 9: Food Systems: From Global to Local

Understanding Goal:
Students will understand their place in global and local food systems in preparation for understanding the place of gardening in their community food systems.

Performance Task:
Students will describe through a diagram, essay or oral presentation the components of a food system and their place in it.

Background Information:
A general food system includes all the steps necessary to get food from the land onto our plates, including production, processing, distribution, and consumption. Food systems are getting a lot of press these days because we are starting to discover that the industrial, global food system that most of us depend upon has a lot of problems. The global food system treats food as a free market commodity in which the primary goal is to produce as much food and distribute it as cheaply as possible in order to make as much profit as possible from it. Other concerns are considered externalities, factors outside the system that are only taken into account if consumers insist that they be addressed. For instance, there are many ecological problems that come from exploiting the land to produce a lot of food cheaply (students can examine some of these in the sustainable agriculture unit). Also, some people are concerned that the global food system is not secure in its ability to provide necessary quantities and qualities of food to all people. Finally, viewing food as a commodity is quite a different view of food from how it has been seen in traditional and indigenous systems throughout the world, in which food provides physical and cultural sustenance.

In order to address these problems, many people are advocating for increasing the role of local food systems to feed individuals and communities. A local or community food system simply means that more of the steps involved in the food system are moved closer to the consumer. Again, this type of food system reflects many traditional systems, such as Alaska Native subsistence, in which the production and consumption of food was closely integrated with the surrounding landscape and cultural community. Supporting local agriculture and gardening is one way to help create community food systems. For instance, community supported agriculture (CSA) enterprises, such as Calypso Farm in Fairbanks, serve as a way to allow consumers to buy from local farms. Shareholders pay for their produce at the beginning of the growing season and then receive a weekly share of whatever is ready for harvest throughout the season.

In this unit, students will explore food systems in order to gain a background understanding to the role their school garden plays in their own food system, primarily drawing from activities in Cornell University's online curriculum, *Discovering the Food System*. This extensive curriculum is targeted for the Northeast United States, but many units can be adapted for Alaska. In the activities section below, specific lessons from the curriculum are recommended.

Terms:
1. Food system
2. Global food system
3. Local or community food system
4. Subsistence

5. Community supported agriculture
6. Production
7. Food processing
8. Distribution
9. Consumption
10. Marketing

Activities:
1. Conduct Lesson 2 (in Section 1), *Food Systems Basics*, from *Discovering the Food System*. This lesson provides a good overview of the components of a food system.
2. Perform an exploration of the food system(s) of which the students are a part. There are several ways to do this. Steps 1 and 2 (in Section 2) of *Discovering the Food System* has some excellent guidelines for finding facts about food systems and identifying local people to interview.
3. Another fun way to explore food systems is to examine school lunches. Students can trace the origins of each item in one school lunch by brainstorming and then interviewing their cafeteria director or another school district employee about food procurement. A version of this activity is described in "Lunch Bag Ecology" from *The Growing Classroom*.
4. Finally, another possible way to explore food systems is by taking a field trip to the local supermarket. Students can work in pairs to explore specific types of food and its origins. Before the trip, brainstorm questions for students to answer, and arrange with a manager prior to the trip so that students can interview him or her. The Growing Classroom includes an activity called "Supermarket Snoop" which can be adapted for this exploration, as its main focus is to teach students to be informed consumers. It also suggests many additional related activities.

Appendix B

Howard Luke Interview Transcript

The following is the transcript of an interview with Howard Luke conducted on February 9, 2007. I have included explanatory comments in select places of the interview to flesh out details from other conversations we had had or to offer my own interpretations about what Howard shared with me. These comments are in italics.

When I began recording for this interview, I had already been visiting with Howard for several hours. We watched footage from his birthday potlatch together, where he gave gifts to all the people who have helped him in his later life while he's been living on his own at camp. When we moved to the table for tea, I asked him to record him, but I didn't start until after the conversation had already begun, so Howard picks up here in the middle of what he was saying. I told him I wanted to record the stories that he'd already told me about gardening with his mother and other things he's learned about gardening.

Howard: … My friends, them downriver down there. Geez, they got good garden, now they say it's cheaper to just buy it. What would you do if you got no money?

Laura: Good question.

H: Yeah... You gotta…(clears throat)... You mind the kids, you know, they see that. As they're growing up, they'll see that. They'll see that, when we don't got no money, we got garden. We got potatoes. We got carrots. We got everything. And that's what I mean, you know. That's… my heart goes out to the young people. I know that they gonna have a hard time, and garden, my mother and them always had a garden. Always had a little garden. Little small garden. Rhubarb, you know? Wild rhubarb? She had some planted out there. Someone spaded it up, because it growed up every year. Every year, they grow up, you know. All them things like that, you know, that, they were our fruit, you know, berries, and stuff like that. It's the same thing in the garden.

L: What else did she grow, in her garden?

H: Oh, uh, carrots and potatoes and mostly, we didn't have rutabagas and stuff like that. We didn't have any of that. I don't know how come we didn't. Just carrots and stuff like that.

L: Cabbage, did you have cabbage? Of course.

H: Cabbage, yeah. We never think about making sauerkraut.

L: Really? When did you learn to make sauerkraut?

H: Well, a couple of my friends from Germany lived in Fairbanks, and they came over one fall and they said, we'll help you dig the garden out. And said, You ever make sauerkraut? And I told them, No, I'd sure like to, I says. So he said he got this shredder, I'll bring it over tomorrow. So that's when we started, you know.

Howard gave me four jars of the sauerkraut that I helped him make last fall, when Brad and Jill accompanied me to camp one afternoon and we shredded about a dozen heads of cabbage from his garden.

L: So what kinds of jobs did your mother make you do when you were little in the garden?

H: Weed the garden all the time. Keep the garden, you know. Nowadays you, nowadays they use that plastic, you know, so the weeds ain't going to grow. And in the mission, that's all that we do. We had garden from here across the river. One was potatoes, and one was all the vegetables like carrots. Whole big gardens. Whole big gardens. And like big root cellar, bigger than this house, root cellar. And that's where we store all our stuff. Plus in the mission, you know, it was like a depression in them days, you know. You never throw nothing away.

Howard told me before that they also had a greenhouse in the mission at Nenana.

L: Did the kids eat all of that? Was it used in lunches and dinners and stuff?

H: Yeah, we had that. Every like, Fridays and Sundays, we'd have a good meal.

L: Where did the meat come from? Hunting and trapping?

H: Oh, people, uh, the village people, you know, give us meat, and then the people that managed the mission, they give them grub, you see, they trade off. They trade off. They give us meat, and then they give them potatoes and carrots and stuff like that. So you know, it's… people look after one another. That's what I'm saying, right now, you know, that we're not doing it. It's too much selfishness right now. And that's why I'm saying right now that I'm afraid for our young kids right now, the ones that's coming up right now, it's going to have a hard time. They wouldn't know how to do this. Cause it's going to be selfish. You see right now, people are so selfish right now. Everything you do, you get paid for it. And I, I never get paid. I traveled all over the world, you know. Go into schools, all the schools. I was down in Brazil. I stayed there one month and I went to, I covered all the schools, and I said, Well, I guess I'm done. And they say, You're not done yet, Howard, we gotta go to the university. In the university, they got down there, the girls and boys, they don't go to the same school. They're separate. They're separated. And they're all in uniforms. Same as the kids, too. Kids got their own uniforms and stuff, and they take care of their own clothes, just like Boy Scouts, you know. They take care of their own things. And that's what I mean, down there. They really look after one another. And that's what I'm trying to do right here, you know, but nobody don't want to listen. We should have garden and stuff like that, you know. Nobody don't want to muck around in garden.

L: Some of us are listening.

