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SCHOOL CHANGE FOR SUSTAINABILITY

By

RYDER DELALOYE

Bachelor of Science in Education, Northern Arizona University, Flagstaff, AZ, 2005

Bachelor of Science in Economics, Northern Arizona University, Flagstaff, AZ, 2005

Master of Arts in Political Science, Northern Arizona University, Flagstaff, AZ, 2008

Master of Arts in Rural Geography, Northern Arizona University, Flagstaff, AZ, 2008

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Approved by:

Scott Whittenburg Ph.D., Dean of The Graduate School
Graduate School

Adrea Lawrence Ph.D., Chair
Teaching and Learning

Morgen Alwell Ph.D.,
Teaching and Learning

Jill Belsky Ph.D.
Society and Conservation

Fletcher Brown Ph.D.
Teaching and Learning

John Matt Ed.D
Educational Leadership

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SCHOOL CHANGE FOR SUSTAINABILITY

Chairperson: Adrea Lawrence

Committee Members: Morgen Alwell, Jill Belsky, Fletcher Brown, John Matt

The welfare of current and future generations is diminished due to unprecedented levels of ecological degradation that is a result of accelerating levels of per capita consumption. Sustainability education is being widely embraced as an applied strategy for addressing both unchecked consumption and environmental degradation (Brown, 2003). Yet, little is known about how schools adopt and implement sustainability education. The means by which to engage and foster sustainability education is not well researched. This qualitative research study seeks to address the following research question: How did students and faculty at each school site go about the process of creating and implementing a sustainability education program? The study utilizes case study methodology to understand the process and experience of sustainability education programming in the context of secondary public education. Through participatory action research, this study explored the ways in which resilience, identity, culture and others factors determine sustainability education programming in an applied manner. The research was conducted at a comprehensive high school and an independent tribal school. The purpose of the study was to develop and provide an understanding of how schools engage in the process of school change for sustainability. The insights gained from this research project regarding the planning, development, and implementation of sustainability education programming can further school change for sustainability.

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Chapter 1 Introduction

Introduction

Creating a more sustainable society relies on educational institutions shaping the values and assumptions people hold (Hosley, 1993). Working with schools to understand the process of school change for sustainability helped to build school specific pathways for the development and implementation of sustainability education programming. This qualitative, multiple case study incorporated elements of participatory action research to understand how programming for sustainability occurs within two secondary schools. According to Kemmis (2010), this integrative approach to research within schools

aims to explore new ways of doing things, new ways of thinking, and new ways of relating to one another and to the world in the interest of finding those new ways that are more likely to be for the good of each person and for the good of humankind, and more likely to help us live sustainably (p. 425).

The action component of this research project allowed me, as a researcher, to contribute directly to the field of education and the practice of sustainability education at each school. The integrative approach as exemplified by Kemmis (2010), helps educational research go beyond theory and into the realm of application, “in our time of global warming and the human threat to life on Earth, it seems to me that a huge task is required of action research – action research for sustainability” (p. 425). This project informed school programming and individual behavior related to sustainability. The project responds to the call for more application-based research within sustainability education.

Purpose of the Study

The goal of the project was to understand the experience of school change for sustainability at two unique case study sites. Through a participatory case-study approach, I worked with a comprehensive high school and an independent tribal high school to understand how sustainability programming is planned, implemented, and experienced. The insights gained from both schools served to inform my understanding of school change for sustainability.

Sustainability is development that maintains the health of ecological systems while ensuring the welfare of individuals and society (Brown, 2003; UNESCO, 2008). The theoretical and applied fields of sustainable development, environmental economics, ecological economics and environmental policy, highlight established pathways of promoting sustainability on local, national, and global levels. Increasingly, education and school programming for sustainability are used to develop sustainable behaviors in future citizens. Sustainable behaviors consist of reducing waste, conserving resources, promoting personal and communal health, and engaging in both environmental and social justice. Throughout the world, Education for Sustainability (EfS) is conducted within schools to create a more sustainably aware citizenry (UNESCO, 2005). Kemmis (2010) states that “in the era of global warming, we are confronted starkly by the question ‘what is to be done?’ both at the level of the individual and at the level of humankind” (p. 425). A central objective of this study is to support the call for increased research in the field of educating for sustainability in an applied manner (Moore, 2005; Kemmis, 2010).

Approaches to sustainability education vary greatly and assume a myriad of orientations. Many schools and teachers are uncertain about how best to begin the process of crafting a sustainability education program. To understand the process of sustainability education program

planning, development, and implementation this study was conducted in a participatory and collaborative manner with members of the school community.

How do students and faculty at each school site go about the process of creating and implementing a sustainability education program? Addressing this questions required the following sub-questions to be explored throughout the research process. First, *what were the understandings and assumptions about sustainability at each school site?* Second, *how does or doesn't sustainability fit within the participants' cultural/community-based understandings and assumptions?* Third, *what are the understandings and assumptions held by the members of the school sites about how the schools related to and fit within broader communities?* Fourth, *how do the sustainability education programs function and operate at school sites?* These questions guided the research experience according to four essential domains of inquiry: 1) The perceptions held by participants within the school sites, 2) The relationship participants had with sustainability and the community, 3) The relationship participants had with sustainability and the school specific settings, and 4) The experience and perceived process of sustainability education programming.

Because of the importance of place and context to sustainability education, my examination of sustainability education programming occurred within two very different schools: Three River Valley High School, a comprehensive mainstream high school, and Medicine Tree Tribal School, a tribally affiliated independent school. I facilitated the development and implementation of a sustainability education program in both schools. Because there is “a need for more research into the learning process by observing children in action,” my research

involved two case studies for the purpose of understanding sustainability education programming (Hedefalk, Almqvist, & Östman, 2014, p. 12).

The first objective of the project was to plan, develop, and implement the sustainability education program at each school site. I examined the school specific factors associated with their experience of sustainability education programming to gain insight into how context and approach shaped that experience. The second objective of the project was to understand the experience of sustainability education programming through meaningful analysis. This project responded to the need for educational research "to pay more attention to the pedagogical aspects of education rather than to focus mainly on school-society relationships" (Kazamias & Schwartz, 1977, p. 174). Through this project, I developed meaningful program implementation strategies that informed future practice. The strategies that emerged are demonstrated within the *Stakeholder Relationship Model*, the *Challenges to Sustainability Education Programming* chart, the *School Change for Sustainability Action Competencies*, and the *Sustainability Education Programming Process*.

Research Question and Case Study Site Selection

Case study analysis and participatory action research were used to answer the research question: *How do students and faculty at each school site go about the process of creating and implementing a sustainability education program?* In addressing this question, the research project examined the means and methods of sustainability education programming at each site through multiple data collection strategies. The inquiry that guided this project focused on understanding how to develop and implement sustainability education programming at two sites.

The two case study sites were selected to gain a rich and varied experience with programming for sustainability education. Although this study was not designed to be a comparative analysis, the use of two case studies as the basis of inquiry allows for more varied experiences to occur. Working with organizations that varied significantly across multiple domains enabled the study of the experience of sustainability education programming to capture a wide array of experiences. In conducting research in a comprehensive high school in an urban setting and an independent tribal school in a rural setting, this research project strived to have a wide array of experience with programming. The comprehensive high school was selected for the purpose of understanding a sustainability education program in a large school that contained many attributes found in structured and highly standardized educational environments. The selection of a tribal school as a case study site is predicated on the assertion that "Indians stand at the crossroads in identifying and establishing their relationship to the institutions of the larger society" (Deloria, 1981, p. 139). Striving to understand this experience and establishing sustainability education programming as informed by tribal values was one of the primary goals of this project. As a small, rural and independent school, Medicine Tree Tribal School helped to connect the experience of school-based programming to the theoretical underpinnings of sustainability.

Defining Independent and Comprehensive High School

The study was conducted in two unique contexts. The experience of sustainability education programming occurred within a comprehensive high school and an independent high school. A comprehensive high school strives to meet a wide range of academic needs and interests. This structure of school organization is common in America. The comprehensive

approach to high school education provides opportunity for students to explore a range of topics. The comprehensive high school contains different strands of learning specialization which includes college preparatory courses, vocational courses, and other additional areas of focus. The basis of the comprehensive high school emerged from the vision of education as exposed by the Committee of Ten. In 1892 the National Education Association formed a committee of Higher Education Administrators. Their task was to articulate a more standardized and comprehensive education system to be implemented across the nation, the basis of which ensured that student participated in programs of study that provided a rich liberal arts course offering.

Independent high schools provide an approach to education that aligns with the needs of their community and their students. Typically, the term independent school refers to private schooling. However, the term independent high school carries other defining characteristics that align with Medicine Tree Tribal School. Independent schools have the freedom to define their mission, the freedom to regulate admissions, and the freedom to teach what the school, teachers, and community, determine to be necessary and appropriate. Medicine Tree Tribal School, although not privately financed, is independent in that it created a focused tribal mission for the school, it limits admission to Tribal members, demonstrates preference for hiring teachers who are Tribal members, and, defines its delivery and content according to the needs of the Tribal community.

Research at different sites helped me to understand how different factors shape sustainability educational programming and how school change for sustainability varies in different educational contexts. The process involved working with the school community to plan, develop, and implement sustainability education programming. Research was conducted through

the use of field notes, artifact analysis, maintaining a reflective journal, and conducting interviews with students, teachers, and administrators. Interviews with participants were used to understand conceptions of sustainability, the ways in which community informs school change, how leadership affects school change, and the role of meaningful learning within sustainability education programming according to participants. School-based stakeholders played a critical role throughout this project. Stakeholders consisted of students, teachers, and administrators. Analysis was aimed at understanding how the stakeholders related and reacted to one another amidst the process of programming. Through observations and conversations meaningful insights regarding the experiences of participants were gained.

Theoretical Framework

Theory guided how the project was planned, developed, and implemented throughout this project. Both long-standing and newly-formed schools of thought were utilized to inform the approach to research. Theory-guided the recursive process of review, reflection, and action that oriented my behavior as a researcher throughout the project. The different theoretical traditions served as lenses by which planning, gathering of evidence, and data analysis was conducted. The topics of sustainability, sustainability education, critical pedagogy, interdependence, and indigenous ways of knowing informed the recursive process of analysis.

Sustainability

Two definitions cited for sustainability come from Lester Brown, a respected environmental advocate, and the United Nations Brundtland Commission. Both sources argue that sustainability occurs when a society can fulfill its needs without diminishing the chances of

future generations to experience a similar or better quality of life. The United Nations Brundtland Commission (1987) defines sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (p. 43). These definitions used for educational programming purposes are limiting. Although they assert the importance of posterity and intergenerational justice, “they do not tell us anything about how to actually build a sustainable society” (Capra, 2007, p. 10). A definition of sustainability used within an educational framework should incorporate values, beliefs, and methods for achieving a more balanced and peaceful world (WCED, 1987, p. 43).

Sustainability Education

Sustainability education integrates sustainability into learning for the purpose of changing student’s identities. Sustainability education as stated by Kemmis and Mutton (2012) is, a process by which children, young people and adults are initiated into forms of understanding, modes of action and ways of relating to one another and the world, that foster individual and collective self-expression, individual and collective self-development and individual and collective self-determination, and that are, in these senses, oriented towards the good for each person and the good for humankind (p. 204). Sustainability education asserts that education shifts identity and behaviors. Education as an experience of transformation for sustainability occurs when individuals learn about, experience, and practice behaviors that provide for the welfare of natural and social systems.

Education for sustainability requires a powerful approach to learning that is both conceptual and experiential. It is learning that enables students to gain a depth of understanding about how their actions affect social, environmental, and economic systems. Sustainability

education enables students to see the relationships and connections that lead to sustainability outcomes. Sustainability education fosters a deep respect for living things and the systems that sustain them (Capra, 2007). It is through this connection that individuals act in sustainable ways. Sustainability education represents a focused approach to education that provides for the integration of “principles, values, and practices of sustainable development into all aspects of education and learning” (UN Decade of Education for Sustainable Development, 2014). Values that uphold social and environmental justice lead to practices that support sustainable systems.

Critical Pedagogy

The emergence of sustainability within critical pedagogy first took place at the UN Earth Summit of 1992. This “inspired educators like Paulo Freire to see that a critical pedagogy must cultivate an ecological dimension” (Kellner & Kellner, 2010, p. 152). Critical pedagogy served a central role in the theoretical framework of this research project. Critical pedagogy is defined by Shor (1992) as the

habits of thought, reading, writing, and speaking which go beneath surface meaning, first impressions, dominant myths, official pronouncements, traditional clichés, received wisdom, and mere opinions, to understand the deep meaning, root causes, social context, ideology, and personal consequences of any action, event, object, process, organization, experience, text, subject matter, policy, mass media, or discourse. (*Empowering Education*, 129)

I engaged with teachers, students, and administrators in a manner that encouraged them to make decisions, assume responsibility for initiatives, and feel empowered to achieve critical

consciousness. Critical consciousness is defined as "learning to perceive social, political, and economic contradictions, and to take action against the oppressive elements of reality" (Freire, 1993, p. 17). Sustainability moves critical pedagogy forward by emphasizing the role of place and environment into the development of critical consciousness through learning. "The ecological challenge to critical pedagogy is to expand its socio-cultural analyses and agendas for transformation to include an examination of the interactions between cultures and ecosystems" (Gruenewald, 2003, p. 5).

Engaging in critical pedagogy relies on conceptualizing the process of meaning making. Learning was considered a reflection of inner ways of knowing and understanding. Within critical pedagogy, engagement leads to deep personal reflection and action. Action is supported by a need to understand and then change the world. Gruenewald (2003) uses the concept *conscientização* to state the goal of education, which is to become "more fully human through transforming the oppressive elements of reality are at the center of critical pedagogical practice" (Gruenewald, 2003, p. 5). Understanding the oppressive elements that lead to unsustainable ways of living is the first step in taking action to overcome the causes of environment and social degradation (Kellner & Kellner, 2010).

Interdependence

Viewing systems as interconnected entities that function in conjunction with one another is an important conceptual premise for sustainability education programming. Students need "to know they are involved in interrelationships rather than a mere relationship with things" (Lee, 2014, p. 31). Awareness of these interrelationships on the part of students creates a lasting bond

between current generations and future generations. As a basis for learning and educational programming, an awareness of interdependence serves to guide current and future behaviors towards sustainability (Gruenewald, 2003, p. 3) It is through deep and personal analysis of the dominant motives that frame our experience and the experience of others that sustainability education becomes manifest (Bonnett, 2002, p. 19).

Indigenous Ways of Knowing

Indigenous ways of knowing according to tribes in specific parts of the Rocky Mountain region of North America informed and shaped how sustainability education occurs from a programming and implementation perspective. For this study, indigenous ways of knowing was referenced specifically to the North American tribes that I worked with through the course of this project. Indigenous ways of knowing consists of the insights, values, and perceptions of the tribes I worked with through this study maintained. Indigenous ways of knowing are connected to the goals and approaches of critical pedagogy and sustainability education as stated by Beckford et al., (2010) “The accumulated knowledge of the remaining Indigenous groups around the world represents a body of ancient thoughts experience and actions that must be honored and preserved as a vital storehouse of environmental wisdom” (Beckford et al., 2010, p. 240). Through the observing honoring ceremonies at the school I began to understand the ways in which the natural environment was viewed and respected at the school.

Indigenous ways of knowing align with the values and ideals contained within sustainability. These ways of knowing relate to practices and ideals that serve to make sustainable action applied. “Modern societies must recapture the ecologically sustainable

orientation that has long been absent from its psychological, social and spiritual consciousness” (Beckford et al., 2010, p. 240). Given that sustainability education strives to bring about behavioral changes it is important to address topics that are deeply personal, such as spirituality and personal psychology. Broaching topics of the sacred are challenging to do within empirically-based approaches to research (Beckford et al., 2010). The belief that nature holds intrinsic value for the individual and the community ground both indigenous ways of knowing and sustainability education. Tribal based “environmental philosophy emphasizes the commitment to the preservation and enhancement of, and respect for the environment while advocating a coexistence with nature and the responsible use of resources” (Beckford et al., 2010, p. 243). Participants utilized indigenous ways of knowing to help identify specific strategies that encouraged students to become sustainable citizens.