H: What they going to do if depression comes? Everything will be gone. What are they going to do?

L: So what's the best way, with these kids at the charter school now, what's the best to teach them some of these gardening skills? I'm trying to design a curriculum to teach them about gardening skills, but I want to make sure they hear about your stories, and your, you know, your experience gardening. What do you think the best way is to teach them?

H: Well, it's just like I say. You gotta look to the future, and you gotta keep telling them that, not only one time. This is why I want you young people to be doing right now because we have to look after one another. We have to look after one another, and we have to help each other. If that other guy doesn't want to spade his garden, you just come in there and help him and then he'll say, Oh, gee, it's my turn to do my share, you know, something like that, you know.

L: How did you learn those lessons when you were little?

H: Well, my uncle and my mother always telling me these things. I tell you, every night after supper, mom blow the lights out, blow the candles out, and we'd sit down. She'd tell me about these things, about depression, that you gotta, you gotta look for the future. This thing is not going to be here forever. And not to be selfish. Not to go against nature. You go against nature, things are going to come back on you, one of these days. You wouldn't know it. You wouldn't know it if you do something wrong. Went against nature. You went against nature, now it's going to teach you.

L: You've told me before, I think, what do you think of using pesticides and herbicides and chemicals in the garden? A lot of farmers use a lot of chemicals in their farms and their gardens now.

H: I don't believe that. I don't think so. You know, we got our own, we got our own fertilizer. You're talking about fertilizer?

L: Fertilizers too, yeah. What do you use?

H: We have our own fertilizer.

L: Like what?

H: You see them spruce needles? Them spruce needles, when they get dry, you mix that right up in the garden.

L: It's good for potatoes, right?

H: Good for everything. Them people down the river down there, I taught them that, and they do that.

L: Really?

H: Yeah, they have good garden. They have good garden down there, but I don't know, they say, It's cheaper to go to the store and buy it, they say.

L: It's a strange thing when our economy works that way, when it's cheaper to buy something than to do it yourself.

H: I'll tell you, so much things we can save, you know. Just like your oil. You see, I don't burn oil, when it gets cold. Cold at night, I light my, cause this stove heats up. What's the use of

having two things going? You gotta think about the future. You know, we're not thinking about the future, we're just thinking that thing is going to be there forever. It's not going to be there forever.

Howard has a wood stove in his front room that he uses exclusively during the day, but he also has an oil-burning stove in the back room that he uses at night.

L: How did your mom save seeds from one season to the next? Did she save seed potatoes and store them until the next year?

H: Yeah, yeah. Everybody got root cellar, you know.

L: Like, where did she get carrot seeds? Where did she get her seeds to plant?

H: Down there, you know, it's like berries and stuff, the fruit on there, they get the seeds, they get the seeds when they come to seeds, they take two, three years to grow, but once you grow, they come back all the time. Come back, like rhubarb and stuff. They're all seeds.

L: How is… I don't know what wild rhubarb looks like. Does it have a long, red stem just like the kind that people grow in their gardens around here?

H: Yeah, they grow about this high, and this part, this part down here turn into wood. Like willow. And this part up here, them seeds are in that, that tube in there. Just like berries. Berries like that too. I tell you, so many things right now, that's why I tell people, I say, depression comes. I say my daughter is going to be worth more than your daughter.

L: I think so. I think you're right. It's about skills and knowledge.

H: Them students that stayed with from out of state, you know. They stayed with me for three months, you know. I had four of them. They stayed three months, and the next year another two come and they stay with me, you know. And I talk about depression, and they don't know about depression, until I explain to them, you know. I explain to them. Oh, yeah, now I know what you're talking about. Well, if depression comes, they said, we're going to come and stay with you. *(Laughs)*

L: Well, is there anything else you want to tell me about?

H: Some things, I mean, it's getting to be, it's too much, too much that we go against nature. That's what's going on right now. You see, what's going on outside? Mudslide. See the weather over there getting right now, we never had weather like that. Well, that's the nature. They went against nature, and that thing's going to come to you whatever. And that's what they told us, at one time, they told us, if you go against nature, that weather is going to change. Going to change, they says. It's what happening right now. Just like they going up to the moon. Going up to the moon. What is it up there? It's none of their business what's up there. Look at all the money they're spending. You see the thing is, that nature, it's going to come back to you sooner or later. It's there, right now. A lot of people tell me, no, that's, you're too old-timer. It's not. You mark my word, I tell them, you mark my word. It's gonna come. Just like, you know, an elder is talking to you, telling you something, and you tell them, Oh no, that's not the right thing. You

gotta go along with the elder. If you held the elder's feelings, it's going to hurt you down the road after a while. After a bit. Cause I was hurt two, three times. Really bad. When they took my name off the school. And then, this president, used to be, of Tanana Chief. I had problem with the fish wheel, a guy didn't want to move out of there. I'd fished there all my life. And I asked him to help me, and he turned me down. He turned me down. He said, I don't have time. And he made me feel awful bad. And you see, I can't forget that. I can't forgive him. You know, you can forgive people. But some like that you can't forgive. So you see, he used to be the president of Tanana Chief, and he got in a car wreck last fall, coming from Anchorage. Broke his back. You see what he did to me?   You know he really hurt my feelings. And that's what's happened. It's gonna to happen sooner or later. And I, I just couldn't forgive him. My niece passed away down Tanacross, so we all went down for funeral, you know, and we sit down and talk, you know, before they started serving, you know. It's a talk, you know. And he come over to talk to Neil and Geraldine, you know, and I was sitting right alongside of them. He turned his back to me and he faced them. And you know, that's bad, that's terrible. He just like…(*unclear*)…with something like that, you know. He really hurt my feeling. And that's no way to treat your elders, you know. Even when your elders are wrong, you wanna go along with them. You wanna go along with them. If you say, no, that's not the right way, you hurt that elder's feeling, it's gonna come back to you sooner or later. That's what I talk about all the time. I don't think the parents are telling their young children that, you know. That's the reason why we're having so much problem. Just like all the suicide that's going on right now. The parents are not talking to them. Tell them, "Don't drink. Quit drinking!" And that's not doing it. …(*unclear*)… that kid, take them to the side and you talk to them, show them that you love them. My heart goes out to them. Geez, that kid, though, one of these days, "Oh yeah, he really loves me. I've got to change my ways. I've gotta change my ways. That's my only chance." You don't just tell them, "You gotta quit drinking. That's not good for you." And that's what I mean, you know. That's why I say we should have more Circle Talk, all the time, because we talk, in Circle Talk, we talk about our problems. We talk about our problems. We don't like that guy. We don't want nothing to do with her. We hate her. And it comes in here *(points towards chest)*, and pretty quick, it get bigger and bigger and bigger. Pretty quick, it explode. And that's what happening right today, you know. By having Circle Talk, we talk about our problems that we, we don't like each other. That guy is no damn good, we say. And we start feeing sorry for ourself. Started crying. So everybody get up, and you just touch him, and you draw that right out. You draw it right out. It's happened to me. We used to have Circle Talk here all the time. For three years, that people from all over the state came here. For two weeks we had Circle Talk. And I did, I talked about that, you know. The man that was staying across the river, and him and I, we just hate each other. We don't like each other. So I talked about it, and my god, it changed right away, right here (*points at chest*). And I was one of his best friends. And that's what it is, you know. That's why I tell people, right now, we should have more Circle Talk, and stuff like that. We're not doing it. We're going against the nature, so much right now, it's just terrible. I just hate to see it, but you know, we…(*unclear*)…it's just like the kids, you know. You gotta, you don't scold them, you just take them to the side and tell them in a nice way, and that kid will know you are right. "He really loves me. He wants me to go on that straight line." And he'll change his mind right there. But if you tell him, "Don't do that. How many times have I told you?" My mother never shout at me, never spank me or nothing, just. If I don't listen, she put me in a corner, and put blanket over me, and I face the corner til I say yes, I change my mind, I'm not going to do it again. That was my punishment. And that's what I say, right now, we have to change our ways. We can't shout at our kids. We gotta show that we really love them, and tell them about our nature. And the future. Because if depression comes, depression comes,

everything going to go. Even the garden ain't going to grow. Your garden ain't gonna grow. I seen depression. No berries. No nothing. Not a thing. Them days, them white people, them sourdoughs. They work with the Native people. They teach each other. The native people teach them how they do things, and he tells us how to do things, just like making sourdough hotcakes like this. We didn't know nothing about it. They taught us how, so you see, it's a trade off. Trade off. We taught each other.

L: Did they also introduce gardening?

H: Yeah, umhmm. Yeah, they taught us about garden, you know, and stuff like that because them days, they never heard of no fertilizer, nothing. They tell us about, about that stuff, what the hell they call it? It grows in the garden, I mean, it don't grow in the garden, it grows out there—peat moss. Peat moss. They tell us about that, and we didn't know nothing about peat moss. And they told us about that.

L: Using it for the garden, you mean?

H: For the garden, yeah, yeah.

L: Do you know where the idea for using fish came from?

H: The white people did that. Yeah, yeah.

L: Cause that's a good fertilizer too, right?

H: Yeah, you use, you just dig it up, you dig a big hole, a trench like that, and you just cover it up and bury it again.

L: We should put some fish in your garden this spring.

H: That one guy downriver at fox farm. When you wash fish, all that blood and stuff like that, he don't throw it away. He use that to water his garden.

L: Let's make sure we water your garden with fish blood this spring.

H: I'll tell you, with so many things, I think about it all the time. Seems like I'm not making right, they just, I think that they just ignore me.

L: I think a lot of people listen to you, Howard.

H: Just like, you know, I write a letter to the editor, and only this guy *(points to a letter from David Guttenburg thanking Howard for his letter to the editor)* and that guy from Anchorage say, Do more of it. Do more of it. People gotta hear you. *(Someone from Anchorage called and asked to come and interview Howard after he read the letter.)* And that's only one, but a lot of people in Fairbanks say, I seen your name in the paper. I don't… I don't do that for myself, I says. I'm doing this for the young people. Just like, honoring somebody. Honoring somebody—I don't believe in that. It's not… like when I got my doctorate degree. I didn't want… I didn't want it, because you know, it seems, people gotta be treated equally. That guy, he says, "Geez, you got

your doctorate degree, and I done just as much as you did. How come I didn't get that?" It seems like that, that's why I say right now, by honoring people, I don't think it's right. We look down on one another, and it's just like going against nature, you know. We say, to hell with that guy. He's too small.

L: So maybe nobody's name should be on the school, huh?

H: Yeah, yeah. It's, uh, honoring… it's just a piece of paper, that's all it is, you know. And those things, I don't. I tell people after I got my doctorate degree, I tell them, "I didn't do that for myself. I done that for you people." I say, for my people. That's what, my young people, they see that.

L: Maybe it will inspire them.

H: Yeah, yeah. And I learned that before I travel, because I learned a lot when I was down in New Zealand. Really taught me a lot of things. And our chief, too, Chief Thomas. He never went to school in his life, but he really was well-educated too. Because he talked to the president down there, he told the president, he said, "I don't believe you." He said, "You're lying." He said, "You're reading your speech like that." He said, "That's a lie." He said, "My people don't believe you." He says, "But when you're talking, when you're talking from your heart, then we really will believe you." "And use some common sense," he said. "You talk about minerals. When you said mineral," he said, "Why didn't you say sand and gravel? Then we can understand you. This is why we don't get along," he says. "We're fighting one another. We're over-educated." He said it just like that. I wasn't born yet. It was two years before I was born, but my mother told me about it.

Howard has shared this story a number of times, about President Harding's visit and his speech to people in Nenana. I don't remember Howard depicting Chief Thomas as being so hard on Harding before; I just remember him telling him he shouldn't use such big words if he wanted people to listen to him. The written speech versus speaking from the heart debate is another of Howard's themes. Again, I don't remember him attributing it to Chief Thomas before, but rather being something that he's modeled in his own life, in that whenever he gives talks, he never writes things down beforehand but speaks from the heart. I think one version of his story is that someone asked him once if he wasn't nervous before a talk because he didn't have anything written down, and he responded that it was better and more honest to speak from the heart.

L: When were you born, what year?

H: '23.

L: '23

H: It was… (*unclear, something about the president's speech*)…'21.

L: Wow. Long before statehood.

H: So I tell you, we have so much to give, and I believe that we're all taking it with us.

Appendix C

EKCS Charter School Proposal and Spiral Curriculum

The following are relevant excerpts from the original Effie Kokrine Charter School proposal, which can be found online at http://www.ankn.uaf.edu/NPE/EKCS/FinalProposal.html.

The Organizing Committee

As early as 2002, a group of educators interested in starting a charter school based on a foundation of Alaska Native history and culture began meeting to discuss this possibility. The group included parents, teachers, elders, and representatives from many of the agencies and organizations that serve Native children and families. Several community meetings were held in Fairbanks.

In December 2003, this group formed the Native Charter School Organizing Committee and started to design a school which would be more meaningful and effective for these students. At that time they focused on 6th, 7th, 8th and 9th grade, intending to solidly prepare the students for the difficult transition from Middle School to High School.

The organizing group envisioned the charter school as an essential part of the development of Alaska Native leaders. Charter school students will emerge from 9th grade level as dynamic future leaders – knowledgeable of Native heritage, traditions and values, and skilled in the basics of subsistence.

Academic Policy Council

As plans evolved so did the governing structure of the organizing group of community members. The Native Charter School Organizing Committee formed the Academic Policy Committee (APC) as the vehicle to eventually formulate and govern the school. With AS 14.03.250 (b) and School District policy 935.13 in mind, indications of interest in serving on the APC were solicited from teachers interested in working at the school, from parents interested in having their children attend the school, and from members of the original Native Charter School Organizing Committee who met state and district criteria for APC membership. Final APC membership was decided by consensus among Native Charter School Organizing Committee members and interested teachers.

Together both Committees named the new school the Effie Kokrine Charter School after a prominent Athabascan leader who taught cultural education for many years in the Fairbanks North Star Borough School District (School District).

The APC is made up of educators, parents, Elders and students within the District area. The Charter School will function within the legal structures set forth by the State of Alaska, the Department of Education, and the local School District. All Committee members of the original Native Charter School Organizing Committee and the Academic Policy Committee, are familiar with Alaska Statute 14.03.250 through 14.03.290, with state regulation 4 AAC 33.110, and with School District Policy 935 on Charter Schools.

During the planning and implementation stages, the APC will meet a minimum of once per month. Everyone is welcome and encouraged to attend these meetings.

Fairbanks Native Association

In November 2004, after much deliberation about the governance of the Charter School and in recognition of State laws and School District policies, the APC made a decision to involve the Fairbanks Native Association as leaders in the project. Therefore, the Charter School is currently a cooperative project between the Academic Policy Committee, the Fairbanks Native Association (FNA), and Fairbanks North Star Borough School District.