Sustainability education promotes meaningful transformation by providing student-centered programming and learning strategies. Students play an important role in the tribal school, and these schools work to “incorporate the inherent social and cultural capital of the child” (Knowles, 2012, p. 900). By honoring the social and cultural capital of the student, learning is viewed from tribal perspectives through the concepts of time, space, and energy (Deloria & Wildcat, 2001). “In reflecting on our role in the world, sustainability education as informed by indigenous values and approaches cultivates the instincts that connect students to others and supports them in acting in a cooperative and caring manner” (Lee, 2014, p. 31). This project helped students understand their role within the web of relationships that exists through and around them.

Positionality of the Researcher

Central to this project was my role as a researcher. Even though this project relied on multiple sources of data gathered over extended periods of time, my role was central to the process of research design, data collection, and data analysis. My personal agenda for this project was to help schools become more sustainable. I was motivated to inspire the future generation to act and live more sustainably. Having lived in developing countries in Asia, I have seen first hand how unsustainable practices lead to environmental degradation, huge levels of disparity between the wealthy and the poor, and extensive social unrest. Each of these factors contributed to devastating levels of resource scarcity and economic instability. I am motivated to help build the capacity for the future generations to live more sustainably.

I have been a teacher for 11 years. I taught in countries around the world, in both public and private schools. As a teacher, I feel that education is the most powerful tool for bringing about societal change. To address the challenges faced around the world, I feel that people need to live and act in a more sustainable manner. By helping to learn and act sustainably through a structured educational program, I believe that students need the opportunity to build the skills and competencies they need to address future challenges. I have two young children, and the promotion of sustainability is critical for me in helping to ensure their future welfare and happiness. As a researcher, I am aware of my biases and dispositions. As an educator, father, and citizen of the world, I am also keenly aware of my responsibility to promote sustainability.

Significance of the study

I worked through this study to understand what sustainability education programming is and how it functioned within the context of secondary public education. From the insights I gained through multiple case study analysis, I developed new insights and understandings about school change for sustainability. These insights consisted of how to plan, develop, and implement programming in different contexts. Educational programming for sustainability enables students to “develop their knowledge, skills, values and attitudes, which promote their ability to understand the importance of a sustainable future and to act as responsible citizens from individual, local and global perspective” (United Nations 19th Special Session, 1997). As evident in the outcomes of their sustainability programs, the participating schools have come to understand the importance of balancing social, ecological and economic systems.

Organization of the Study

The purpose of this study is to understand the experience of school change for sustainability within two unique schools. In Chapter 2, a comprehensive review of the literature was provided that related to the research question. The following question guided the study’s trajectory of inquiry: *how do students and faculty at each school site go about the process of creating and implementing a sustainability education program*, helped to guide inquiry. The sections and topics contained within this chapter allowed me to provide a conceptual foundation for the practice of sustainability education programming. The first task of research was to define sustainability. The second task was to understand, frame, and contextualize sustainability education. This chapter concluded with a review of the programming aspects of sustainability

education. A framework for sustainability education programming analysis was developed through a review of the literature. This framework served to guide the experience of research and analysis.

In Chapter 3, the research methodology utilized in the project is presented. Sources of data, the processes used for data collection, and procedures employed for data analysis are presented. I outline in detail the analysis process utilized for this study. This chapter also includes an account of how the research conducted in an ethical and safe manner. The chapter concludes with recognition of the limitations to research that exist.

Chapter 4, provides a comprehensive overview of the data collected at the case study sites. The data collection focused on understanding the process of sustainability education programming and the outcomes of the respective programs by exploring the project data. Project data consist of participant responses related to their experience with sustainability programming, observations, reflexive journaling, and artifacts. The chapter concludes with a description of the generated themes derived from the analysis of the planning, developing, and implementing the sustainability education programming.

Chapter 5 discusses the meaning and significance of the themes derived from the analysis. This chapter examines potential implications that the project has in both theory and practice. Considerations regarding the role of the researcher and limitations of the study are offered. The chapter concludes with recommendations for future study.

Chapter 2

Literature Review

Theme 1: Defining Sustainability

Framing and Addressing the Environmental Crisis

Much of what underlies sustainability and the work being done to foster sustainability education is the environmental crisis. According to Clarke and Ainsworth, (1993) negative environmental change has occurred in the

atmosphere, geosphere, hydrosphere, and biosphere associated with a series of major ecological problems: ozone depletion, global warming, rising sea levels, air pollution, soil erosion, desertification, deforestation, water shortages, toxic wastes, etc. (p. 54).

The growth and magnitude of ecological problems in each of these areas are correlated with the increasing population growth and the rapid technological advancements of the last century (Schleicher, 1989). The accelerating use of resources to further consumption is the root cause of the environmental crisis. Schleicher (1989) believes that the environmental crisis is a multilayered issue that is largely the result of human activity. He states, “it is obvious that the equilibrium of the biosphere is changed and that the environment is shaped by man's adaptation to his surroundings and by the social systems he creates as his second 'nature'” (Schleicher, 1989, p. 258). The perceived relationship people have with their local environment and the resources they consume is at the heart of the issue and a crisis. Mcphie and Clarke (2015), refer to a crisis of perception as they identify how individuals are experiencing a complete “disconnection to ‘nature’” (p. 5).

Awareness of the environmental crisis arose initially in the 1970's (Shrivastava & Berger, 2012). In 1972, Meadows, Meadows, Randers, & Behrens wrote a study called *Limits to Growth*, this study developed simulations that examined how world population, industrialization, pollution, food production, and resource depletion would lead to a total collapse. Meadow et al., “showed that under the assumptions of industrial development, there was a clear conflict between human demands and Earth’s finite resources” (Shrivastava & Berger, 2012, p. 246). The study supported the belief that uninhibited growth was not possible, and it became a call to action for addressing unchecked economic growth.

The underlying factor contributing to the environmental crisis is the overconsumption of natural resources. Woods (2006) identifies that rapid population growth serves as the foundation of the environmental crisis. “The Earth’s population has grown from 1.5 billion at the beginning of the 20th century to 6.5 billion currently and is expected to grow to 9.5 billion by 2050” (Woods, 2006). As the population rises to an anticipated peak of 9.5 billion people, and as those people increase their personal levels of consumption, the rate, and severity of environmental degradation will increase (Chavas, 1993). Clean air and water rely on healthy ecological systems. If those systems are damaged to a point of collapse, it will have unprecedented consequences for all life on the planet. The extent of these consequences on social and environmental systems is not entirely understood. “Humans might also take irreversible steps that could threaten the long-term future of many species, possibly including the human species” (Chavas, 1993, p. 73). How far humanity goes towards collapse depends on our ability to take action to address the environmental crisis.

The intensity of economic growth is becoming an issue of ecological justice. Manufacturing, industry and commerce all impact the integrity of natural systems through the consumption of natural resources. Hill (2012) connects economic development trends directly to issues of ecological justice: “as societies across the world face the stark reality of growing social inequality, economic uncertainty, and environmental degradation, it is increasingly evident that we are sustaining the unsustainable” (Hill, 2012, p. 15). The earth’s carrying capacity is overburdened in two primary ways: through natural resource extraction and waste production (Brown, 2003; Parker, 2012; UNESCO, 1987). Increasing per capita resource consumption is directly leading to escalating levels of resource extraction. The carrying capacity of the planet is failing as natural systems collapse due to the human-induced strains of resource depletion and overloading the carrying capacity with excessive waste (Brown, 2003). The rate of environmental degradation is advancing rapidly. According to Tilbury (2012), this rate of advancement is limiting our ability to adequately respond to the issues at hand. “New economic, socio-cultural and environmental issues, such as the global economic crisis, human mobility, and climate change, are challenging governments’ and civil society’s aspirations” (p.1). The causes of the crisis can be seen in the consumption and waste production of individuals within society (Schleicher, 1989). “For the 10% of the Earth’s population that uses well over 90% of its resources, the drive to consume is greater than the drive to sustain” (Jickling & Wals, 2008, p. 3). The unabated drive for both personal and societal consumption is at the heart of the environmental crisis (Hill, 2012, p. 16).

The response to the environmental crisis is multifaceted. The US federal government’s response consists of exploratory policies aimed at curbing greenhouse gasses (GHG) and limiting

the impact of resource extraction on natural systems (Kelhart, 2008). A primary strategy used to curb the environmental crisis is the development and implementation of environmental policies that limit natural resource degradation. The emergence of the National Environmental Policy Act (NEPA) in 1970 was a response to highly publicized environmental degradation. The purpose of NEPA was to establish “national environmental policy and goals for the protection, maintenance, and enhancement of the environment and provides a process for implementing these goals within the federal agencies” (EPA, 2014). The Clean Air Act of 1970 and the Clean Water Act of 1972 mandated that all Americans should have access to clean air and water (Kuzmiak, 1991). The development of national policy to ensure that access indicates how serious the issue had become. The Environmental Protection Agency (EPA) regulates and enforces the established legislation (Kelhart, 2008). According to Kelhart (2008) the EPA enforces

environmental protection standards, conduct environmental research, provide support to others combating environmental pollution and assist the White House Council on Environmental Quality in developing and recommending to the President new policies for environmental protection (p. 924)

Sustainability also includes social and economic considerations. The environmental movement began to fracture amongst competing concerns regarding conservation, human rights, labor conditions and equality. Kensler (2012) states that

global climate change, water and air pollution, food production and safety, increasing oil demands, loss of biodiversity, high rates of tropical rainforest deforestation, and widening economic gaps between rich and poor communities are just a few examples of the socioecological challenges facing the world (p. 790).

Sustainability as a behavioral orientation represents a concrete strategy for addressing the social and environmental risks associated with climate change. The burden that overconsumption of resources is evident in numerous social and environmental systems.

The emergence of sustainability enabled the environmental conservation movement to address the social and economic causes of environmental degradation. Barry Commoner (1971) and Paul Ehrlich (1968) worked to frame the issue of environmentalism as a crisis and in doing so called for sustainability as the solution. Their early work on sustainability focused on alerting “the public to the dangers of rapid population growth and the need for controls” (Kuzmiak, 1991, p. 271). The success and notoriety of their message which called for restricting unchecked economic growth became pronounced when the energy crisis of the early 1980’s occurred (Kuzmiak, 1991). The central idea of scarcity is a guiding tenet of the newly arisen sustainability movement. Prior to 1999, the term sustainability was reserved for UNESCO reports and policy initiatives. Now its widespread use serves to legitimize and situate sustainability within mainstream society in economic, environmental, and social spheres (Kenlser, 2012).

Framing Sustainability

One of the most frequently referenced definitions of sustainability comes from the 1987 report of the U.N. World Commission on Environment and Development: sustainability “meets the needs of the present generation without compromising the ability of future generations to meet their own needs” (Bruntland Commission, 1987, p. 43). This definition is limited because it does very little to guide our future activity in any concrete manner. In many ways, this broad definition is too rudimentary for the sophisticated challenges we face (Shrivastava & Berger,

2012). In connecting sustainability to education for the purpose of creating an applied approach to sustainability, the definition constructed for this project provides a robust and educationally focused conception of sustainability: *the experience of balance in which the integrity of interdependent social, economic and environmental systems are integral to providing for the welfare of the current and future generations*. Sustainability implies a balance between social, environmental and economic interests. Too often economic factors function to override communal or environmental considerations.

There are many examples of the concept of sustainability being used to promote sustained and unchecked economic growth (Callicott, & Mumford, 1997). Corporate entities have leveraged sustainability to imply uninhibited economic growth. “Sustainable development has been interpreted to mean sustaining (at least until the next election) economic growth” (Callicott & Mumford, 1997, p. 34). Environmental sustainability by definition is antithetical to inhibited economic growth. Sustainability directly confronts the ethos of unrestricted growth by promoting social and environmental limits to development (Barr, & Devine-Wright, 2012).

Expanding the definition of sustainability to include issues of poverty, social justice, and community welfare has occurred as it is applied within education and schools. “In an interconnected and constrained world, in which we have a symbiotic relationship with the planet, environmental sustainability is a precondition for poverty eradication, economic development, and social justice” (Memorandum, 2011, p. 781). The Royal Swedish Academy of Sciences (2011) calls for a dual track approach to sustainable action. The first approach relies on stopping the degradation of environmental and social systems, and the second occurs by providing long-term structural solutions. The Academy states that “we need to support our ability

to innovate, adapt, and learn” (p. 781). By expanding the definition of sustainability, it is possible to address social and community-based issues related to development and consumption.

Sustainability is a value-laden concept (Fischer, et al., 2012). By embracing the values of ecosystem integrity, social equity, and economic restraint, it is possible to create a functional and responsive definition of sustainability. Non-western value traditions are not panaceas for addressing global sustainability problems as this utopian view can “pose serious epistemological challenges regarding how to conduct both research and environmental management” (Fischer, et al., 2012, p. 158). However, understanding how indigenous communities in the American Northwest engage with the topic of sustainability can provide insights into the process of applied sustainability education programming. Research in a tribal school allows for an exploration of how indigenous values and beliefs frame experience. “Values and beliefs offer real independents to a consumption and growth-based society that already exist in some human cultures” (Fischer, et al., 2012, p. 158). Sustainability values inform the relationships that individuals and society have with natural systems.

Having a personal connection with nature guides sustainable habits and behaviors. Biocentrism is a belief that nature holds intrinsic value (Barr, 2003; Rolston, 2012). Biocentrism is egalitarian and affirms that all things within nature possess intrinsic value. Traditional societies accept that natural systems have value in their right. Nature is not a singular event but rather systems that sustain and nourish all things (Deloria, 1973). Viewing all things as deserving of basic rights through a belief in their intrinsic value requires a profound ideological shift in future citizens for sustainability to be actualized.

Helping sustainability become an applied concept requires imbuing it with meaning and value. As future citizens, students need to be proactive to facilitate the outcomes of sustainability. “Imagine sustainability as a far richer concept than simply meeting material needs, continuing to exist, or trying to keep a degraded planet from getting worse” (Stone, 2010, p. 34). Sustainability as a guiding concept provides for the social, economic and environmental justice necessary for healthy communities (Stone, 2010).

Sustainability, as framed by this project, consists of three primary orientations. The first is the moral imperative for living within the ecological limits of the Earth. The second is an understanding of the interconnectedness and interdependence of economic, social and environmental systems. The third aspect of sustainability is that it fosters equitable distribution of resources through access and opportunity.

Contributions of the United Nations to Sustainability

The environmental crisis continues to grow as a global priority. Broad public recognition can be traced back to 1972 at the Stockholm Summit, in which it was “acknowledged that human–environment interactions were indeed a global challenge” (Shrivastava & Berger, 2012, p. 247). This summit drew international attention to the risks associated with environmental degradation. Limiting consumption and understanding how to live in balance with the ecosystem was the focus of the summit, as well as learning new behaviors and living in ways that do not diminish the recharge rate of natural resources.

The United Nations Organization for Education, Science and Culture defines sustainable development as

a constantly evolving concept, it is the will to improve everyone's quality of life, including that of future generations, by reconciling economic growth social development, and environmental protection...no single continent, government, institutions or individual, however, can attain this alone because the nature of the challenges to overcome requires a global collective, and individual commitment (2005).

This definition of sustainable development asserts that environmental and social issues are interdependent.

People consume what they perceive is important to them in their pursuit of happiness. "Environmental sustainability is value based" (Whitford & Wong, 2008 p. 190). Fostering sustainability requires an understanding of how values shape behavior. "In recent years, environmental awareness has increased at every level of society" (York, 2008, p. 98). The adoption of sustainable values is changing how people live their lives (Hill, 2012). Engaging in sustainable behaviors would diminish the rate of resource extraction and the production of greenhouse gasses. Small actions conducted by individuals on a global scale would have lasting social and environmental impacts.

The Concept of Resilience as a Conditioning Factor for Sustainability

The increasing rate of global warming motivates communities to take action through cultivating resilience. Resilience occurs when individuals and communities take action to address climate change. Resiliency is fostered through direct and indirect activity that supports localized sustainability initiatives. By taking a more direct response to environmental degradation that emphasizes pragmatism and survivability, communities can face future challenges (Barr &

Devine-Wright, 2012). Resilience does not replace sustainability but articulates an important shift within sustainable activity. “Rather than resilience having emerged from nowhere to become the ‘new’ sustainability, we need to initially recognize it as living out of sustainability” (Barr & Devine-Wright, 2012, p. 526). Resilience allows communities to adjust to changing social, environmental and economic systems by strengthening their capacity to manage issues.

Resilient communities are dynamic places that continuously reproduce and revitalize their local social, economic, and ecological systems by identifying problems, establishing priorities, and crafting policy tools (Jung-Jun & Conroy, 2013). Sustainable communities embody the values of resilience, replenishment, and resourcefulness. These values address global issues through locally-based responses. “When all three values are represented, identifying problems, establishing priorities and mobilizing resources are comprehensive and undertaken to address and empower weaknesses among the values rather than emphasizing one of the values” (Jung-Jun & Conroy, 2013, p. 907). Through the process of identifying specific values held by the community, initiative is assumed by the community to address the issue directly.

Resilience in ecological terms enables systems to “withstand, adapt, and thrive in the face of perturbations to its environment” (Jung-Jun & Conroy, 2013, p. 904). Extending this concept of resilience to social systems enables communities to determine how they respond to issues of climate change, environmental disaster, economic downturn, population changes and resource scarcity. “Resilient communities are ones that prepare for and react to disturbances in a way that may create opportunities for innovation and development” (Hun & Manta, 2014, p. 904). An aspect of a resilient community is its ability to recover from change. “Resilience is an active, community-based, internally driven and holistic approach that should, in theory, provide greater

protection against external shocks” (Barr & Devine-Wright, 2012, p. 526). The threshold a community has for enduring shocks has a bearing on its ability to sustain both internal and external systems.

Challenges to Sustainability

Many challenges to conceptualizing and achieving sustainability exist. One of the most direct challenges to sustainability is the belief that nature and humanity are in direct competition. Many approaches to sustainability have “adopted the persistent and problematic ‘human versus nature’ binary in Western thinking, a conceptual legacy that leads to false dichotomies separating problems considered more ‘social’ from those classified as more ‘environmental’” (Chiro, 2014, p. 17). The view that classifies systems as existing discretely fails to incorporate the interdependent nature of social, environmental, and economic systems. When viewing systems as interdependent, decisions occur in a more precautionary manner. Adherence to the precautionary principle on the part of the global community allows individuals to assess their daily activity to current and future impact regarding their community and the environment.

The precautionary principle implies that whenever possible individuals and groups of people should strive to “improve our overall understanding of the problem, guide the application of available techniques, and identify areas where appropriate techniques are lacking uncertainty” (Dovers & Handmer, 1995, p. 97). Many of the major environmental disasters of the 20th century are examples of organizations acting without consideration of the precautionary principle (Ambio, 2011). When corporations make decisions that disregard risk in the pursuit of profit, environmental degradation occurs. Deep sea oil drilling serves as a powerful example of when

the precautionary principle does not occur. Climate change is a major challenge to human and ecosystem welfare (Chavas, 1993). “The belief that constant comfort and consumption is possible is encouraged and exploited by commercial interests, particularly through advertising, but it represents a form of blindness toward the biophysical and ethical limits of consumption” (Fischer, et al., 2012, p. 156). Helping to educate society about those limits will require effort and adjustment.

Theme 2: Sustainability Education

The Need for Sustainability Education

Sustainability education supports the personal development of a student while addressing their social and emotional needs. Sustainability education focuses on shaping behaviors and empowering action. Stone (2010) outlines a model of education that leads to a more sustainable citizen. In his approach to learning the student is exposed to topics of sustainability while being given the tools to engage with those topics critically. “The need in education is a ‘culture of critical commitment’ – engaged enough to make a real difference to social–ecological resilience and sustainability but reflexively critical enough to learn from experience and to keep options open” (Sterling, 2010, p. 517). Sustainability education as an approach to learning adheres to the principle that the transition to a more sustainable society is achieved through education. “Schools are examples of the ecological principle of nested systems; they are embedded within larger systems: school districts, cities, economies, ecosystems” (Stone, 2010, p. 35). As a nested

system, schools act to incorporate energy, resources, and community values. Schools have the capacity to be centers for sustainable action.

Goal of Sustainability Education

The goal of sustainability education is to enable students to act in a manner that balances their social, economic, and communal needs with environmental constraints. “Sustainability education aims to amalgamate disciplines of ecology with those from economics, sociology, and politics” through learning approaches that incorporate biophilia, social justice and engaging citizenship (Evans, Whitehouse & Gooch, 2012, p. 121). Key learning outcomes related to consumption awareness, community engagement, service and critical thinking are required to achieve sustainable behaviors (Stone, 2010). These approaches to learning represent the basis for acting more sustainably. “Changing practices requires not only changing the awareness, understanding, concerns and skills of individual participants in the practices, but also changing the practice architectures that hold existing practices in place” (Kemmis and Mutton, 2011, p. 188). School-based sustainability occurs by fostering meaningful learning that is transformative (Hopkins, 2013). Sustainability education focuses on student engaging in applied experiences. “Action skills for sustainable living involve the ability to change current patterns of action by making value judgments about different ways to act” (Hedefalk, et al., 2014, p. 2). Sustainability education empowers individuals as future citizens to realize that their welfare both now and in the future is contingent on the actions of themselves and others (Moore, 2005, p. 537). Awareness of interdependence and intergenerational equity motivates students to behave more sustainably.

Contributions to Sustainability Education from the United Nations

The United Nations played an important role in defining and promoting sustainability education worldwide. “Education for sustainable development (ESD) has its roots in the history of the United Nations” (McKeown, 2007, p. 147). The emergence of sustainability education originated at the 1992 Conference on Environment and Development in Rio de Janeiro, in which a non-binding action plan called Agenda 21 was developed (United Nations Conference on Environment, 1992). Agenda 21 states that education must incorporate “environmental and ethical awareness, values and attitudes, skills and behavior consistent with sustainable development and for effective public participation in decision-making” (United Nations Conference on Environment and Development, 1992).

The United Nations effectively shifted environmental education to sustainability education through the integration of social and economic considerations (Jickling & Wals, 2008, p. 4). Having students work to understand and address complex global issues requires a nuanced and multifaceted framework to guide learning (Chiro, 2014). By helping students to develop sustainability literacy in schools students are learning about the interdependence of social, economic and environmental systems both now and in the future.

Numerous initiatives launched by the United Nations occurred for the purpose of promoting and supporting sustainability education. “UNESCO’s Education for All movement, millennium goals, and its Decade for Education for Sustainable Development, for instance, are seen as opportunities for educational change” (Jickling & Wals, 2008, p. 4). Sustainability education within the United Nations approach consists of “envisioning a better future, critical

thinking, and reflection, participation, [creating] partnerships for change and systemic thinking” (Evans, Whitehouse, & Gooch, 2012, p. 122). The stated goals of the initiative intend to provide an opportunity for refining and promoting the vision of, and transition to sustainable development through all forms of education, public awareness, and training and give an enhanced profile to the important role of education and learning in sustainable development (UNESCO, 2005, p. 5).

Through these efforts, sustainability education is becoming adopted as practice on a global basis.

Approaches to Learning within Sustainability Education

Sustainability education is grounded in the experience of the learner. Traditional views and approaches to education are shifting within the development and implementation of sustainability education. Education, as framed by sustainability, is

a process by which children, young people, and adults are initiated into forms of understanding, modes of action and ways of relating to one another and the world, that foster individual and collective self-expression, individual and collective self-development and individual and collective self-determination, and that are, in these senses, oriented towards the good for each person and the good for humankind (Kemmis and Mutton, 2011, p. 204).

This definition of sustainability education emphasizes the role of education in creating meaningful changes within individuals that support sustainable ways of knowing and acting. The origins of this definition link to Freire’s (1993) emancipatory outlook on education. According to Freire (1993) education serves to condition learners to the logic of the present system, or it can

function to help learners think critically and creatively to transform their world for the benefit of all. The transformation of an individual through learning to think and act more sustainably is a primary goal of sustainability education.

Sustainability education should promote lifelong learning in a manner that considers the well-being of the environment, society, and economy. Learning should be locally relevant and culturally appropriate. This occurs when local needs, perceptions, and conditions are considered on an educational basis. Formal and informal education is celebrated to accommodate the evolving conceptual nature of sustainability. Effort is made to address the relationship between global issues and local priorities. Sustainability education builds "civil capacity for community-based decision-making, social tolerance, environmental stewardship, an adaptable workforce, and quality of life" (p. 155). This approach to learning is interdisciplinary and accepting of varied pedagogical techniques that promote participatory learning and higher order thinking.

The inclusion of these factors as articulated by McKeown (2007) that education is student-centered, engaging, inquiry-based, grounded in higher order thinking and focused on the transformation of the learner. Jickling and Wals (2008) developed a learner framework by which sustainability education manifests in four areas. The first area seeks "to help learners understand why the idea of sustainable development ought to be of interest to them" (p. 16). The second focus area is aimed at helping "learners gain plural perspectives on issues from a range of cultural stances" (p. 16). The third approach provides the learner with "opportunities for an active consideration of issues through appropriate pedagogies which, for example, might begin from learners' and teachers' different interests, helping pupils understand what they are learning and its significance" (p.16). This approach helps learning to become integrated into the

experience of the learner. The final component encourages “pupils to continue to think about what to do, individually and socially, and to keep their own and other people’s options open” (p. 16). Creating a healthy balance of cultivating values and experiential learning is the task of sustainability educators.

The Role of Resiliency in Sustainability Education

A resilient learner is one who embodies the qualities of resilience, resourcefulness, reflection, and relationship. Resilience is characterized by determination, grit, and fortitude. The resourceful learner is capable of using their skills and interests to guide their learning. Resourcefulness allows the student to “learn in different ways” (Sterling, 2010, p. 517). Reflection enables the learner to “become more strategic about learning” (Sterling, 2010, p. 517). The ability to learn independently and with others is indicative of a learner who has a capacity for relationships. “The assumption of much sustainability education theory is that significant change in cultural worldview is necessary if more sustainable states of society are to be attained” (Sterling, 2010, p. 520). The inclusion of a growth mindset to sustainability education is critical to helping students create meaningful learning that is grounded in their direct experience.

The resilient learner engages in uncertainty with confidence. They assume a growth orientation towards their learning and development. Their ability to adapt to changing situations is encouraged through their education. “Resilient individuals will be more inclined to take on learning challenges of which the outcome is uncertain, to persist with learning despite temporary confusion or frustration, and to recover from setbacks and failures” (Sterling, 2010, p. 517). Given the volatility of social, economic and environmental systems it is crucial for learners to

develop the aptitude and disposition for resilience. The healthy development of the individual is at the core of resilience-based sustainability education. The embodiment of resilience is evident in how people problem solve issues, act autonomously, have a sense of purpose, and engage in social competence. “There is much in common between resilient learner discourse and the intrinsic view of sustainability education” (Sterling, 2010, p. 517).

The resilient learner is an active learner that works to achieve sustainable outcomes. Supporting personal development through both outer and inner change is a primary objective a resilience-focused learning. In accepting the need for inner change, the learner becomes critically aware, reflexive, and autonomous (Sterling, 2010). The resilient learner is also capable of adopting and accepting “key ideas about participative and contextualized learning” (Sterling, 2010, p. 517). Through engaging in the process of developing both the inner and outer aspects of oneself, the resilient learner is capable of undergoing significant transformation. Resiliency develops through individualized experiences and group collaboration. Resiliency, as applied to sustainability education, provides the basis for a transformative educational paradigm. “Such a paradigm is necessary to nurture resilient learners capable of building resilient, sustainable social–ecological systems” (Sterling, 2010, p. 525). It is within this process of nurturing that communities are transformed and provided with the necessary capacity they need to foster meaningful levels of sustainability.

Conceptual Framework of Sustainability Education

Sustainability education relies on a conceptual framework that integrates social, economic, and environmental ways of knowing and acting in the area of learning. Sustainability

education is value-based. The inclusion of nature-based ethics is a primary component of sustainability education. Aldo Leopold (1949) addressed the need to create a more engaging and nature-focused educational model to bring about a more conservation-oriented society. Leopold (1949) called for ecological literacy in education. “A land ethic then reflects the existence of an ecological conscience, and this, in turn, reflects a conviction of individual responsibility for the health of the land. Health is the capacity of the land for self-renewal” (Leopold & Schwartz, 1949, p. 221). The view that land is sacred and serves to accomplish self-renewal is one that is held by Native American cultures. Vine Deloria Jr. (1973), asserts that tribal religious beliefs connect to natural spaces. Land in this view should not be exploited but rather serve as the basis for spiritual renewal and transformation. “In Indian thinking, all things are connected, and all things are related” (Fixico, 2009, p. 558). Social, political, economic, and environmental systems all affect the welfare of individuals and their communities.

Pedagogy for sustainability includes systems thinking, place-based learning, problem-based learning, eco-cultural literacy, eco-justice values, and developmentally appropriate assessment (Kemmis & Mutton, 2012). “The inclusion of social and economic concerns marks a departure from most established environmental models, which have strong connections to traditional scientific disciplines and are traditionally taught to secondary students” (Spearman & Eckhoff, 2012, p. 354). Making learning place-based enables students to address the challenges that a place is facing directly.

A love of nature emerges from a sense of place and an awareness of interdependence. Stone (2010), identifies that “ecological literacy fosters a perspective essential to sustainable living: that human needs and achievements are both supported and limited by the natural world”

(p. 37). Within ecological literacy, there are core principles that guide learning. The first principle is that nature is a teacher. This principle guides student inquiry into the natural world. The second principle is that “nature sustains life by creating and nurturing communities. No individual organism can exist for long in isolation” (Stone, 2010, p. 37). By orienting ecological literacy towards the concept of interconnectedness, students foster authentic learning.

In framing sustainability as an educational approach, it is essential that a process of alignment occurs by which educational practices and strategies align to the assumptions of sustainability. According to McKeown (2007), this process relies on combining pedagogical techniques and strategies of different disciplines to build “mental habits that support sustainable societies” (p. 151). The topics of interdependence, community orientation, precautionary principle, indigenous ways of knowing, active citizenship and engagement are all contained within the conceptual framework of sustainability education utilized for this project.

Interdependence

Interdependence is a core principle of sustainability that affirms how social, economic and environmental systems are directly dependent upon each other. Sustainability education requires an awareness of the “the essential interdependencies between economic, cultural and other variables within an overall system” (Throsby, 1995, p. 204). “If people changed their attitudes and became more sensitive to, say, ecosystems and their intrinsic values, or to the rights of non-human animals, they would also reduce pollution, the extinction of species, to a minimum” (De-Shalit, 1996, p. 49). Adherence to biocentrism allows individuals to see themselves within an interdependent continuum of relations between human and nonhuman

systems (Vance, 1997, p. 68). This outlook functions to shift future patterns of behavior by helping people to understand the long-term impacts of their actions. Biocentrism is a strong component of sustainability education because it serves to highlight the interdependence of social and ecological systems. The assumption that nature has intrinsic value serves to guide behavior that embodies sustainability (Rolston, 2012). By viewing all organisms in this light, actions regarding consumption assume an ecologically conscientious character.