It is the intention of the FNA Board of Directors to guide the Academic Policy Council in their governance, management, and fiscal oversight responsibility for the Charter School during the initial years of operations until the Academic Policy Committee attains legal status as a 501(c)3 nonprofit corporation. The Academic Policy Committee membership has since been approved by the FNA Board of Directors and are authorized to make decisions to govern the Charter School in accordance with FNA's responsibility as a 501(c)3 obligations, School Board policies and the laws of the State of Alaska. The President and Chairman of the FNA Board of Directors is a member of the APC to assure such compliance. Any changes in the membership will also be approved by the FNA Board of Directors. Requested exceptions from district policies appear in this charter school application, with the rationale for the exceptions provided in pertinent sections.

Community Advisory Committee

Interest in helping with the Charter School as well as in teaching at the school continues to grow as word of the developing charter school has spread throughout Alaska's interior. Attached are copies of marketing materials marked as Appendix XV – Outreach Materials and Flyers.

In addition to the Academic Policy Committee, the Charter School will develop a Community Advisory Committee made up of people interested in developing an exceptional educational program for Fairbanks. Members will be recruited from business partners, agencies that serve families and children, educational institutions, community leaders and others who are committed to the school's mission. Community Advisory Committee members will be expected to actively support the school by helping with strategic partnerships, fund-raising, long-term planning or other needs. The Community Advisory Committee will have seven (7) to eleven (11) members and will meet quarterly. This committee will not be started until after the school charter is approved by the School District and the Alaska Board of Education and Early Development.

Basis for the Curriculum

The Committees, with much community involvement, designed the school around the following criteria established as priorities:

• Teaching methods based in Native ways of instruction and learning
• Active, project-based learning
• Curriculum based in Native knowledge of the world
• Presence and involvement of Native elders

• Use of broad community as a learning context
• Building students' pride in Native culture as an element in success
• Academic success

Project-based education is successful in small schools across Alaska. Culturally appropriate curricular and methods-of-instruction resources are available through the Alaska Rural Systemic Initiative (funded by the National Science Foundation for ten years) and numerous other sources. The Charter School is designed to build on these experiences and on the related resources in order to immerse students in the knowledge, values and practices of Alaska Native cultures. It is designed to help the students experience academic success from within a cultural context. The Committee fully accepts the Alaska State Standards and related assessments as required measures of that success.

Vision

In the vision of its founders, all children choosing to attend the Charter School will be successful. The students will be young people healthy in body, mind and spirit. All students will be taught using individualized preferred learning style. They will be active participants in learning Alaska Native heritage and culture – well on their way to becoming dynamic leaders.

In this vision, school is a place of support, development and learning for the whole child. It is a place where learning builds on who the children already are and where they come from. It uses their cultural background as the foundation of who they are. On this foundation, the school helps to develop each child into a fully contributing member of his or her cultural community.

In this vision, students enter the school understanding its special mission and wanting to be a part of it. When they leave, they leave as successful students, proud of themselves, hard working, and responsible. Charter School students will be able to perform well academically and interact constructively with their community.

Mission

The mission of the Charter School is to provide educational opportunities for students to succeed in the world by developing a strong sense of purpose, identity, place and community through cultural and academic empowerment.

The Charter School shall provide an educational program that shall advance students' mastery of basic skill areas including mathematics, science, health, reading, language arts and social studies, appropriate to the age of students included in the program. Provision will also be made for Alaska Native studies, language and culture; physical education; music, art, and instructional technology within the educational program.

Educational Philosophy

The philosophy of the Charter School is that, for students to achieve their educational goals, their learning must connect, or resonate, with them. To resonate, the students' learning must be embedded in a meaningful context. To achieve a meaningful context, the learning must be based in who the students are and where they come from – their homes and their culture. Therefore, the

school makes extraordinary efforts to relate curriculum, teaching methods and every aspect of the school experience to the homes and social communities from which the students come.

• Cultural Values as School Organizing Principles
Traditionally, Alaska Native cultures assume that people realize their potential, not through individual effort, but also through fitting into their physical environment and through a complex network of support from their family and communities. In this cultural context, effective schooling for children must therefore be embedded in place and community – concepts which are intimately connected in Native cultures. To support its students, therefore, everything the school does contribute to belonging-in-a-place and to developing community.

•• Family
Family members of the Charter School are required to provide active support for their children, and for all the children, in the school. They are expected to respect, support and praise the students. Parents or other family members are required to give at least one hour per week -- or comparable service -- to school projects. In their active role as models for the children, parents and family members are expected to demonstrate healthy personal choices as well as commitment to cultural involvement.

•• Tribe
For Alaska Natives, the tribe is the relevant political community. It is intended that Interior Alaska Tribal organizations will contribute by developing new activities for their participation, i.e. by helping the students establish school government based on tribal governance practices. Tribal organizations are expected to welcome the children into on-going tribal activities and decision-making. Tribal members are expected to teach their ways of establishing purposes and achieving goals to the children by modeling these ways and by involving the students as much as possible. Further, tribal members are expected to model appropriate public behavior for the students.

•• Community
One factor contributing to the uniqueness of this school is that the lines among the influences on students (families, school, physical environment, community) are much more fluid than in traditional schools. It will not be unusual to have community leaders in the school, for instance. It will not be unusual that school staff mix socially with school parents. In design and implementation, the Charter School intentionally blurs divisions between school and related communities, thereby enlarging the children's sense of belonging within community.

•• The School
As the community learns more about the school's philosophy, it is envisioned that more people will be come involved in various ways including building the basis for a culturally strong curriculum. As part of their commitment to the school mission, school staff will have or gain a Native knowledge base as the basis for staff behavior and instruction. Within the guidelines and policies not waived of the local education associations, the school has built into the curriculum the use of community leaders and cultural teachers as instructional resources. The school will prepare students for state benchmark assessments, while adding to this success the values of Native cultural communities.

Educational Goals

Relying heavily on a strong network of community members, program and organizations, the school will develop students who 1) enjoy and stay in school; 2) acquire the knowledge and skills stipulated in the Alaska Cultural Standards for Students, as adopted by the Alaska State Board of Education and outlined below; 3) take pride in themselves and their cultural heritage; 4) contribute to community and benefit from belonging to community; and 5) perform at acceptable levels of academic achievement as measured by state assessments.

Curriculum Model

The curriculum for the Charter School (see the graphic representation on following page) is structured around twelve themes that encompass the essential cultural and academic knowledge. These are linked to Native cultural values as outlined by the Denakkanaaga Elders and the Alaska Cultural Standards for Curriculum (listed below). The themes are organized into a cumulative series of three-week-long intensive blocks in which students participate in classroom- and community-based activities based on the educational principles and practices outlined in the Alaska Standards for Culturally Responsive Schools. A particular emphasis is put on project-oriented, culturally responsive, place-based and experiential curricular and instructional strategies.

Thematic Curriculum, Resources and Standards

Each of the twelve themes outlined in the SPIRAL curriculum model above is linked to one or more of the State Content Standards as well as the Alaska Standards for Culturally Responsive Schools, so that all of the essential subject-matter knowledge is taught in a relevant cultural context whereby students acquire the full range of necessary academic knowledge and skills at the same time that they acquire the appropriate cultural knowledge and skills associated with the unique place in which they are situated. (Appendix VIII - Detailed Curriculum Outlines as aligned with Cultural Standards and state content standards.)

While each three-week module will focus on a particular aspect of the curriculum as it relates to the specific level of each cohort of students, continuous attention will be given across all themes to the core areas of language, culture, literacy and numeracy. When individual needs warrant, students will be able to enroll in college courses and training programs offered through the Interior Athabascan Tribal College, the University of Alaska and other educational providers from throughout Alaska. Sample lessons, units and resource materials associated with the SPIRAL curriculum are available through the Alaska Native Knowledge Network and summarized on the charts attached to the SPIRAL curriculum outline.

Instructional Methods and Materials

The instructional practices and teaching behaviors associated with the SPIRAL curriculum model outlined above are based on the guidelines for culturally responsive pedagogy as specified in the Alaska Cultural Standards for Educators (listed below), and they are consistent with the Alaska Teacher Standards.