Learning that promotes knowledge and experience associated with the principle of interdependence emerges from indigenous ways of knowing. A well-documented account of Lakota religious beliefs comes from a medicine man named Black Elk. In his biography of Black Elk, Neihardt (2000) records how Black Elk views interdependence through the analogy of the sacred hoop. Through his visions, Black Elk comes to see that the sacred hoop as his people. He understands how his people are interrelated to the land and both future and previous generations. The challenge of how to establish and maintain a balance between social and natural systems pervades his inner experience. In their research with Native American students, Fryberg, Covarrubias, and Burack, (2013) found that “interdependent representations of self and trust for teachers were positively related to academic performance for Native American students” (p. 446). Experiencing interdependence helps students to understand that “sustainability lies in the best self-interest of the individual” and the community (Nuemayer, 2013, p. 17). Helping students to understand the connections that exist between human and environmental welfare is a primary task of sustainability education.

Community Orientation Through Place-based Experiences

Through collaboration, inquiry, and critical engagement students develop the skills they need to be effective sustainable citizens. Place-based learning teaches valuable skills that enable students to address both social and environmental issues through community-based interactions. “Pedagogy of place in this context involved thinking about global issues, such as how easy it is to consume without considering the cost to others” (Duhn, 2012, p. 26). Place-based approaches to learning help form a sense of belonging with natural and social systems. “Well-known, well-loved places have the best chance to be protected and preserved so that they may be cherished and cared for by future generations of students” (Stone, 2010, p. 38). It is through direct place-based learning that students gain insights into their community which serves to cultivate a sense of belonging and place attachment.

Place-based learning is a collaborative process. This process gives students opportunities for community engagement and service. Students who engage in collaborative learning create positive academic outcomes because they form “trusting relationship in school” (Fryberg., et al., 2013, p. 442) Traditional classrooms are framed as learning environments “in which ‘learning’ is construed as being about the development of autonomous thinking (Fryberg., et al., p. 446). Collaboration is needed within sustainability education. Collaboration forms behaviors and attitudes for future community engagement (McKeown, 2007).

Precautionary Principle

The precautionary principle as applied to sustainability education is grounded in critical thinking and deliberation. Applying this principle to learning and teaching allows students to develop higher order thinking skills. Sustainability education “creates knowledgeable consumers

who can analyze the messages of corporate advertisers and see beyond ‘greenwash’” (McKeown, 2007, p. 151). Critical discernment and rational thinking are required for students to navigate the complexities of concepts contained within sustainability education. Both intergenerational and intragenerational justice function to guide learning for sustainability (Throsby, 1995). It is important for students within sustainability education to create an open mind about sources and traditions of knowledge. “Students should always be provided with opportunities to compare and contrast different perspectives and practices but a Western science versus indigenous knowledge approach perpetuates the institutionalized false dichotomy between them and should be eschewed” (Beckford et al., 2010, p. 247). Incorporating Native American communities’ ways of knowing “provides a point of reference for critical self-reflection within the conventional North American culture and education on the relationship between values, attitudes, and the environment” (Beckford et al., 2010, p. 247). Critical self-reflection is a primary goal of sustainability education.

Active Citizenship and an Ethic of Care

Sustainability education goes beyond conceptual learning. It consists of an action-based approach to learning (Hedefalk, et al., 2014, p. 2). Cultivating personal and social qualities within students through character formation is a component of sustainability education. “The values and attitudes advocated in the environmental philosophy and the spiritual connection of the (indigenous) people in general toward the environment can form the basis of examinations of Western values and attitudes, their impact on the environment” (Beckford et al., 2010, p. 246). Modern society and contemporary education focus on developing economic capacity. “The

ancient concept of virtue accordingly needs to be dusted off, updated, broadened, ecologized, feminized, and reintroduced into the contemporary curriculum and from there into the mainstream of an increasingly cynical society” (Orr, 1990, p. 220). Reintroducing virtue into education enables individuals to connect with their innate reason and practical wisdom. Teaching students about the morality of sustainability motivates them to engage in social and environmental issues.

An important aspect of learning that fosters active engagement is an ethic of care. An ethic of care promotes a society that wants more from its future citizens than just knowledgeable people. Moreover, academic learning is contingent on children believing that they are cared for and learn to care for others (Noddings, 1995). Through promoting the ethic of care, individuals take meaningful steps to promote positive change (Duhn, 2012). Assuming an ethic of care within sustainability education embodies a true appreciation of the interdependent nature of all things. In addition to fostering knowledge of interdependence, this approach to learning supports students experiencing the principle of intergenerational equity. Thorsby (1995) states that the

principle of intergenerational equity thus asserts that if development is to be sustainable, then society, as the custodian of the cultural capital that it has inherited and that it will hand on to future generations, will have to recognize a responsibility to those future generations which is no less demanding than its responsibility in respect of the physical and biological environment (Thorsby, 1995, p. 204-205).

Helping students to understand how their actions and behaviors impact others and themselves both now and into the future is a primary goal of sustainability education.

Justice plays an important role in fostering community engagement within sustainability education. “If it is a requirement of justice to meet the conditions necessary for all to have the opportunity to realize their basic rights to life, then this applies in principle as much to the future as it does now” (Dower, 2004, p. 402). An example of justice is the right to breathe clean air and drink safe water. The commitment to justice is the foundation upon which sustainability relies. For schooling an ethic of care “means a move toward personal responsibility, toward helping rather than rating, toward increased opportunities for dialogue, toward long-term and, perhaps, joy filled personal relationships” (Noddings, 1999, p. 54).

Indigenous Ways of Knowing

The beliefs of Native American communities can serve as an important moral system that informs sustainability education. In referencing the outlook held Native Americans on the nature, Robyn (2002) states that nature “influences Indigenous institutions, such as criminal justice, education, religion, community and interpersonal relationships, resource use, harvest, and many other important aspects of people's lives” (p. 217). Land is embedded with memory and tradition. Sacred spaces are relevant to Native Americans because they hold the history of the tribe. Deloria (1973) affirms this belief by stating that “every part of this soil is sacred in the estimation of my people. Every hillside, every valley, every plain and grove, has been hallowed by some sad or happy event in days long vanished” (p. 173). Events frame the collective history of the tribe and provide a reference point for tribal activity.

The environmental ethic held by Native American tribes of the Northwest informs sustainability education beliefs and practices. Sustainability exemplifies in how Native

Americans view their relationship with nature (Robyn, 2002). Changing our collective history of environmental degradation is predicated on changing how we view ourselves and our relationship with nature. According to LaDuke (2005) science and economics work together to create “a reductionist view of the world through scientific eyes” (p. 129). This view enables nature to be broken down into a commodity to establish the extent to which it can be extracted and consumed at the highest possible level. “This epistemological and metaphysical reductionism often results in an objectification of reality, including other living beings, into mere commodities for human management” (McDaniel, 2002, p. 1462). Nature is more than a collection of resources waiting to be extracted and consumed for people to feel connected to it (Nelson, 1995). A goal of sustainability education is to construct a personalized view of nature and resources.

Transforming nature into a commodity for consumption is heretical to many indigenous peoples. “The concept of ‘holy land’ cannot be exclusive in a multicultural and multi-spiritual society” (LaDuke, 2005, p. 14). Viewing nature and place as sacred are integral to an authentic view of sustainability. “The humility of collaborating with nature, which is at the heart of sustainable design, is re-placed by an impulse to ‘manage the planet’” (McDaniel, 2002, p. 1462). Living in a sustainable manner requires a dramatic shift in an individual’s relationship with nature. Our actions have led humanity and the planet to the current global environmental crisis we are facing (McFague, 2001). Responding to this challenge requires more than just belief and intention, it requires action.

The community is an important component of indigenous ways of knowing. Strong communal ties connect members of the tribes to the past and future generations. Scholars of

Native American culture often emphasize the communal nature of Native American society. Native Americans often relate to one another in a manner that emphasized extended family and prioritizes decisions that ensure the welfare of the community. According to Deloria (1973), the “communal nature of Indian personal existence is further supported by the presence of a large body of literature on the histories of the respective tribes” (p. 28). The communal bonds that define Native American ways of life are also present in the ideology of sustainability. An ethos of sustainability that aligns with honoring community considers the sacredness of nature. This ethos incorporates recognition of the contributions of shared ancestors. Through recognizing ancestors for their contributions and sacrifices, they are honored and respected. Deloria (1973) states that “to us ashes of our ancestors are sacred and their resting place is hallowed ground” (p. 173). All nature is made sacred by the communal heritage associated with it.

Challenges to Sustainability Education

The goal of sustainability education is to support students and the broader school community to be transformed through the process of learning about and engaging with sustainability. Enabling schools to become more sustainable requires time, energy and resources. Sustainability education must be innovative and dynamic to face the challenge of being integrated into the dominant system of education (Stone, 2010). “Whilst education is widely held to be a key agent of change, it is currently largely part of the unsustainability problem that it needs to address” (Sterling, 2010, p. 522). Sustainability education needs to move beyond the fringe of educational programming into the forefront of standards-based educational outcomes.

Student achievement in literacy, critical thinking, and social skills are correlated with sustainability education (Evans., et al., 2012).

Theme 3: Sustainability Education Programming

The Purpose and Need of Sustainability Education Programming

To foster sustainability education systemic approaches to developing, implementing and evaluating sustainability education need to be supported. Sustainability education promotes “public awareness, and training systems to help create more sustainable societies” (Hopkins, 2013, p. 124). The purpose of engaging in programming for sustainability education is to understand how this process shapes behavior. Programming for sustainability education according to Kemmis and Mutton (2012)

involves transforming people’s unsustainable social practices by changing not only the participants in those practices but also the cultural-discursive, material-economic and social-political orders and arrangements – the practice architectures – that hold unsustainable ways of living in place (p. 205).

To achieve sustainability education outcomes a holistic and integrated approach to programming is needed. Through the development of programming for sustainability education, schools can construct a holistic approach to programming (Evans., et al., 2012).

Sustainability education programming builds community capacity by fostering collaboration. In programming for sustainability education, “teachers and administrators model and students learn and practice, the skills required for cooperative decision making and action”

(Stone, 2010, p. 38). It is through the process of creating a sustainable school that members of the community can practice the essential work of collaboration and build capacity for future resilience through partnership formation (Stone, 2010, p. 40). The whole-school approach serves to support schools in creating sustainability in all aspects of school life. McKeown (2007) states that the whole-school approach occurs when “schools try to embed sustainability beyond disciplines by modeling sustainable development practices in all their activities in the everyday running of the schools,” this approach allows sustainability to exist within the schools and the communities they serve.

Guidance and leadership are needed to bring about sustainability education. The guidance for sustainability education “comes in the form of frameworks for decision making, and, in some cases, as mechanisms for converting ideas into action” (Shrivastava & Berger, 2012, p. 250). Programming that aligns the operant, and theoretical assumptions of sustainability are needed to help schools transform. This effective programming considers how systems interact as interdependent entities. This approach is capable of helping the school to “adopt time horizons long enough to capture both human and ecosystem time scales, thereby responding to current needs as well as those of future generations” (Shrivastava & Berger, 2012, p. 250).

Sustainability Education Programming Around the World

Sustainability education programming is occurring throughout the world. Through a review of how sustainability education programming is conducted in others countries, it is possible to gain insights into the necessary support structures and programming elements that enable sustainability education to thrive globally. It is through analysis of these programs that

enduring elements of sustainability education as program components reveal themselves. “The emerging realization is that sustainability education appears to improve the overall quality of the education system” (Hopkins, 2013, p. 124). National education programs are actively implementing sustainability education. In addition to Finland, “other top scoring nations, such as Japan, Korea, Canada, Sweden, and Australia, also are trying to understand how sustainability education is not just a moral obligation to assist their youth to cope with the massive social, economic, and environmental issues they will inherit” (Hopkins, 2013, p. 123). These countries recognize that the formation of a sustainable citizenry is critical and are developing sustainable dispositions within its citizenry through social and educational reform.

Australia and Finland serve as models sustainability education. One of the most important aspects of effective sustainability education is a clear mandate of support. In Finland, sustainability education supports align to the Finnish constitution. “According to the Finnish constitution, every individual is responsible for nature and its biodiversity, environment, and cultural heritage” (Marja-Leena, 2006 p. 11). In Australia, a national action plan outlines specific and strategic approaches to development, implementation, and evaluation. “Providing information and raising awareness are important, but so too is building individual and organizational capacity and motivation to innovate and implement solutions” (Commonwealth of Australia, 2009, p. 8). The focus of this plan is to build capacity for the purpose of fundamentally reorienting the way people live and work for the purpose of achieving greater levels of sustainability.

A holistic approach assumes support for sustainability education. In Finland, “the principles of sustainable development will be taken into account in the educational provision,

and other activities of different school forms” (Marja-Leena, 2006, p. 12). At a national level different entities have been created to support and coordinate efforts for sustainability education. The development of an inclusive and far-ranging curriculum framework functions as a driver for sustainability education (Marja-Leena, 2006). Established objectives guide schools to construct a curriculum, approaches to learning and assessments that demonstrate meaningful growth in learning for sustainability. The integration of sustainability into the Australian national curriculum is about fostering resiliency in its students so that they can address future challenges (Commonwealth of Australia, 2009)

National education entities evaluate sustainability education that is occurring while programming is conducted by states and local entities. The Finnish National Board of Education supports the schools by engaging in sampling methods to understand school-based practices. The results of the data samples and self-evaluations are used to support schools to improve their daily practice of sustainability education. “The results have been used when describing the situation in schools” (Marja-Leena, 2006, p. 14). Curriculum development, implementation, and evaluation are an iterative and deliberative process. “The ongoing revision of curricula presents a great challenge for including sustainable development in instruction, everyday life and vocational competence” (Marja-Leena, 2006, p. 14). In Australia, a central question guides the evaluation of schools: “What real difference have they made regarding promoting and adopting the new ways of living and working across all sectors of the Australian community that are required to achieve sustainability?” (Woods, 2006).

Teacher training and support are important elements of achieving sustainability education in both countries. Changes to teacher training and professional development in Finland occurred

to support sustainability education. “Since environmental issues are interdisciplinary and relate to lifestyle, dealing with them in a varied way requires cooperation in work communities of schools and with partners from outside school” (Marja-Leena, 2006, p. 28). Given the integrated nature of sustainability as a concept, teacher training and development for sustainability education is assuming a more collaborative and systems-based approach. Through sustainability education, countries are addressing the causes of environmental and social problems. Through integrated approaches to education and learning countries around the world are addressing real issues and providing for the needs of both the current and future generation. “Education for sustainability aims to tackle the underlying causes of unsustainable trends” (Commonwealth of Australia, 2009, p. 8). Schooling provides a powerful guiding instrument for achieving societal sustainability. Sustainability education is a process that requires not only a focus on student learning but also on institutional learning (Hopkins, 2013).

Sustainability Education Programming in the United States

Various states within America have begun developing and implementing sustainability education initiatives. Washington State has developed a program called ‘Education for Environment and Sustainability.’ Through state legislation sustainability education has become a mandate for its schools. “The Education for Environment and Sustainability program is to support academic success and life-long learning and to develop a responsible citizenry capable of applying knowledge of ecological, economic, and socio-cultural systems to meet current and future needs” (The State of Washington, 2015). This program is promoting meaningful education for sustainability through targeted grade-level learning standards. Another state that is at the

forefront of sustainability in education is Vermont. Vermont has created rigorous and meaningful standards of learning that have created “assessment strategies to ensure that sustainability is taught and results in standards-based learning outcomes” (Agne, 2005 p. 3). Non-educational entities within the state guided this initiative for sustainability education. Through inclusive processes, sustainability education became articulated and integrated into the state-level curriculum. The process of deliberation “gathered community perspectives from more than 300 participants around the meaning of sustainability and what K-12 students need to know and be able to do to achieve sustainability” (Agne, 2005, p. 4). Community engagement ensures that sustainability education is integrated and supported in public education.