Evaluation Procedures

Evaluation of the success of the SPIRAL curriculum model in achieving the educational goals outlined for the Charter School will be based on student performance as it relates to the Alaska Cultural Standards for Students, including the state Content Standards. In addition to meeting all federal and state assessment requirements, Charter School students must maintain a comprehensive and cumulative portfolio documenting their work in each curriculum module, by which their proficiency will be evaluated based on relevant performance criteria defined in the form of rubrics spelled out in reference to the learning goals for each module (as they relate to the respective cultural and content standards associated with the module). Each student starting out as a freshman will have completed 44 of the 48 modules satisfactorily to earn 22 credits to graduate.

Teacher Professional Development

Teachers (and all staff) choosing to work at the Charter School will be expected to be knowledgeable in Alaska Native cultures, Native knowledge systems and Native ways of knowing, as well as the teaching practices associated with the Alaska Cultural Standards for Educators (as indicated above), along with the Guidelines for Preparing Culturally Responsive Teachers, Guidelines for Nurturing Culturally Healthy Youth, Guidelines for Respecting Cultural Knowledge and the Guidelines for Strengthening Indigenous Languages.

As a foundation, teachers are encouraged to take the following courses, which also apply to Alaska Department of Education and Early Development continuing education requirements:

ED/CCS 610 – Education and Cultural Processes (including Old Minto Camp)
ED 681 – Place-based Education (oriented to Interior Alaska)
CCS 608 – Indigenous Knowledge Systems

A one-month staff development course, the Native Culture Immersion Course, will be held every summer prior to or overlapping the opening of school, and all school staff are required to teach for it, or take it as students, or both. It will be rigorous, in-depth professional growth in the development of learning resources and their integration into instructional design. The course content will range from Native culture and languages to the history and founding principles of the Charter School. Participating teachers will talk with elders and other Native leaders, so they know how to integrate these people with their students. Teachers will get site-specific instruction about all the Fairbanks and Interior region resources available to augment classroom-based instruction, so they know what they can draw from and build on. They will attend Native community festivals, dinners, meetings and other functions to come to understand Native ways of being in the world.

Every year, the products resulting from the Native Culture Immersion Course will be the basis for curricular decisions for the coming year. Teachers will leave with numerous reference materials and boxes of culturally-relevant instructional materials, with "team-teaching" units at least partially designed with their instructional colleagues in the community, and a several-months' start on lesson plans. Teachers will also leave understanding where the state standards and required assessments fit into instruction, where they fit into the annual school calendar, and how they fit as important benchmarks in their students' lives.

Through the Native Culture Immersion Course the teaching and other staff will fully understand the mission of The Charter School and the many ways in which they are invited and required to support that mission.

Description of the Student Population

As required by law, AS 14.03.265 Admission. (b), the school will enroll all applicants who submit a timely application for which the school has room. As is also allowed by law, AS 14.03.265 (a), the school program is specifically designed "for students who will benefit from a particular teaching method or curriculum." The school is intended for, and will recruit, students particularly pertinent to its mission and design. The curriculum and teaching methods are designed for students who are expected to learn best through Native ways of instruction. Obviously, one intention is to recruit Native students, but non-Native students interested in learning about and through Native cultural approaches to life and learning will also be admitted.

Nondiscrimination Disclosure

Attendance at The Charter School is voluntary. As per AS 14.03.265 (b) the school shall enroll all eligible students who submit a timely application. In the event of too many eligible applicants, the school will follow Fairbanks North Star Borough School District Lottery Procedures for Open Enrollment. The lottery will be held on April 15 of every spring, for enrollment for the following fall, and will be conducted in accord with district policy.

The Charter School will not discriminate by race or special needs or other inappropriate criteria. No student shall be denied participation because of a learning disability, handicapping condition, or special need. However, due to budget and facility restrictions the Charter School must refer severely handicapped students to the School Districts Special Education Department where specialized staff is available.

As per AS 14.03.265 (a) the school is intended for and will recruit for those students most likely to benefit from its curriculum and teaching methods. Within the eligibility criteria, the school will strive to achieve a mix of students regarding grade level and gender balance.

Student Behavior

While behavioral guidelines at the Charter School will be based on traditional child-rearing and parenting practices in nurturing culturally-healthy youth in the contemporary world, the Charter School will utilize and incorporate the School Districts disciplinary policies regarding student discipline.

Effie Kokrine Charter School
Thematic Curriculum

May 14–May 31

July 10–July 28

EXPLORING HORIZONS
Respect for Others/Peace

FAMILY
Respect for Elders/Love for Children

April 23–May 11

July 31–Aug. 18

SUBSISTENCE
Sharing/Caring/Providing for Family

LIVING IN PLACE
Honoring Our Ancestors

April 2–April 20

Sept. 18–Oct 6

APPLIED TECHNOLOGY
Hard Work/Self-Sufficiency

ANCSA
Cooperation/Endurance

Feb. 26–March 16

Oct. 9–Oct. 27

ENERGY/ECOLOGY
Respect for Nature

TRIBE/COMMUNITY
Responsibility/Unity

Feb. 5–Feb. 23

Oct. 30–Nov. 17

CULTURAL EXPRESSION
Wisdom/Spirituality

LANGUAGE/COMMUNICATION
Knowledge of Language

HEALTH/WELLNESS
Compassion/Love/Dignity

OUTDOOR SURVIVAL
Honesty/Humility/Humor

Jan. 15–Feb. 2

Nov. 27–Dec. 15

Numeracy · Language
Culture
Literacy

Numbers: 7, 8, 9, 10, 11, 12, 13, 14

Outer Ring = Themes (Values)
Spiral = Annual Cycle of Learning

Beadwork by Effie Kokrine

Appendix D

Researcher Background

In action research such as this, it is imperative for the researcher to make her background and biases explicit. Hence, in this introduction, I will begin by sharing my own background, followed by the PhD path that led to this research. In many ways, this dissertation reflects the culmination not only of five years of PhD coursework and fieldwork but also of a diverse academic and employment history, all with the guiding goal of learning how to use my skills to help my culture design and pursue more appropriate relationships with the natural world than the ones that currently define mainstream America. My skills tend to fall in the academic realm, which is why I chose to enter a PhD program in the first place. But I have always wanted my academic work to have practical applications. Hence, this dissertation has at its heart the complementary objectives of making a practical and positive change in my world as well as contributing my voice to an academic discussion of the context and ramifications of such a change. This union of practice and theory is fundamental to an action research approach.

In college, I chose biology as my major because of my interest in the natural world, but from the beginning I carved an educational path that was slightly out of step with the norm, somewhat interdisciplinary, somewhat value-driven. At the time, I called myself an environmentalist, and following college, I worked at an environmental organization for a brief time. However, I quickly tired of the reactionary politics and the oversimplified ideology of that particular community. I wanted to be engaged in designing sustainable solutions. So I continued my formal education by pursuing and earning a master's degree in Earth Literacy, a program that resembled environmental studies but focused as much on cultural interactions with the environment as on the environmental science and policy usually addressed in such programs.

I began my doctoral education in the fall of 2002 by embarking in a new interdisciplinary graduate program funded through the National Science Foundation at the University of Alaska Fairbanks (UAF). The national program is known as Integrative Graduate Education and Research Traineeship (IGERT). The UAF IGERT Resilience and Adaptation Program (RAP), unites natural and social sciences in the study of resilience and adaptive capacity in linked social-ecological systems. Graduate students are trained in conducting interdisciplinary research on some aspect of resilience and adaptation in such a system. This program correlated well with my overarching career interests in ecological sustainability and environmental education.

Although my background was in ecology, I entered the program as an anthropology student. After my exposure to the exploration of human-environment relationships in my Earth Literacy degree, I felt that anthropology would be a good field to pursue my interest in Alaska Native peoples' relationships with their natural environments. However, I was committed to designing an applied anthropology project rather than a theoretical investigation that would address only academic understandings of culture and environment without some practical application. During my first summer in RAP, I completed an internship working for a natural resources department of a tribal organization in interior Alaska, looking for research ideas that would be of interest to local people and simultaneously illuminate their interactions with their local environment.

In the spring of 2004, I decided to devote my dissertation research to ecological, place-based education in a cross-cultural setting rather than on natural resource management. Education seemed like a natural focus for applied work that could also provide a window into human-environment interactions. About a year later, after completing my initial coursework, I left the anthropology department at UAF and entered the interdisciplinary (INDS) PhD program, while still retaining my association with RAP. I had discovered that UAF's cultural anthropology program had little applied focus and few faculty with the expertise to support me through dissertation research on education. Enrolling in INDS allowed me more flexibility in creating an experienced committee and reflected my growing philosophical stance on the purpose of my research and of cross-cultural research generally. I retained my original advisor in anthropology as a co-chair on my new INDS committee.

Over time, I realized that calling my approach *applied* did not completely capture my attitude towards research. For instance, I wanted my research to be collaborative as well, so that the people I worked with played an active role in designing my project. With this collaborative, applied research approach in mind, I started discussing education project ideas with my former internship supervisor. He was excited about the possibility of collaborating, and we explored possible project ideas with his organization and with the local school district, none of which panned out. For instance, I considered applying for a position with the tribal organization as their education coordinator, wondering if this was the opening I needed to conduct truly collaborative, applied research. But I was dissuaded from doing so by some of my academic advisors because they feared I would lose focus on what I needed to accomplish for my graduate work.

At about the same time, I started reading more about a research orientation known as *action research*. What I read seemed to be asking and attempting to answer my own questions about why and how we do research. Action researchers devote their research to making positive change in their research contexts and in so doing often favor the generation of practical knowledge over theoretical knowledge, or at least insist on generating both concurrently by eliminating the institutional divide between reflection and action. I found myself sharing quotes with colleagues, especially other graduate students. For instance, a passage from Hilary Bradbury (2002) spoke directly to me. Bradbury had done her dissertation working with the organization *The Natural Step* on environmental education and sustainable development projects. She writes,

> "Graduate students can well afford to be engaged in the work they love if they attend both to the necessary 'rigor' of good social science as well as the necessary 'vigor' of work needed in the face of our quest for sustainable development. The tension between the two is creative and can bring fruit to our activism, by making it more relevant and engaged...This chapter is intended to exemplify for struggling graduate students that we need not give up on a desire to be in conversation with the legitimate academic mainstream because we are committed to using an action research approach" (p. 312).

Other sources I explored reassured me that I had been making legitimate attempts to do applied, collaborative research but that the action research process is not straightforward. It takes time to build trusting, collaborative relationships and to ensure that the research design is relevant to the local context.

I realize now that in my conversations with the rural school district, I was making attempts at action research by sharing my very unrefined ideas early on so that I could garner as much input as possible on my research. However, my approach came off as too unprofessional with some school district staff. I was left frustrated with the feeling of not knowing how to design the kind of project I was envisioning. I questioned whether research was really what I wanted to be doing, or if I simply wanted to be a teacher or an environmental educator. But I had entered grad school wanting to explore the kinds of questions that I felt I would not be able to address as a full-time educator. How does one explore those questions while still conducting research that is meaningful to local practitioners?

Appendix E

Research Methods and Calendar

This appendix summarizes the details of my research methods and presents a field work calendar. The data generated for this research came from the following sources:

- Field notes taken during participant observation throughout field work, including
    - Summer 2005 internship for Boreal Farm
    - Extensive volunteering and teaching in EKCS classes, especially summer 2006
    - Informal conversations with EKCS teachers and students throughout fieldwork
    - Attending five EKCS staff and/or board meetings
    - Conducting three meetings with EKCS staff regarding gardening
    - Six visits to Howard Luke's Galee'ya Spirit Camp, one with EKCS students
- Ten semi-structured interviews with teachers and others working with the EKCS
- One open-ended interview with Howard Luke (Because this interview was so different from the others and was not anonymous, the transcript is included in Appendix B.)
- One focus group with ten EKCS students

	2005	2006	2007
January	Decide to conduct field work in Fairbanks	Teach one week of 8th grade boreal forest module	Begin drafting dissertation chapters
February	Apply to work for school gardening program at Boreal Farm	Present research proposal to EKCS Academic Policy Committee	Conduct more EKCS interviews and one with Howard; start working on gardening curriculum
March	Start training with Boreal Farm staff	Continue ongoing, problematic discussions with Boreal	Arrange Howard's visit to 8th grade classroom
April	Volunteer at Boreal Farm	Decide not to pursue collaboration with Boreal and move forward with EKCS plans; visit Howard Luke's camp first time	Substitute teach one week for EKCS 8th grade
May	Start school garden supervisor job; begin discussions with Boreal staff about collaboration	Defend dissertation proposal; co-teach 8th grade food system module; spend one night at Howard's with students	Conduct EKCS student focus group
June	School gardening position offers challenges in hiring students and working with Boreal supervisors	Attend EKCS graduation and other school events	Give draft of gardening curriculum to EKCS teachers
July	School gardening job progresses well with two student employees, not so well with Boreal staff	Visit Howard's with friends to put up moose fence	Vacation
August	School gardening job ends; begin more intense talks with Boreal Farm re collaboration	Guest lecture on food systems to EKCS high school class; start teacher interviews for research/curriculum	Vacation
September	Continue slow email communication with Boreal about collaboration	Visit Howard's with friends to harvest and make sauerkraut; present garden plan ideas to EKCS staff and have garden planning meeting	Receive feedback from EKCS collaborators on gardening curriculum draft
October	Begin talking more with EKCS teachers; arrange to volunteer in 8th grade	Visit Howard's with friends to cut wood; conduct more teacher interviews and two garden meetings	Work on dissertation
November	Start volunteering at EKCS	Finish written comprehensive papers	Work on dissertation
December	Start preparing 8th grade boreal forest module	Finish oral comprehensive exams	Defend dissertation

Appendix F

IRB Interview Protocol

Interview Protocol for

Place-Based Education and Agriculture in Interior Alaska:
Strengthening a Community Food System
Researcher: Laura Henry, UAF Graduate Student
Dates: March – October 2006

Introduction:
I am collaborating with the Effie Kokrine Charter School to design and teach gardening curriculum. I would like to hear your perspective on gardening at the school. There are two reasons I'd like to hear from you. One is so you can contribute to the design of gardening curriculum for the school. The other is so I can evaluate whether the project is proceeding successfully. I am investigating whether this project is contributing to the ecological knowledge of the participants as well as to community and ecological health. You probably already know something about this project, so you could start by telling me what you know. Your participation in this interview is completely voluntary and you may stop at any time.

Additional guiding questions for open-ended discussion:

What is your involvement in this project thus far?

What are your hopes for a gardening curriculum at the school?

What is your understanding of Fairbanks' food system?

How can schoolyard gardening play a part in Fairbanks' food system?

For students:

If you are a student participating in a gardening lesson, what are the strengths and weaknesses of the lesson?

What is your favorite thing you've learned? The most important?

What was your interest in gardening before and what is it now?

For adults:

What role has gardening played in your life?

What is your understanding of sustainable agriculture?