Numerous local initiatives are emerging that promote sustainability education. The Sustainable School Project is a program that works to promote sustainability education. This program creates partnerships between schools and other sustainability initiatives. The goal is to “help schools use sustainability as an integrating context for curriculum, community partnerships, and campus practices” (Sustainable School Project, 2012). In achieving this goal new ways of planning, developing and implementing sustainability education programming will be explored within the context of place. Another community-based organization that promotes sustainability education programming is the Marion Institute. This program promotes sustainability education by connecting school education programs to their *Seed to Table* and *Green Jobs, Green Economy* initiatives by providing authentic experiences that support students learning about sustainability. The goal of a whole-school approach to sustainability is to unify curriculum in a manner that integrates sustainability through the grade levels and content areas (Marion Institute, 2015).

A program that recognizes the need for curriculum integration to support sustainability education is the Green Ribbon Schools initiative (U.S. Department of Education, 2016). This program was launched in 2011 by the United States Department of Education to recognize and honor exemplary achievement in reducing environmental impact and costs, improving health and wellness, and providing effective environmental and sustainability education. This program seeks to reduce the environmental costs associated with consumption of resources. It strives to improve the health and wellness of the entire school community. The third component of the program seeks to “provide environmental education, which teaches many disciplines and is especially good at effectively incorporating STEM, civic skills, and green career pathways” (US Department of Education, 2016). Sustainability education in America is developing and growing through national, state-level and local initiatives. These initiatives include educational outreach programs that are sponsored by the National Forest Service. Non-governmental entities also work to educate and motivate sustainable behaviors through outreach and educational programming.

Leadership for Sustainability Education Programming

Strong leadership is needed to achieve sustainability education programming. “Effective leadership is widely accepted as being a key constituent in achieving school improvement” (Harris, 2010, p. 15). Constructivist theory orients the leadership model within sustainability education. Constructivism as an orientation for leadership emphasizes collaboration through personalized supports (Sultan., Woods., and Koo., 2011). Another way to align the assumptions

of sustainability to a formalized leadership approach is to consider indigenous ways of knowing. Lee (2014) states that “leaders worked for a community’s prosperity, stability, harmony, and continuance” (p. 25). These value-based outlooks help to frame the approach to leadership assumed by tribal leaders in the Northwest. In his review of Northwestern Native American tribal leaders, Lee (2014) asserts that an important element of leadership with Native American society is selflessness and humility. Leaders “thought of others before their individual wants and needs” (p. 25). This approach to leadership is similar to servant leadership. Servant leadership “is defined as a leadership style that is primarily focused on the growth and well-being of individuals” (Waal & Sivro, 2012 p. 176). Both servant leadership and Native American conceptions of leadership look to the character and integrity of the leader as important indicators of strength. Integrity is also a prominent theme within servant leadership. Wals and Sivro (2012) that this trait “reflects in large part the character strength of the leader” (p. 174). Sustainability education relies on leader’s commitment to manifesting community-based values related to nature and communal wellbeing in a manner that is morally grounded.

Leadership developed through sharing traditional stories and narratives emphasizes character and leadership qualities. “Creation narratives can help Native people to overcome the many socioeconomic challenges and to build harmonious, stable, and prosperous communities” (Lee, 2014, p. 30). Through these narratives leaders could channeled the creator(s) for guidance in planning and to strengthen them to carry out the necessary plans. “These narratives can help contemporary leadership serve the people in an ethical and courageous way” (Lee, 2014, p. 30). In the same way, servant leadership identifies that meaningful and transformative leadership is a courageous act (Waal & Sivro, 2012).

Servant leadership aligns with sustainability education in a variety of ways. Waal and Sivro (2012), identify humility, standing back, forgiveness or interpersonal acceptance, authenticity, empowerment, accountability, stewardship, and courage as being the key elements that constitute servant leadership. Servant leaders use knowledge and expertise of individuals within the organization to better inform and guide their decisions. “Servant leaders are not afraid to acknowledge their limitations, but seek contribution and participation of others to overcome them” (p. 176). Sustainability education programming relies on members of the school community feeling empowered through the recognition of their deeds and achievements. Empowering members of the school community “means providing meaning, paying attention to followers, caring for them, and showing appreciation and by doing this, servant leaders empower employees to be the best they can be” (Waal & Sivro, 2012 p. 176). The leadership required within sustainability education programming requires both risk and vision. The commitment of a leader to sustainability education has a huge impact on the success of the whole-school approach to programming. “The level of support a principal is willing to provide is pivotal to the success or otherwise of these initiatives” (Evans., et al., 2012, p. 134). Leadership for sustainability education requires leaders to hold themselves accountable to sustained commitment while remaining grounded in the needs of the school.

Effective leadership for sustainability education programming relies on a leader having a variety of skills and dispositions. Harris (2010), states that “through a variety of symbolic gestures and action they were successful at realigning both staff and pupils to their particular vision of the school” (p. 18). Consistency in vision is necessary to engage in education that seeks to manifest a whole-school approach to sustainability. Fostering shared vision and effective

practices can be “organized around personal values such as the modeling and promotion of respect for individuals, fairness, and equality, caring for the well-being and whole development of students and staff, integrity and honesty” (Harris, 2010, p. 18). Without a shared vision on the part of all teacher’s problems associated with culture building and morale can arise. “The risk of the uncooperative staff members is that they can undermine or resist the efforts of committed staff” (Evans., et al., 2012, p. 123).

Leadership for sustainability education utilizes a range of leadership strategies. Harris (2010) observed that leadership for sustainability was capable of adjusting to “the contingent nature of many of the decisions they made and how different leadership strategies would be used in different contexts” (p. 20). Sustainability education as a whole-school approach to programming relies on leadership that is adaptive and accommodating. Maintaining consistent staff morale and motivation is achieved by meeting both the personal needs and the needs of the program. Being responsive to the internal and external context of sustainability is essential for successful sustainability education programming.

Challenges to Sustainability Education Programming

Many challenges exist for sustainability education programming. Understanding these challenges is needed to provide effective and meaningful programming for sustainability education. One of the most significant challenges to sustainability education is consistency in programming. Even though Australia has developed a national action plan for sustainability education, the interpretation and implementation of a sustainability action plan varies greatly

from school to school. “In many schools across Australia, sustainability education has struggled to establish and maintain a profile on a long list of other competing educational demands” (Evans., et al., 2012, p. 122). Implementation of sustainability education is often a low priority initiative for schools. The process of implementation is marginalizing because it lacks clear guidance and direction.

Understanding the applied experience of sustainability education is the first step in developing effective strategies that address challenges. Evans et al. (2012) identify specific barriers to the actual process of programming. These barriers consist of a “lack of time, information, and content knowledge” (p. 123). Due to a lack of knowledge about sustainability and a lack of familiarity with teaching practices for sustainability education, teachers often struggle to enact sustainability education program goals and objectives. The authors go on to state that the conceptual barriers to sustainability education consist of, “oppositional attitudes from some staff and parents, the increasingly busy or overcrowded curriculum” and “an unwillingness of teachers to explore controversial issues with their students lest it affect their relationships with student families and other staff members” (p. 123). These barriers function to limit the efficacy of the program and the overall buy-in that the learning community has in the program. McKeown (2007) also identifies the lack of transdisciplinary learning as a major barrier. Overcoming these barriers is largely the task of administrators.

Administrative barriers hinder sustainability education programming. The resources needed to develop and implement sustainability education programming are significant (Evans., et al., 2012). Funding and resources for programming purposes are often insufficient. The perception of schools engaging in sustainability education is that “greater levels of direct funding

would enable greater innovation” (Evans., et al., 2012, p. 128). Overcoming barriers to sustainability education is no small task. It requires “a combination of funds, innovation, commitment and hard work” (Evans., et al., 2012, p. 135). It also requires a clear educational framework that enables whole-school programming. Skillful programming that is capable of supporting schools through the planning, development, and implementation of sustainability education programming is necessary to achieve the goals of sustainability education.

Chapter 3

Methodology

Introduction

The purpose of this study was to understand, develop, and implement sustainability education programming within specific school case study sites. The research was conducted using multiple case study analysis and participatory action research. These approaches framed the research experience in a manner that was personally relevant and socially embedded.

Research Methodology

Utilizing a Qualitative Research Approach

The goal of this qualitative study was to understand the experience of sustainability education programming through two school cases. This study generated insights about personal experiences and systematic structures associated with school change for sustainability through participant observation. My role as a researcher was central to the construction of meaning throughout the project. I used thick description and reflexive analysis to articulate the experience of programming. Thick description within this project consisted of provided a multilayered account of the experience of programming. Evidence from observations, both formal and informal participant feedback, reflective journaling, and artifacts derived from experience all coalesced together to construct a rich and robust portrait of the experiences at each school associated with sustainability programming. The reflexive analysis that occurred consisted of

moving beyond the description of experience and in order to critically analyze factors that contributed to the experiences at both schools. Through a multiple phase approach to analysis themes and patterns were identified to construct meaning from the experiences. Information gathering and analysis protocol framed the experience of research and analysis. I developed protocols to assist in the process of drawing forth data from multiple sources to ensure the trustworthiness and credibility of the research results. Participant observation and action-based research guided the project to address real problems through a formal methodology of reflection and data collection (Camarota, 2007).

The study was designed to capture the collaborative and participatory nature of programming. It was important to consider how social interactions contributed to the process of meaning-making. There was ongoing work throughout the project to understand varying perspectives. Anderson (1989), states that interviews, observations, and document analysis within qualitative research maintains the "view that the cultural informant's perceptions of social reality are themselves theoretical constructs" (p. 250). There was continual reflection about the decisions made regarding the process of school change for sustainability. As a facilitator to the process of school change for sustainability participants began to see "themselves as co-researchers, driving the study forwards as a group of individuals with shared objectives and decision-making powers" (Savin-Baden & Wimpenny, 2007, p. 333). Methods and approaches to research were continually questioned through a process of reflection on personal experiences and data analysis. This high degree of personal reflection was done to critically examine my perception and experience of programming, my adherence to the research protocol, and to incorporate feedback from my dissertation committee.

This research project explored the subjective nature of the inquiry. According to Peshkin (1994), it is important to value subjective ways of seeing and experiencing, "rather than denigrate subjectivity, its traditional fate, I believe it is more appropriate to cherish it" (Peshkin, 1994, p. 55). Reflection of my role as a participant observer was ongoing at each school. Peshkin (1994) believes that his "subjectivity is the source for the singular contribution [he] can make based on whatever study [he] conduct" (p. 52). The process of reflection enabled greater awareness of my personal investment in that process of school change. Through this awareness steps were taken to ensure a programming experience that was collaborative and driven by participants.

Case Study Analysis

A case study research design was utilized to understanding the process and experience of sustainability education programming. The case study approach required the use of specific analytic tools to format, collect, and analyze data. Good (1943), believes that case study analysis is a holistic process involving in-depth exploration, the research process involves taking "account of all pertinent aspects of one thing or situation, employing as the unit for study an individual, an institution, a community, or any group considered as a unit" (p.161). The school community as a case study unit consisted of teachers, students, and administrators.

Multiple sources of information balanced perceptions with actual observed behaviors (Creswell & Miller, 2000). By spending extended amounts of time at the schools the experience of school change for sustainability was captured through direct observation, participant feedback, and artifact analysis. Good (1943), identifies a five step cycle to follow when conducting case

study research. The first is recognizing and determining the status of the phenomenon being investigated. The next step was collecting data related to the factors associated with the phenomenon. After that, it is then possible to identify the causal factors that will serve to address the issue. The fourth step is applying corrective strategies to improve the case study experience. The fifth step is a review of the process and outcomes resulting from the remedial action. It is undergone to understand the efficacy of the applied solution.

Ethnographic Inquiry

This study used strategies of ethnographic research to guide inquiry. “Ethnography is the study of social interactions, behaviors, and perceptions that occur within groups, teams, organizations, and communities” (Reeves, Kuper, & Hodges, 2008, p. 512). Ethnographic research is designed to explore culturally embedded phenomena from the point of view of the subject of research. Understanding the experience of school change for sustainability from the perspective of students, administrators, teachers, and me was a primary goal of the project.

Ethnographic research focuses on developing an understanding of the basis for interpreting experiences and observations. Prasad (2005) asserts that webs of significance are evident when researchers strive to understand social phenomena. The research conducted focused on understanding the webs of interactions between the various stakeholders. "All human action is suspended in webs of significance that can be apprehended only by grasping the specific local interpretations engaged in by the natives themselves" (Prasad, 2005, p. 79). By working with these schools over an extended period of time insights into the norms, values, and practices that framed the culture of the schools was developed.

Thick description is an aspect of ethnographic reflection and evaluation. Thick description in this project occurred by having multiple sources of data and corroborating those sources through analysis. Thick description was supported by conducting multiple visits over extended amounts of time and collecting data from interviews, field notes, nonverbal interactions, observations, and program artifacts (Creswell, 2007). Prasad (2005) identifies that “for thick descriptions to happen, ethnographers must resist the temptation to provide somewhat simplistic and unitary cultural accounts that focus on shared meanings at the expense of the pluralism and contradictions inherent in any social milieu” (p. 81). The process of analysis consisted of referencing observations, experiences, and reflections to substantiate claims.

By engaging in systematic internal reflection, also known as reflexivity, I came to understand how the research process, data collection, analysis, and evaluation were shaped. Reeves et al., (2008) states that "reflexivity is a central element of ethnographic work, owing to the relationship the ethnographer shares with participants and the ethical issues that flow from this close relationship" (p. 513). Reflexivity guided how interactions with participants occurred. It also impacted the questions asked during informal interviews and the analysis conducted of the interview responses. The process of analysis required careful examination of bias and laden assumptions. The process of personal reflection and analysis occurred by integrating reflexive descriptions throughout the analysis.

Participatory Action Research and Participant Selection

An external researcher in participatory action research (PAR) is an "active participant, bringing his/her own philosophy, experience, and understanding to the research" (Dickson &

Green, 2001 p. 245). Through an open and collaborative approach, the school community guided the development and implementation of the programs. Participants were supported in seeing "themselves as co-researchers, driving the study forwards as a group of individuals with shared objectives and decision-making powers" (Savin-Baden & Wimpenny, 2007, p. 333).

Savin-Baden and Wimpenny (2007), state that the PAR process first requires "focusing on the agenda of participants embracing a PAR process is not only about getting on with problem-solving the issues at hand, but also considering the continuing well-being of all those involved" (p. 335). Collaborative analysis of data with participants occurred to understand the experience of school change for sustainability. Self-reflective cycles were conducted. They consisted of reviewing and analyzing decisions made about programming in light of the developed project goals. In viewing participants as co-researchers their feedback on transcriptions and the analysis resulting from transcriptions was highly valued.

The project required sensitivity to how members of the school community viewed and experienced the world. At Medicine Tree Tribal School there was consideration of how the school's Native American tribal cultures shaped individuals at the school. Fixico (2009), states that "a Native logic exists that governs how Indian people think according to their tribal background and how they were raised in their community" (p. 556). Being sensitive to the demands and pressures that teachers experience was critical to the process of conducting observations, engaging in interactions, and working in collaborative processes to develop and implement sustainability programming. The unpredictability of school life "means that ethnographers have to be flexible, patient, and persistent in their work, as data collection activities can be disrupted or access withdrawn as local circumstances and politics change"

(Reeves, et al., 2008, p. 514). Being flexible, responsive, and reflexive throughout the research process was necessary.

Program Planning, Development, and Implementation

Three River Valley High School is a comprehensive high school. Medicine Tree Tribal School is an independent tribal school. Each school expressed an interest in participating in a structured program of sustainability. The initial planning for the sustainability education programs began in August of 2015. Over the course of the 2015-2016 academic school year, The process of research in sustainability education programming required the schools to develop and implement the programs.