Appendix G

IRB Informed Consent Form

Informed Consent Form (for participation in)
Place-Based Education and Agriculture in Interior Alaska:
Strengthening a Community Food System

Description of the Study:
I am conducting a study about place-based education in Effie Kokrine Charter School's (EKCS) gardening program. I am helping design a garden curriculum for the school. I am asking you to participate in this study because you are involved with the EKCS garden or sustainable agriculture in Fairbanks. If you decide to take part, I will observe your participation in this project and have informal conversations and maybe formal interviews about the project. I will take notes, and if you agree, I may record interviews with a digital voice recorder. Please read this form and ask any questions you may have before you agree to be in the study.

Risks and Benefits of Being in the Study:
There are no major risks to you if you participate in this study. Some people are uncomfortable being observed or interviewed, and I will make every effort to provide a comfortable atmosphere if you agree to participate. Your participation in this program will help us create a gardening curriculum that will benefit the EKCS community. As a participant, you may receive benefits such as education about gardening, but there is no guarantee that you will benefit directly from taking part in this study.

Confidentiality:
Because I am conducting this study as a part of my research through the University of Alaska Fairbanks (UAF), the results will be public information. Also, this study will result in a written curriculum for the EKCS. Because you are a participant in the EKCS garden project, people familiar with the program may guess your identity from your answers to some questions. However, I will not collect any identifying information about you in this study, and will make every effort to protect your identity. Any information about you as an individual that you reveal in conversations or interviews will be kept strictly confidential and secure in a locked office at UAF. This signed consent form will be stored securely and separately, making it difficult to link you to this study. Only I will listen to any audio recordings that I make, and I will transcribe the parts that I need, and then I will erase the recordings within one year. I may ask to video record some of our educational gardening activities. I may use the footage to create a DVD for the school as part of the gardening curriculum. If you agree to be video recorded, I cannot guarantee your confidentiality.

Voluntary Nature of the Study:
Your decision to take part in the study is voluntary. You are free to choose not to take part in the study or to stop taking part at any time without any penalty to you.

Contacts and Questions:
If you have questions now, feel free to ask me. If you have questions later, you may contact me at 907-374-0431 or ftlrh@uaf.edu or my faculty sponsor Ray Barnhardt at 907-474-1902 or ffrjb@uaf.edu.

If you have questions or concerns about your rights as a research subject, please contact the Research Coordinator in the Office of Research Integrity at 474-7800 (Fairbanks area) or 1-866-876-7800 (outside the Fairbanks area) or fyirb@uaf.edu.

Statement of Consent:
By signing this form you agree that you understand the procedures described above, your questions have been answered to your satisfaction and you have been provided a copy of this form. You agree to participate in this study in the specific activities initialed below.

(For minors, guardians initial below.)

_____ I consent to being interviewed but **NOT** being recorded.   _____

_____ I consent to being interviewed **AND** being recorded.   _____

_____ I consent to being recorded while participating in a group meeting._____

_____ I consent to being video-recorded.   _____

_____ _____
Signature of Subject & Date

_____
Signature of Person Obtaining Consent & Date

For parental consent, if participant is under 18 years old:

_____has my permission to participate in this study. I understand the procedures described above. My questions have been answered to my satisfaction, and I allow my ward to participate in this study. I have been provided a copy of this form.

_____
Signature of Legal Guardian & Date

Appendix H

Research Proposal submitted to EKCS Academic Policy Committee

**Integrating Schoolyard Gardening into Effie Kokrine Charter School Curriculum:
A Proposal for Participatory Action Research**

By Laura Henry
Interdisciplinary PhD Student
University of Alaska Fairbanks
474-6758; ftlrh@uaf.edu
February 2006

Introduction

I have prepared this brief proposal for the Academic Policy Committee (APC) of the Effie Kokrine Charter School (EKCS). I propose to initiate a collaborative research project for my PhD research at the EKCS this spring, 2006. The purpose of this research will be to design a gardening curriculum to be implemented at the EKCS, building on and contributing to programs already conducted by [Boreal Forest Farm]. This project will build links between EKCS students, their community and our local food system. This proposal will include my information about my background, my proposed research framework and objectives, a plan for collaborative field work, and a timeline for designing the curriculum and implementing a demonstration project.

Research Objectives

This project intends to meet multiple educational and research objectives by linking them together in the design of a gardening curriculum.

Specific objectives for this project:

- Collaborate with EKCS teachers, students, parents, and others and with [Boreal Forest Farm] to
- Create a gardening curriculum for EKCS.
- Design and implement at least one specific three-week module during the gardening season as a demonstration or pilot project for the curriculum.

Potential objectives for a gardening curriculum at the EKCS:

- Enhance student's ecological literacy and gardening skills through experiential education in gardening.
- Provide learning opportunities in science, math, and language that are integrated with the experience of gardening.
- Provide nutritious, local produce for students.
- Perform a service to the community by providing produce for community members.
- Build connections between the school community and the wider community.
- Foster ecological stewardship and citizenship among students.
- Improve ecological health of regional ecosystem by reducing food imports in favor of producing vegetables locally and sustainably.

Broad research objectives:

- Illuminate some dynamics of local food systems, hopefully indicating ways that Fairbanks' local food system can become more resilient and ecologically sustainable through schoolyard gardening.
- Explore whether this kind of project can improve—in David Sobel's words— "community vitality and environmental quality."

Schoolyard Gardening and Place-based Education

Schoolyard gardens are burgeoning around North America. In places where the growing season overlaps with the conventional school year, gardens serve as outdoor classrooms for students at the same time that they produce fresh, healthy vegetables for school lunches, such as in The Edible Schoolyard in Berkeley, California. In places where the gardening season is shorter, summer gardening programs may offer youth employment opportunities, such as The Food Project in Boston, Massachusetts. Gardening and agriculture may not be seen as traditional Native Alaska practices. However, my observation has been that many Native Alaskans in rural villages have family or community gardens. In communities all over Alaska, local gardening offers a better way to access nutritious produce than shopping at local stores, which have a limited and often expensive selection of produce imported from the lower 48 states at great cost. In addition, traditional Athabascan fish camps on interior rivers, such as Howard Luke's Galee'ya Spirit Camp on the Tanana, often have a garden. At least one rural community in interior Alaska—Fort Yukon—has expressed interest in linking community gardening with education. The village of Chickaloon already has a community garden and greenhouse and has been using students to help plant, maintain, and harvest produce. The gardening curriculum at the EKCS could link to these other objectives and initiatives in interior Alaskan communities.

I have already observed during my brief time volunteering at EKCS the many ways that the school exhibits a place-based educational philosophy. David Sobel (2003) describes place-based education as

"…the process of using the local community and environment as a starting point to teach concepts in language arts, mathematics, social studies, science, and other subjects across the curriculum. Emphasizing hands-on, real-world learning experiences, this approach to education increases academic achievement, helps students develop stronger ties to their community, enhances students' appreciation for the natural world, and creates a heightened commitment to serving as active, contributing citizens. Community vitality and environmental quality are improved through the active engagement of local citizens, community organizations, and environmental resources in the life of the school."

Native Alaskan educational practices seems to reflect an inherent place-based approach by using the local environment and local people as educational opportunities. Schoolyard gardening also embraces this local approach. This project would draw from these similar approaches to education and in turn investigate whether Sobel's observations apply to the EKCS and its community.