The first step in developing the sustainability education program at both school's was contacting and communicating with the administrators. In the spring of 2015, a series of professional development seminars on the topic of Writing Across the Curriculum (WAC) was conducted at Medicine Tree Tribal School. By working with the staff and faculty over extended amounts of time meaningful relationships based on mutual trust and support were formed. After contacting the Superintendent of Medicine Tree Tribal School about furthering their WAC integration strategies, he decided to frame future programming according to sustainability education in a manner that emphasized tribal values and indigenous ways of knowing. In August of 2015, professional development workshops were conducted to plan and develop the school's sustainability education programming. During these sessions, teachers and administrators decided on the range and extent of programming. Professional development at the school consisted of monthly two-hour workshops. Instructional presentations were provided on a

sustainability education related topic through the lenses of WAC strategies. Teachers were provided time for collaborative sessions that functioned to model students-centered learning strategies consistent with sustainability education. Students were engaged through classrooms visits, conducting guest lessons and running school assemblies. Different teacher led committees were created to develop and implement the different focus areas of sustainability education within the school.

One of the most important elements of working with a tribal school was ensuring that the program aligned with tribal values. The implications of conducting research on a tribal reservation was considered throughout the research project. As a researcher, I was very aware of how my role as an outside researcher affected the school community. Coming from a privileged white, middle-class background, I was sensitive to how the school community perceived me. Researchers become attached to research by marginalized people who believe they are studied excessively by others (Dickson & Green, 2001). Due to the relationships I formed with members of the school community, I strived to maintain open communication and to foster mutual decision making. Through an approach to research that was participatory and collaborative, I worked to support the school in identifying a clear tribal orientation to programming.

It was important for the project to abandon the assumption that research within Native American societies is something that is exotic. This view could have hindered the research from considering the environmental and human perspectives that shaped the experience (Fixico, 1996). Tribally embedded research required me to consider different cultural layers that existed within the school. In referencing the organization of tribal communities, Fixico (1996) asserts that they "are built on an infrastructure of interrelated societies and roles, such as clans, leaders,

warriors, medicinal persons, and others” (p. 34). Working to understand place-based ways of knowing allowed me to consider how culture and community shaped the experience of sustainability education programming at the school. According to Kemmis (2010), research in a tribal school

takes place in contexts characterized by contestation where different people and groups have different starting points, different interests, and different locations in matrices of power as, for example, in the abiding disputes over Indigenous versus non-Indigenous perspectives over land and land use, culture and cultural heritage and language, and the interests of social justice (p. 424).

Participants were encouraged to follow and trust their voice and perspectives through the process of school programming and the analysis of data. As insights were developed based on collecting and analyzing data, participants were asked to give feedback on those insights. They were treated as co-researchers by including them in decision making and data analysis. Through collaboration with co-participants, decisions about programming were made through collaborative and shared processes. Working with the school to create partnerships and collaboration between students, teachers, administration and me was essential to resolving differences in perception.

In addition to working with a tribal school, I received the opportunity to work with a comprehensive high school. The school principal at Three River Valley High School contacted me with a request to conduct sustainability education programming at the school in the spring of 2015. Shortly after the decision was made to conduct programming for sustainability education at the school I was hired to run an academic program there. As an employee at the school, I had much greater access to the students, teachers, and administrators. I became a part of the school

community. The first step in the process of programming at Three River Valley High School was to work closely with the student environmental club. This group played a central role in much of the programming conducted at the school related to sustainability. I engaged several interested staff and faculty members to help support programming for sustainability education. I engaged the staff by conducting informational meetings and sending out emails about programming for sustainability. The process of programming at Three River Valley High School relied on coordinating sustainability efforts at the school, collecting data on those initiatives and developing new programming components that ensured a holistic sustainability education program. The second step in the process at the school was to conduct an inventory of practices related to sustainability. This inventory had two major focuses: applied practices related to sustainability and curriculum related to sustainability. Both digital and written strategies were used to gather information from the school community about their experience in sustainability.

Once the baseline inventory was completed the team worked to review and synthesize the information. That information was shared with the school community. The next step consisted of working with teachers, administrators, and students to develop program goals and objectives. Forming the objectives of the program required them to be specific, measurable, attainable and time-bound. Different individuals took responsibility for implementation program components and documenting both the process and outcomes of that implementation. Because it was guided and driven by the school community, the sustainability education program developed according to the needs and interests of the school. The team gave special attention to strengthening existing programs such as recycling and developing new programming components such as curriculum integration and composting. Weekly meetings were conducted with the student environmental

group and held bi-monthly meetings with different teachers. These work sessions consisted of planning and identifying tasks for the purpose of program implementation.

Analytic Strategies, Data Sources, and Data Collection

Data Collection Protocol

This research project utilized observations, personal reflections, artifacts, and interviews to analyze the process and experience of school change for sustainability. A wide variety of data collection strategies were employed over a prolonged amount of time to gain results. The research protocol included an established schedule for data collection to ensure clear expectations and a consistent timeline. I interacted with teachers and students at a minimum of twice a month at Medicine Tree Tribal School and on a weekly basis at Three River Valley High School over the course of the 2015-2016 school year.

Planning and professional development meetings were conducted with teachers. The sessions at Medicine Tree Tribal School consisted of monthly meetings with the entire teaching staff. During these collaborative sessions, we explored topics related to sustainability education and programming. The sessions at Three River Valley School consisted of focused meetings with academic departments. Meetings occurred during lunch time, at planning periods, and after school. The professional development sessions provided teachers with collaborative and individual work time. One-on-one work sessions or small group meetings were conducted with teachers to support their planning, development, and review of school-based sustainability initiatives. The typical format of the sessions consisted of a brief instructional activity in which a presentation on a sustainability education topic using student-centered learning strategies would

occur. These strategies were used to promote and model collaboration, small group learning, and personalized inquiry. After introducing the teachers to a sustainability topic through student-centered learning, we would engage in a reflective discussion about how the topic could be integrated into the sustainability program occurring at the school. With the remaining time a collaborative work session occurred that allowed teachers to review program benchmarks, conduct progress checks, and plan for future program integration within the school. In addition to formal professional development and planning sessions, observations were conducted. These visits were intended to foster interactions with students and teachers related to programming. Towards the end of the programming experience, these visits became the primary vehicle for conducting semi-structured interviews.

The observation schedule at Three Valley High School consisted of meeting with students on a weekly basis and with different teachers on an intermittent basis that fit their personal schedules. The student environmental group at Three River Valley High School met every Wednesday at lunch time. Attending this meeting provided access to participating students and teachers. Numerous teachers and staff at the school coordinated and supported sustainability efforts. Because I worked at the school coordinating an academic program, I had the time and flexibility to meet with teachers and support overall programming. The process of programming consisted of working with the student group to help implement their ideas and goals related to sustainability at the school. The school's facility and administrative personnel were consulted to coordinate different initiatives. In essence, programming for sustainability education at Three River Valley High School was about refining existing sustainability practices, developing new initiatives, collecting data on programming components, and synthesizing the

data into meaningful information that could inform future practice. At Medicine Tree Tribal School student interaction primarily at lunch time or during their class time. Given the small class sizes and the relaxed classroom culture, it was very easy to check-in with individuals and small groups of students about sustainable practices occurring at the school.

Through the interactions with teachers and students, I gained insights about their experiences with school change for sustainability. Observing classroom learning enabled me to understand how sustainability education occurred. Data collection was guided by different elements of qualitative research as articulated by Creswell (2007). In adhering to an established data collection protocol, a review of the needs of the school community was conducted through an examination of “beliefs, language, behaviors, and issues of power, resistance, and dominance” (Creswell, 2007, p. 70). This examination occurred through developing consensus initially with the school leaders on the extent and focus of sustainability education programming. Consensus was strengthened by meeting with students and teachers to plan and implement the different programming components. During this process of program planning and development insights into the behaviors, practices, culture, and issues occurring at the schools was gained. These insights guided how research was conducted and interactions with individuals and groups occurred regarding specific topics.

Essential to the research process was locating a culture-sharing group to support the development of the sustainability program and my exploration of it. The basis of sustainability education programming at Three River Valley High School was the student environmental group whereas, the entire teaching staff at Medicine Tree Tribal School was the dominant driving force of the program. After identifying and establishing these groups as the primary drivers of the

programs, I oriented my research design and analysis around these groups. Members of these groups played a primary role in the informal and formal interactions I had with the planning, development, and implementation of the respective programs.

The next step outlined by Creswell (2007) in the process of qualitative research is to select cultural themes or issues to study about the group. The broader cultural theme was sustainability education. Understanding the process of program development became the primary focus of the study. Through a participatory approach, the cultural theme of tribal identity became the sustainability focus at Medicine Tree Tribal School. Tribally rooted beliefs and practices guided the program planning process at the school. At Three River Valley School the focus was more on connections with nature and place-based attachment. Topics of community-based sustainability guided the programming at both case study sites. These specific focus areas allowed me to examine the process and outcomes of school change for sustainability. Creswell (2007) states that a participant researcher "might address an inequity in society or some part of it, use the research to advocate and call for changes and specify issues to explore" (p. 71). The next step was to develop through collaboration, a culturally embedded set of rules or patterns as the final product of analysis that leads to meaningful insights and understanding of the outcome. In using sustainability education programming to guide the research and collaboration between teachers, I was able to orient strategies for programming. The goal is to create a final product that is a portrait of the experience at each of the schools (Creswell, 2007, p. 72).

Observation through Reflexive Journaling

Observations served a key role in the process of developing, planning, and implementing sustainability education programming. Through reflexive journaling, experiences were processed throughout this project. I reflected on my practice to confront personal, historical, and socially embedded ideologies (Leitch & Day, 2000, p. 185). During visits to the schools documentation of observations through notes occurred. This included documenting interactions, artifacts, behaviors, and the built environment. In the evening a review of the notes would occur. Then a narrative response would be constructed that synthesized the experience. The insights gained helped to frame and contextualize the experience of conducting and engaging in school change for sustainability. These experiences informed how the manner of facilitating future conversations about sustainability programming at the school. This process structured reflection helped me to understand the different perspectives and approaches to school change.

Field notes were established as an observation protocol. The purpose of this was to maintain a high level of objectivity throughout the process of participant observation. Smith (1978) states that research in this manner is a dynamic process in which decisions need to be made on the basis of changing circumstances, "while we are in the field observing directly, informally talking with and listening to participants, collecting and reading documents, a variety of discriminable intellectual operations seems to be occurring" (p.333). Taking field notes allowed me to document experiences and perceptions of myself and others. In the process of reflexive journaling descriptive and reflective comments were written.

As a researcher I tried to be flexible, considerate of the opinions of others, collaborative, and not beholden to ideas that narrowed the scope or approach to the project. According to Norris (1997), it was important for me "to remain open-minded, alert to foreclosure and sources

of error needs some measure of detachment" (p. 173). Being detached does not mean that the researcher is not engaged or committed to the research project, rather it means that do not limit research possibilities with their own bias or prejudice. Norris (1997) also believes that researchers should be detached from themselves and willing to explore how they influence the data (p. 173). I was careful to consider my views, biases, and presuppositions continually. Integrating reflection within my field notes was helpful in recognizing and checking my bias. Presuppositions "represent our preferred ways of solving research problems; preferences that are often as much to do with personal strengths and weaknesses as they are to do with determining the best match between methodology and problem" (Norris, 1997, p. 173). This self-reflective process challenged me to identify and confront limitations of research methods or strategies. Reflexive journaling practices provided an essential framework for me to understand, adjust, and substantiate my research approach for this project. This process of reflection-in-action provided safeguards to ensure that the research process and approach stayed focused on the research question. Safeguards were adhered to in order to protect participants and to remain sensitive to their shifting experience. Guidance and feedback in the form of intercoder reliability checks was provided from committee members. Interview transcripts were coded for themes and patterns to establish consistency.

A specified format and protocol for field notes was selected before the start of the research. Both descriptive and reflective criterion was used to guide the observation process. The actual practice of taking descriptive notes occurred during and immediately after the observation experience. The reflexive contributions to the notes occurred within two days of the experience. The role of participant observer as a researcher allowed me to experience a wide array of social

and personal phenomena at the school. Field notes were used as the basis for summarizing and interpreting those experiences. Without a detailed and focused field note protocol, it would have been easy to have gotten lost in tangents of personal interest or overwhelmed by specific experiences. General guidelines for observation according to Creswell, (2007) consist of finding a suitable site to observe and then identifying what, when and for how long to observe. Two guidelines that required significant thought and consideration for this project were establishing the role of the observer and designing "an observational protocol as a method for recording notes in the field" (p. 134). Other guidelines included recording different aspects of the experience, establishing relationships with participants, and respecting participant contributions by thanking them. The organization of observational data occurred through a coding process that categorized different observed events and experiences. Categories were formulated and coalesced by identifying themes within the initial analysis of the observation notes. Through the process of triangulating interview data, observations notes, and artifact analysis, the analytical claims generated were substantiated.

Interviews: Purpose, Selection Process, and Protocol Development

The semi-structured interviews conducted with participants played a critical role in understanding the experience of school change for sustainability. The feedback received helped in the synthesis of observations and experiences. In conducting the interviews for this project, it was important for me to remember that the process involved "a give-and-take between individuals" (Soss, 2006, p. 135). Interview sessions were used as an opportunity to review and reflect on what I had experienced and observed. The interview questions were developed through

a review of my field notes, reflexive journal, and program artifacts. During the interviews participants were related to in a casual and friendly manner. As a researcher, I needed to be prepared for the interview to "veer off into topics irrelevant to the research" (Soss, 2006, p. 135). Because of the relationships I developed with the participants it was possible for me to be responsive to their shifting needs during this process.

The selection of interviewees was intentional. This was done to ensure varied perspectives about school change for sustainability amongst students and teachers. Participants ranged in age and experience. New and experienced teachers were selected. High school students in all grades were interviewed.

Procedural steps developed by Creswell (2007) were implemented to support the interview process. The first step was to select interviewees based on purposeful sampling procedures. At Three River Valley High School six teachers, seven students and one principal was interviewed in two rounds of interviews. At Medicine Tree Tribal School five teachers, six students, and one administrator was interviewed. Due to the nature of the student recruitment process only students that were 18 years of age or older were interviewed at this school. Through developing relationships interested participants were identified that would be willing to be interviewed. The next step in the process was to "determine what type of interview is practical and will net the most useful information to answer research questions" (Creswell, 2007, p. 133). The interview approach shifted during the interviews between formal to informal language to gain meaningful feedback. Consideration of setting was important in creating a safe place for interviewees to respond in an open manner. Interviews were conducted in classrooms, the library, or other familiar and comfortable places. Creswell (2007) feels that "for one-on-one

interviewing, the researcher needs individuals who are not hesitant to speak and share ideas, and needs to determine a setting in which this is possible" (p. 134). In three instances, group interviews were conducted with students so that they would feel comfortable sharing responses. Creswell (2007) recommends that informing the interviewee about the topics and gaining consent should occur first. The protocol required the process of interviewing to "stay to the questions, complete the interview within the specific time, be respectful and courteous, and offer few questions and advice" (Creswell, 2007 p. 134). All the interviews were conducted in a timely and respectful manner. In comparing other forms of data collection with the interviews, experiences and observations were clarified.

Before each interview the relationship between interviewer and interviewee was considered to minimize bias or presuppositions. This was accomplished through "a consideration of self as a researcher and self in relation to the topic of research is a precondition for coping with bias" (Norris, 2007, p. 174). Through a process that combined different strategies such as voicing prejudices, stating assumptions, and engaging in personal introspection an honest and credible approach to interviewing was maintained. The validity was improved by conducting participant intercoder reliability checks. Allowing others to review the data, revealed how the relationship and approach shaped and formed the experience of data collection. Norris (2007) suggests that participant views allow researchers "learn how they see the researcher, the process of research and the accounts it has generated" (p. 174). Capturing the authentic voices and meaning of the participants in the analysis of the data was a priority.

To honor the complexity of interpersonal communication it was important to consider that interviewing involved more than just verbal communication. There was documentation of

multiple layers of experience occurring within the interview. During the interview the expressions and body language of participants were recorded. By reviewing these notes during the transcription process new meaning from the experiences was gained. Two digital audio recorders were used when interviewing. Digital documentation was done to minimize possible device malfunction. Transcription occurred within two days of conducting the interview. The transcription process was ongoing throughout the interview process. Timely transcription played an important role in substantiating research claims and reducing bias.

The development of the interview protocols occurred in several stages and with the guidance of dissertation committee members. After summarizing and analyzing my observation notes and reflexive journal preliminary interview questions were developed that focused on the following themes: 1) Community Perspectives, 2) Natural Environment and Resources, 3) School Experience, and 4) Learning and Action. A small amount of interview questions were developed per category with the intention of understanding participants perspective and experience in each thematic area. The first round of interviews at both schools occurred over two months. The interviews ranged from 15 minutes to 45 minutes in length. After completing the first round of interviews, an initial and summary analysis of the responses was conducted. After reviewing the initial interview transcripts, a second round protocol of interview questions was developed. The questions relied on the emergent patterns from the first round of interview. They were intended to explore emergent themes more deeply. The themes in the second round interview protocol were: 1) Program Success, 2) Place-based Experiences, 3) Curriculum for Sustainability, and 4) School Change. These interviews were conducted over a period of one

month. To minimize the time commitment for participants for interviewing, two questions were asked per thematic area. The duration of interview responses ranged from 15-35 minutes.

Document Analysis

Document analysis required me to examine the texts through an analytical and theory-based lens. In following the document analysis protocol outlined by Creswell (2007) of providing a description, engaging in analysis, and offering an interpretation. Documents were used as an extension of the broader research process. Documentary data in the form of "minutes of meetings, diaries, and photographs" served to guide deeper analysis into the experiences and perceptions examined (Reeves, et al. 2008, p. 514). Documents were analyzed for the purpose of understanding processes and experiences. Documentation of the teacher and student-created evidence occurred through digital field notes and photo gathering. A protocol for documentation analysis was constructed to ensure that the analysis conducted was consistent and ongoing. Documents served to substantiate data claims for the purpose of informing the interview process and the overall project analysis (LeCompte, 2000). I collected and digitally archived evidence in the form of student work, lesson plans, planning documents, the sustainability plan templates, posters, emails and others related program documents. I processed the document in the following manner: 1) personally identifying information was redacted from the files, 2) I labeled them with a description and date, and 3) they were analyzed for their structure, format, meaning, and audience. All digital information was stored on a password secured device.

Data Analysis

Data analysis was done by coding the observations, documentation materials, and interviews for patterns and topics. After the initial process of coding, categories were developed of experiences and perception. The emergent categories were reviewed and reflected upon amidst the process of constructing memos and analytical clustering. Patterns and associations within categories and between categories were identified and examined. Identifying independent explanations served to check the process of data analysis by helping to compare emergent themes against each other.

A timeline of data collection and documentation procedures were created to serve as the basis of analysis protocol. Data analysis relied on procedures “established by researchers documenting the inquiry process through journaling and memoing, keeping a research log of all activities, developing a data collection chronology, and recording data analysis procedures clearly” (Creswell & Miller, 2000, p. 125). Data was analyzed in this project by corroborating experiences and by eliminating overlapping evidence through data management strategies. The data was analyzed in order to identify themes and patterns. The synthesis of the themes and patterns embedded within the data helped to tell a story of the experience within the context of place (Creswell & Miller, 2000).

An important aspect of analysis consisted of identifying both specific categories of data and broad themes within the data. Categories were developed by grouping data according to specific characteristics and features. From this process grouping themes were generated. Grouping allowed me to carefully review multiple sources of data to draw out emergent patterns and themes (Creswell & Miller, 2000, p. 127). The theoretical framework was used to aid in the search for disconfirming evidence that challenged my assumptions and experiences. A review of

the data occurred to find any evidence that challenged initial analysis that was conducted (Creswell & Miller, 2000 p. 127). Findings were substantiated by employing member checks with participants. These checks were used to ensure that the resultant analysis was in alignment with participants intended purpose and perspective (Creswell & Miller, 2000 p. 127). Intercoder reliability checks were used to support the research conclusions. This process consisted of members of the data from my dissertation committee. This experience provided me with a check on my personal process of identifying patterns and themes within the interview narrative.

The framework established by LeCompte (2000), was used to guide the data analysis conducted in this study. The actual process of analysis relied on returning again and again to the sources of data to gain new insights. Repeatedly, the sources of data were reviewed with different conceptual and theoretical lenses to derive new meaningful and insights. Lenses of critical pedagogy, indigenous ways of knowing, interdependence and sustainability were used as a cognitive filter for data analysis. In cycling through data sources, the analysis became more integrated into the research. The first step involved tidying up the data. This required setting up rules that determined how data was assembled for the purpose of answering the research question (LeCompte, 2000, p. 148). The initial strategy for tidying up the data was using qualitative analysis software called NVivo. After uploading interview transcriptions word frequency tests were conducted. Then patterns across interviews regarding phrases, statements, and responses were identified. Categories and subcategories were constructed from this initial analysis. After that reviews of the interviews occurred by assigning statements, phrases or words to the different categories. Upon completing the software-based analysis, a more traditional approach to data analysis occurred. This analysis used printed transcriptions for the purpose of coding for themes

and patterns. I compared the software-based analysis and the traditional analysis. Overlap in dominant themes and patterns was found within the responses.

The second step required finding "specific things in the data set that researchers code, count, and assemble into research results" (LeCompte, 2000, p. 148). The frequency in which items occurred provided a raw sense of instances and patterns of occurrence of which constructed declaration of experience were determined (LeCompte, 2000, p. 148). Declarations "are identified as present or significant by study participants who tell researchers they exist" (LeCompte, 2000, p. 148). I investigated "whether or not the items do exist in the data, and if not, why not, even though participants say they do" (LeCompte, 2000, p. 148). The use of NVivo was very helpful in accurately identifying specific items across the interview transcription files. After conducting the software-based analysis, the context of the cited occurrences was determined to derive meaning that was rich and nuanced.

The next step was creating stable sets of topics. The emergent topics were organized into fields of experience. Items were grouped by comparing and contrasting topics within the data (LeCompte, 2000, p. 149). Member checking supported the credibility of this process by helping guide the process of sorting data into meaningful taxonomies. It also served to identify emergent themes that resulted from the analysis. The fourth step in the data analysis process consisted of reorganizing patterns (LeCompte, 2000, p. 150). This process of meaning making utilized data from the observations, reflexive journal, artifacts, and interviews. Key understandings arose about the experience of sustainability education programming that helped to clarify critical issues within the research experience. The final step of data analysis involved assembling structures. Patterns were identified and then grouped into structures. A description was constructed of the

program (LeCompte, 2000, p. 151). It is in this phase of analysis that recommendations were developed that provided a discussion on the implications, and shared the significance of the research. This approach to research functioned to develop overarching suggestions for future programming in the field of sustainability education.

Ethical Considerations for Research

For this research the policy guidelines set forth by the University of Montana Institutional Review Board were followed. These policies oversee human subject research to protect and ensure safe research protocols. The Institutional Review Board informed the procedures regarding data collection with participants. This process included crafting an informed consent protocol, establishing strict confidentiality, and stating the risks and benefits associated with engaging in the study to participants. Each participant of the study had a full and complete understanding of the nature and degree of involvement they could select to have in this research project. Participants were provided with an extensive review of the project, its purpose, and the ways in which they could select to be involved in the project. Strict confidentiality ensured that all personally identifying information related to the schools and the participants were protected and inaccessible to anyone but me. Every participant received knowledge that they could select to participate in the study and that they had the ability to withdraw from the study at any time without consequence. Any possible exposure within the project of participants was minimized by

using pseudonyms for the schools. Participants within the discussion of analysis were referred to without using names or any identifying information. Participants were informed that they were being recorded during interviews and that the resulting transcriptions would be securely protected.

Limitations of Research

The study had several limitations. Interviewing is an interpersonal experience. It required relating to the participant in meaningful ways to gain trust and access. Forsey (2010) asserts that interview experiences can be greatly hindered when they involve "people who do not relate to each other in some way" (p. 561). Working with others in a participatory manner was sometimes challenging as I negotiated interests and needs. This sticky approach to research is often critiqued for its lack of credibility and neutrality because the researcher and the researched are continually defining their role and approach (Anderson, 1989, p. 255). In working to relate to participants in this study, I strived to be accessible, supportive, and considerate of the process of engagement with participants.

As an insider at the Three River Valley High School, I had to be very careful not to lose sight of the research question. "Insiders have been accused of being inherently biased, and too

close to the culture to be curious enough to raise provocative questions" (Merriam et al., 2010, p. 411). Throughout the experiences at both schools a sense of unfamiliarity was maintained (Hockey, 1993). Maintaining a sense of intense curiosity and a sense of uncertainty helped to minimize bias and complacency. Critical questions were asked of both me and the participants. Peshkin (2001) views rapport as a continuum of relationships. Rapport was maintained by being considerate of others and by not asking sensitive questions too early in the course of the interviews (p. 12). Bias was regularly reflected upon to ensure objectivity with personal perception and in my role as a researcher. From a methodological standpoint, bias represents preferred ways of addressing problems (Norris, 1997, p. 173). I was attentive to how bias affected research approaches and my subsequent analyses. I was honest with myself as a researcher, how I engaged in research, and in how my personal views had shaped the process of analysis (England, 1994). I continually worked to disclose to myself and others the biases that shaped my process of meaning making. Theoretical considerations were balanced with the applied context in which research had occurred. This balance was accomplished by not being too theory driven or biased (Anderson, 1989). Bias was acknowledged and used to guide meaningful and purposeful research. There was consideration of how in qualitative research there are not definitive right or wrong approaches to inquiry (Peshkin, 2001, p. 14).

Conclusion

From a methodological standpoint this study incorporated numerous elements that promoted the quality of the data used for analysis and evaluation. This qualitative research

design utilized a variety of research strategies to understand the experience of sustainability education programming within two schools. The methodology involved using multiple case study design to explore in depth the experience of programming within the context of public education. Analysis within the project assumed an inductive character through the application of observation field notes, reflexive journaling, artifact analysis, and interviewing. Data was collected to understand the overall experience at both schools. Through a thorough and in-depth process of analysis that involved multiple iterations of coding, insights and understandings were derived about the experience from the perspective of participants of sustainability education programming. The insights gained from the interviews served to substantiate or refute the observation experiences that occurred within the project. In this way the different methods and approaches to data collection within served to validate data collected within the project overall.

CHAPTER 4

ANALYSIS

Introduction

In researching school change for sustainability at Three River Valley High School and Medicine Tree Tribal School I came to understand the different ways that these schools approached programming for sustainability. In this chapter I organize the data into three headings: 1) Summary of Sustainability Education Programming 2) Outcomes of Sustainability Education Programming, and 3) Reflection on Programming Experience. The data used for analysis is the result of observations, personal reflections in the form of field notes, artifacts arising from programming experiences, and interviews with teachers, students, and administrators. I relied on information from the interviews to support, clarify, and inform the analysis conducted from the case study documents and observations. I divided the interview

responses into five categories according to the research questions for the study: 1) Conceptions of Sustainability, 2) Role of Community in School Programming, 3) School Programming for Sustainability Education, 4) Leadership for School Change, and 5) Meaningful Learning for Sustainable Behaviors. I conclude this chapter by outlining four broad themes that emerged from the experience of sustainability programming within the two case study sites.

Case One – Three River Valley High School

The students, teachers, and administrators who comprise Three River Valley High School have a healthy relationship with the natural environment that surrounds the school. Stewardship and conservation of nature is a core value maintained by the community. Three River Valley High School embodies the ethos of care for the environment held by the community. One of the most active student groups at the school is the environmental club. This club dates back decades and has served to shape the school's commitment to sustainability. The school has a strong tradition of athletic programming across multiple sports. School programming related to speech and debate, business leadership, and experimental science are important to the school. The school is known for having excellent academic programs. Students have the ability to take a series of college level courses across content areas. The school values its visual and performing arts programs.

One reason that this school became a case study site was its sustainability focus. The school had created a culture around environmental awareness and had taken meaningful steps towards conservation. I was asked by the student environmental club if I would help them engage in sustainability education programming in a more deliberative and comprehensive manner. The school's existing sustainability initiatives included recycling and composting programs, rooftop solar arrays, and vegetable gardens. Through our process of program development we worked directly with the school community to refine, develop, and reflect on the practice of educational change for sustainability. I was offered a position that involved coordinating one of the academic programs at the school shortly after I selected the school as a case study location. Working at the school allowed me to gain greater access to the school and to become an integrated member of the school community.

Summary of Sustainability Education Programming

The sustainability education program at Three River Valley High School developed a culture of sustainability through an ongoing process of collaborative planning. The program supported initiatives related to sustainability. Recycling at the school occurred through a student-led program. Paper, metal, plastic and cardboard was recycled at the school. On Thursday's after school, the student environmental group would begin that task of collecting the three dozen recycling containers from around the building, sort the contents of the containers, bag the materials to be recycled, and then weigh the recycling. Each week more than a dozen students would take responsibility for this task. Through documentation of this process other students

who were not even part of the club we observed helping in the process of recycling. Three River Valley High School's student environmental organization served as a driving force for making the school more sustainable. The club had committees that coordinated efforts specific to recycling, composting, gardening, hosting Earth week, and grant writing. Each of these committees had a chair and participating members. The club fostered a high degree of civic engagement and civic leadership on the part of students and teachers related to sustainability.

The school aligned itself to the three pillars of whole-school sustainability programming. The first pillar focused on reducing environmental impacts by conserving energy and reducing waste. Through the program experience, the school refined its recycling program and developed a resource efficiency plan. The energy conservation and waste reduction plan required systems for data collection to be established. The school developed strategies to use resources more efficiently. Examples of student engagement were documented. This observation resulted in an insight about how the program empowered students to experience what waste reduction looks like in action through installing solar panels and establishing a composting program. As the sustainability team analyzed the data received from its energy audit, members of the school community developed and implemented specific energy conservation practices. The sustainability team identified energy savings strategies and took steps towards improving energy use efficiency. The process of whole-school sustainability required the sustainability program facilitator and the school facility manager to work closely together to determine where and how energy consumption occurred. The insights gained through this effort were shared with teachers and students. In reviewing the data, the school community developed new energy reduction strategies focused on behaviors related to heating, lighting, and plug load. The process of

developing these practices occurred through a collaborative effort between the student environmental club, teachers, the facilities manager, and the administration. A sustainability program facilitator for whole-school sustainability functioned to coordinate between different groups to share information and develop consensus.

Another aspect of programming involved improving the health and wellness of students and staff. The sustainability team applied a multifaceted approach to wellness. The wellness program consisted of incorporating strategic nutrition initiatives, improving student activity levels, and developing emotional wellness programming. Connections between the curriculum and the wellness program strengthened the program overall. Wellness programming included conducting an assessment of health-related activities such as using green cleaning materials, the disposal of toxic materials, integrated pest management, and indoor air quality. Supporting the wellness component of sustainability involved a coordinated effort between counselors, health teachers, and administrators to ensure that the physical and mental health of students.

The third pillar consisted of curriculum integration. Adherence to this pillar was ongoing throughout the project. A strong example of curriculum integration of sustainability was evident in how the World Language department supported the wellness program. The world languages faculty developed an integrated unit on food that focused on place-based agricultural practices, sustainable growing practices, and cultural practices that related to food. I worked with the World Language department to identify areas of integration related to sustainability topics.