Participatory Action Research

I intend to conduct my research as participatory action research (PAR). In PAR, the researcher is not someone who "objectively" studies a situation or a group of people for the purposes of analyzing a research question of her own design and writing a theoretical paper without any relevance to the people in question. Rather, an action researcher believes in

collaborating with local research partners in every stage of the research and in conducting research that helps solve local problems. Hence, I do not want to conduct research that is of no interest to EKCS. I intend to make my research useful to the school, and need participation from teachers, students, parents, and the APC to make sure that this happens. This proposal is meant as a "conversation-starter," in which I will lay out my interests, but which will ideally lead to input from the APC initially and others later about the design and conduct of this project. Ideally, [Boreal Farm] staff will also be collaborators in this project, as one of their long-term goals for their school garden program is to find ways to integrate the garden into the school curriculum. They have expressed informal interest in my research, but we have not formally agreed on a project design.

Methods

I have already been volunteering and substitute teaching at EKCS, in part to gain experience in the school's educational approach so that I can apply my experiential knowledge to the design of the project. In research language, this could be considered *participant observation*. However, this has thus far been a very casual approach. If my research is approved by the APC and by UAF's Institutional Review Board (IRB), I will start documenting my observations more formally in a *field journal*. I also propose to conduct *interviews* and hold *group meetings* with stakeholders to work together on the design of this gardening curriculum. These activities will require *informed consent* from participants, and for students, parents will have to give their consent as well. But my involvement will go beyond conventional field research and will have a more active character. I propose to put together a gardening curriculum committee and facilitate committee meetings to design a gardening curriculum and then conduct a three-week module some time during the gardening season as a pilot project to give the committee some additional feedback for designing the curriculum. My final product for the school will be a report or a written curriculum guide for schoolyard gardening at EKCS.

Potential Garden Sites

The gardening curriculum committee would need to decide to what extent and how gardening curriculum could be implemented this summer and what garden site to use. Boreal Farm will be hiring students to work in the school garden program this summer, and they will be producing food for their customers. Any gardening curriculum that utilizes the present schoolyard garden will have to be coordinated with Boreal Farm. They have suggested that the most useful way a gardening curriculum could be implemented this summer is for students to help in ways that would contribute to the school garden program, such as by building a much-needed moose fence. There may be other potential gardening sites off-site as well. For instance, UAF started a community and youth garden last summer that may offer space for EKCS students to work this summer. Students may be able to work at Howard Luke's garden at the Galee'ya Spirit Camp. The logistics of transporting students to the camp could be challenging. However, the EKCS is looking for ways to utilize the camp in the school curriculum. Building a gardening curriculum around Howard Luke's garden is appealing because of the cultural connections to subsistence fish camps and because maintaining a garden at Galee'ya could be performed as a service for a Native elder and his community.

Timeline
February 2006—Obtain approval/input from EKCS APC and IRB approval from UAF.

March—Put together gardening curriculum committee of teachers, students, Boreal Farm staff, and other stakeholders; hold first meeting. Investigate examples of other schoolyard gardening projects in northern latitudes.

April—Continue committee meetings; decide on a site for implementing any garden projects this summer.

May—Potentially, conduct either a full module preparing students for gardening season or incorporate garden planning into other module lessons. Some module time could be devoted to gathering input from the student body about how they would like to incorporate gardening into their curriculum.

June-August—Either help Boreal Farm maintain schoolyard garden and/or maintain off-site garden.

September—Conduct some type of "end of season" event, either a "harvest" module, or perhaps a local foods potlatch or event that incorporates garden produce as well as traditional Native subsistence foods.

October-December—Write an EKCS gardening curriculum or report.

Spring 2007—Write dissertation.

Researcher Background

 I was raised in Pennsylvania and West Virginia and have lived in Alaska for six years. My broad research interests concern ecological education and sustainability, and I have a bachelor's degree in biology from St. Mary's College of Maryland and a master's degree in Earth Literacy from Saint Mary-of-the-Woods College in Indiana. I am in my fourth year as a graduate student at UAF. I am an interdisciplinary student based in the Center for Cross-Cultural Studies (CCS) and in the Resilience and Adaptation Program (RAP). As part of my RAP requirements, I completed an internship working for the Council of Athabascan Tribal Governments in Fort Yukon during the summer of 2003. The following summer, I took a UAF summer course in place-based education and spent a week at Old Minto as part of that course. These two limited experiences perked my interest in collaborating with Alaska Natives on a place-based education project for my PhD research. Ray Barnhardt and Craig Gerlach serve as co-chairs on my graduate committee and have helped guide me in this goal.

 Last summer, 2005, I continued to gain experience in place-based education by working for Boreal Farm's school garden program as the Youth Garden Supervisor for two students from the former Howard Luke Academy. I have been following the development of the EKCS with interest for a few years now. Recently, I have been volunteering and substitute teaching at the EKCS and I am excited about the opportunity of collaborating with the school to build my experience and interests into a garden curriculum for EKCS. I believe EKCS offers a unique opportunity to explore place-based education generally and gardening education in particular because of its educational philosophy and the logistical convenience that students will be attending school during the gardening season. I bring to this project an ongoing investigation of educational gardening projects in other northern communities and of ecological and cross-cultural educational frameworks.

Appendix I

State of Alaska Cultural Standards for Education

Cultural Standards for Students
   A. Culturally-knowledgeable students are well grounded in the cultural heritage and traditions of their community.
   B. Culturally-knowledgeable students are able to build on the knowledge and skills of the local cultural community as a foundation from which to achieve personal and academic success throughout life.
   C. Culturally-knowledgeable students are able to actively participate in various cultural environments.
   D. Culturally-knowledgeable students are able to engage effectively in learning activities that are based on traditional ways of knowing and learning.
   E. Culturally-knowledgeable students demonstrate an awareness and appreciation of the relationships and processes of interaction of all elements in the world around them.

Cultural Standards for Educators
   A. Culturally-responsive educators incorporate local ways of knowing and teaching in their work.
   B. Culturally-responsive educators use the local environment and community resources on a regular basis to link what they are teaching to the everyday lives of the students.
   C. Culturally-responsive educators participate in community events and activities in an appropriate and supportive way.
   D. Culturally-responsive educators work closely with parents to achieve a high level of complementary educational expectations between home and school.
   E. Culturally-responsive educators recognize the full educational potential of each student and provide the challenges necessary for them to achieve that potential.

Cultural Standards for Curriculum
   A. A culturally-responsive curriculum reinforces the integrity of the cultural knowledge that students bring with them.
   B. A culturally-responsive curriculum recognizes cultural knowledge as part of a living and constantly adapting system that is grounded in the past, but continues to grow through the present and into the future.
   C. A culturally-responsive curriculum uses the local language and cultural knowledge as a foundation for the rest of the curriculum.
   D. A culturally-responsive curriculum fosters a complementary relationship across knowledge derived from diverse knowledge systems.
   E. A culturally-responsive curriculum situates local knowledge and actions in a global context.

Cultural Standards for Schools
   A. A culturally-responsive school fosters the on-going participation of Elders in all aspects of the schooling process.

B. A culturally-responsive school provides multiple avenues for students to access the learning that is offered, as well as multiple forms of assessment for students to demonstrate what they have learned.

C. A culturally-responsive school provides opportunities for students to learn in and/or about their heritage language.

D. A culturally-responsive school has a high level of involvement of professional staff who are of the same cultural background as the students with whom they are working.

E. A culturally-responsive school consists of facilities that are compatible with the community environment in which they are situated.

F. A culturally-responsive school fosters extensive on-going participation, communication and interaction between school and community personnel.

Cultural Standards for Communities

A. A culturally-supportive community incorporates the practice of local cultural traditions in its everyday affairs.

B. A culturally-supportive community nurtures the use of the local heritage language.

C. A culturally-supportive community takes an active role in the education of all its members.

D. A culturally-supportive community nurtures family responsibility, sense of belonging and cultural identity.

E. A culturally-supportive community assists teachers in learning and utilizing local cultural traditions and practices.

F. A culturally-supportive community contributes to all aspects of curriculum design and implementation in the local school.