Curriculum integration of sustainability allowed students to engage in experiential and place-based learning activities. The process of connecting sustainability to real-world experiences helped sustainability concepts become more relevant and applied. I often heard from

students about how sustainability became much more meaningful when they could see it in action. Through careful attention to scaffolding and to meeting the needs of students by engaging their interests, this program promoted sustainability education in an applied manner. Students would go on field trips to experience sustainability firsthand in the context of project-based learning. An example of this occurred when students helped to monitor stream health of a local watershed. Students also served food at the food bank and helped build hiking trails in the surrounding forests. All of these learning activities occurred through partnerships with local and regional entities that worked to promote the health of the environment or the welfare of the community. Partnerships with community organizations provided students with access to numerous community-based learning experiences. Helping students to see how their actions impacted both themselves and others was a primary goal of the program. Students reported that these experiences were the most meaningful experiences they had in high school. Students played a significant role in guiding the programs by shaping the different initiatives according to their interests and through their commitment.

Participant Responses, Observations, and Reflections

During the 2015-2016 school year, the project was planned, developed, and implemented to foster school change for sustainability. Interviews were conducted with participants, observations occurred, meetings were held, activities related to sustainability were engaged in, and artifacts from those experiences were documented. Collaboration occurred with students, teachers, and administrators to understand their experiences through the lenses of observations and personal experiences with school-based programming for sustainability. A first round of

interview questions were developed by drawing from my experiences at the schools. The questions focused on understanding themes related to Community Perspectives, Nature and Environmental Resources, School Experience, and Learning & Action. After conducting an initial analysis of the responses and comparing that to my observations, A second round of interview questions were developed that explored new topics in greater depth. The second round topics were Program Success, Place-based Experiences, Curriculum, and School Change. Four themes emerged from the analysis of observation notes, reflections and interview responses. These themes were Conceptions of Sustainability, Role of the Community in School Programming, School Programming for Sustainability Education, Leadership for School Change and Meaningful Learning for Sustainable Behaviors. Throughout the process of analysis I worked to corroborate participant responses with data that emerged from my observations, reflections, and artifact analysis.

Members of the school community all had different reasons for committing themselves to sustainable practices. Through observations and documentation I gained insight into what motivated and guided people at the school to act in a sustainable manner. These reflections occurred using both formal and informal documentation processes. The reflection process often required an analysis of observation notes in a manner that sought to construct meaning from the experience. As a participant researcher, I would ask myself questions about the context of the experience and the motivation that guided the behavior of the people involved in the activity. Reflections were recorded through a reflexive journal. The journal was maintained on a regular basis visits to the school's occurred. A regular review of the observation notes occurred and a response was provided to each entry. This review was framed through personal knowledge,

experiences, and insights. In addition to engaging in this formal process, informal reflections were conducted. These reflections occurred soon after an observed occurred or there was participation in an experience. An internal protocol was developed in which observations of the context happened to try to understand the motivation of participants, anticipate potential effects, and understand the lasting impact of the experience on the program and participants. Through the interview process students, teachers, and administrators explored how different aspects of sustainability education influenced and affected them. To identify how participants internalized and understood the concept of sustainability they were asked to share their beliefs on a range of topics related to experiences in nature, connections to place, and relationships with natural resources. These responses were compared to how they acted and engaged in the process of sustainability at the school.

Conceptions of Sustainability

Participants demonstrated and reported to that nature had a big impact on them and the community. When asked about how they connect with nature participants referenced specific activities that community members engaged in, such as hiking, biking, swimming, skiing, camping, fishing and hunting. The lifestyle choices of participants frequently put them in direct contact with nature. Most participants felt that being active in nature fostered meaningful personal connections to the environment: "A connection to a place starts from an experience" (personal communication, March 24, 2016). A student noted that community members "are very connected with nature. They go on hikes and lots of recreational activities. I know people who participate in those activities" (personal communication, February 18, 2016). Several instances

were documented of teachers and students talking about the different outdoor activities they engaged in and what they meant to them personally. Students and educators demonstrated leading active lifestyles. When asked, students and teachers conveyed that their plans were for the weekend often involved camping trips, hiking, or skiing. The school community embraced being outdoors. It was evident in their verbal and nonverbal communication that those experiences nurtured them. One example that demonstrates the strong ties to nature the school community had occurred in February after a big snow storm. Students and teachers were excited about the skiing conditions. I observed numerous interactions that day about how great the skiing conditions were. The interactions were shared between all members of the school community. It was clear that the school community was passionate about being outdoors and was excited about the opportunity to experience it. One student came up to me that day and asked if I had been up skiing yet. I told him that I had not gone yet. He then went on to share about how great the conditions had been and then he encouraged me to go skiing as soon as possible. I reflected on how positive the interaction was and how excited this student was to share about his experience. I realized through this experience that connections with nature occur in all different forms and should not be limited to narrow definitions. Individuals within the school defined their connection with nature on their own terms and I realized that there are no set definitions of what a connection with nature consists of. Students, teachers, and administrators emphasized both in their words and in their actions how critical access to nature was for the school community. Repeatedly, participants said that they enjoyed being in nature. One student stated that they could walk out their back door and go for walks and hikes with their dogs. Many participants felt gratitude for the access and opportunity that they had to be in nature. When teachers and students

shared about being in nature they often had a big smile on their face. An administrator referenced her connections with nature by providing the following examples: “you can enjoy the fresh snow or a beautiful sky or watch the deer walk down the street while you are drinking your coffee...your passion for nature grows because it touches your soul” (personal communication, March 1, 2016). There were multiple instances documented of how connections to nature motivated the school community to act in a manner that was sustainable. Through the course of this research project there were numerous observations, reflections, and the responses provided by participants that related to the role that nature played in motivating people to believe, act, and live sustainably.

Experiences in nature occur in a variety of setting and contexts. Participants said that nature is found in a garden, on the playground, or on a walk. One teacher said the reason so many students focus on the outdoors is that they "are just raised with this desire to be outside" (personal communication, February 29, 2016). There were many examples of effort made by students and teachers to be outside. These experiences outdoors strengthened the connection participant's had with nature and their commitment to sustainability. There were instances documented throughout this project in which members of the school community demonstrated a sense of responsibility to preserve nature. By observing this it was understood that their motivation was not based on receiving external praise. Instead individuals were intrinsically motivated because they felt a connection to the place they were preserving. Examples of sustainable action occurred when students picked up recycling on Thursday afternoons throughout the school. In speaking about their feelings of commitment to sustainability one student stated that "it really helps with all the reusing and sustainability if you can see the impact

you have on the outdoors and you see a bunch of trash you realize it destroys the aesthetic and ambiance, and you are inclined to pick it up and not litter and help” (personal communication, February 18, 2016). Reflections on the experiences had with programming shed light on the work that the school community engaged in to preserve the places they cared about.

Participants demonstrated and reported that nature gave them inner peace. In referencing the importance of feeling connected to nature one teacher stated that “when we are in nature without the influence of humanity that sense of connectedness is so strong and the connectedness develops the sense of belonging and brings the sense of peace, peace is the lack of struggle” (personal communication, March 25, 2016). Another teacher spoke about how their feeling of connection with nature and place was always at the forefront of their mind (personal communication, March 25, 2016). Learning experiences that occurred in nature helped to create meaningful and engaging learning experiences. It was evident that students were focused and interested in learning when it allowed them to go outside. There were numerous documented instances in which the connection that teachers felt with nature propelled them to seek out outdoor learning opportunities for their students. I realized that experiences in nature served to reinforce future experiences in nature. As students learn in nature and have personally moving experiences, those experiences reinforce their interests and passions. Teachers have the ability to impact thousands of students over the purview of their careers. As teachers engage their students in outdoor learning experiences students gain the skills, knowledge, and interest to pursuit future experiences in nature. Through reflection I came to understand that those experiences in nature can inspire future activities and even careers interests. One teacher stated that in wildlife biology students "are taking regular field trips to [a] trout hatchery. They go for walks and because of

courses like that there is this respect for nature and appreciation for nature that is being instilled in these students" (personal communication, February 29, 2016). When asked about this course student's said that it had a meaningful impact on them. One student stated that it was "the only class that I have ever been in that went outside of campus and did something in nature was wildlife biology, which was a great experience (personal communication, March 24, 2016). Students enjoyed learning in nature and those connections to nature function to foster sustainable action.

Role of Community in School Programming

Community organizations promote sustainability in schools. Throughout the experience of programming for sustainability there were multiple documented instances in which local and regional organizations worked to further their mission of providing academic and service learning opportunities to students. Organizations consisted of governmental agencies, non-profits, utilities, and for-profit entities. These different groups shared a common goals of improving the sustainability at the school by helping to decrease waste and improve energy efficiency. Through observations of community organizations in action it was clear that their work within the school was an extension of their broader mission to serve and education the community. When community members came in the school it was observed that they carried a sense of authority and expertise. Throughout the project there was documentation of students and teachers responding to community-based initiatives with enthusiasm and excitement. One student stated, "I definitely see guest speakers and people promoting their organizations through the school using posters and events" (personal communication, March 1, 2016). On multiple occasions the program facilitator participated in sponsored events at the school that fostered

interactions between members of the community and the school. These community-school interactions provided participants with new resources and approaches to sustainability. One event that helped shape the experience of sustainability programming at the school occurred in the early Fall. The event consisted of a representative from the US Green Building Council (USGBC) coming to the school to share knowledge and insights about sustainable practices with students. Multiple classes came listen to the guest speaker in the auditorium. After the presentation teachers made explicit connections between topic presented on and concepts learned within the classroom. After the event students and teachers commented about how impressed they were with the presentation and they felt surprised that the school was able to host this individual. Teachers and students were excited about the resources that organizations provided and the potential to expand the impact of their activities. Events that were hosted by community organizations helped build relationships between the community and members of the school community. Reflection notes from this project document how these relationships could serve as future pathways for community-based sustainability. Many of the questions asked by students during the USGBC presentation were related to future career options. Students wanted to know what kind of jobs would be available to them and how they could best prepare for those jobs. A teacher stated that community-based interactions are examples "of bringing the community and the school together because it opens up conversations going in both directions" (personal communication, February 29, 2016). Within the project it was documented how these interactions built capacity for both the school and the organizations they worked with. Both entities expanded their ability foster sustainability through their shared work. Teachers and students reported feeling inspired by new ideas and approaches to sustainability shared on behalf

of organizations within the community. Students responded by wanting to take action when a watershed conservation nonprofit organization conducted a presentation at the school. This presentation inspired an entire unit of learning about watersheds. Students and teachers in a variety of classes took field trips to local streams and lakes to collect water samples. Students then reported the results of the tests back to the community organization. This mutually beneficial activity served the community and the students by helping to connect sustainability to the taught curriculum. Through reflection it is clear to see how activities like this strengthen the resilience of the community and function to build future leaders who are sustainably minded.

Learning artifacts provided evidence of student learning and transformation. Not only did the related learning artifacts capture the development of content knowledge they also captured the shift in thinking that was occurring in students who engaged in hands-on work in a real life context. Students felt that the best way to foster sustainability at the school was to have more direct partnerships with community organizations. Many students demonstrated feelings that sustainability is about shifting behaviors and adjusting how individuals interact with the environment and their community. Teachers demonstrated through their words and actions that community engagement was beneficial for promoting sustainability. One teacher stated that "the more we have the community inside the school, the more the students can realize that education is more than sitting at a desk, it is about communicating and interacting with the people around and about working together" (personal communication, February 29, 2016). While working directly with community members it was documented through learning artifacts that students made connections between the world around them and what they were learning in their classrooms. Through ongoing reflection on the impact of experiential learning it was observed

how sustainability is vehicle for action. In order for students to take action they must learn to be engaged. Throughout the project observations of students being engaged in their learning were often associated with activities in which they were collaborating, communicating, engaging in inquiry, creating projects, and critically analyzing an issue. These student-centered instructional strategies enable topics within sustainability to become personally relevant to learners.

School change for sustainability relied on students working closely with community organizations. Through a review of different student-led sustainability initiatives at the school reflection occurred on how these activities led students to develop leadership qualities. Through the process of reflecting on leadership it was possible to reference my personal experience as a leader and also my experiences with other school leaders. One of the most important traits of leadership is effective communication. It was documented that engaging in sustainable action required students to communicate regularly with community organizations to plan, organize, and implement initiatives. For example in their committee work students took initiative to identify community contacts and set up informational sessions to provide all students with a baseline understanding of the issue and the possible strategies to address it. Committee work provided the opportunity for students to develop leadership skills. One committee consisted of students focusing on gardening. Gardening at the school occurred on the roof, in the classrooms, and on a small plot near the school. The students in the committee researched the topic of gardening, developed actionable tasks, and assigned work responsibilities. In the early fall the garden committee hosted a Salsa party for the school community. The salsa was made from tomatoes and chilies that came from the roof garden. This event helped the school community gain insight into the work being done to foster sustainability at the school. Students felt empowered through

the planning and implementation of sustainability initiatives. Students worked throughout the project in their committees to overcome adversity and foster a growth mindset. One student stated that “the kind of people and businesses that are interested in preservation and sustainability are the kind of people that feel driven to share that and propagate that message and whenever we reach out people feel really excited to connect with us” (personal communication, February 17, 2016). Having worked with a variety of community organizations both personally and with students I have seen first-hand how that process of collaboration fosters essential skills such as communication, critical thinking, and developing a growth mindset. Teachers at the school viewed the community as a support pillar for successful programming. One teacher stated that they felt “the role of the community is to make connections and offer support” (personal communication, February 25, 2016). Teachers worked extensively to coordinate visits from community organizations. Organizing visits required countless phone calls, organizing schedules, getting administrative approval, developing curricular connections, and co-creating meaningful learning experiences.

School Programming for Sustainability Education

Participants spoke about school change, curriculum integration, meaningful learning experiences, the importance of student voice and agency, connections with the community, the role of the teacher and school leadership within the context of sustainability education programming. All of these topics framed the participant's experiences with school-based programming for sustainability education.

School change for sustainability is a process that relies on teachers, students, and administrators working together. It was documented throughout this experience that change was grounded in shifting patterns of behavior and occurred by incorporating ongoing reflection. Reflection on the experience of programming enabled an understanding of how change was occurring behaviorally and in terms of shifting perception on the part of participants. The process of school change for sustainability was set within a broader experience of educational change overall. Participants felt that education overall was at a critical point. One teacher felt that "public education is in a major shift in a number of ways and foundationally that shift is the purpose, the purpose of public education is changing" (personal communication, March 1, 2016). Through this project it was documented that there was a shift towards student-centered practices at the school related to sustainability. The reason for this shift was because these approaches to learning are aligned with the central tenants and approaches contained within sustainability education. On numerous occasions it was documented that teachers responded to student initiatives by developing meaningful learning activities related to sustainability. Teachers were interested and eager to incorporate topics related to conservation, recycling, and many other green practices into their daily lessons. Some activities consisted of outdoor experiences in which student engaged in observation-based citizen science. Other activities focused on refining student recycling and composting practices through a student-guided initiative. In the science class students used GPS systems to find different locations within the surrounding forests. Sustainable practice required teachers to enable lessons to become action-based. A program facilitator must coordinate meetings and the activities occurring in different classrooms. The goal of this process of coordination is to align the activities happening at the school and to provide an

open forum to teachers and students to engage in those activities. Accomplishing this task relied on building buy-in and genuine engagement of students, teachers, and administrators. This occurred by creating clear communication channels and transparent documentation of program components. One teacher stated that student engagement required students to have a voice in what and how they are learning, “in my class students feel comfortable saying let’s not do this, it seems like busy work” (personal communication, February 26, 2016). This teacher created a learning environment where students guided their inquiry. Students provided feedback on how to fix problems at the school and assumed a sense of responsibility for solving them by taking action. One example of this occurred with the establishment of a data gathering protocol for recycling. Students identified a need to improve recycling efforts at the school. In order to do this, they first established a baseline of information regarding the current program of recycling. Teachers provided guidance as students documented recycling every week to determine how it was changing. There was documented evidence of student’s providing the impetus for action. In referencing the importance of student action one teacher stated that “I think you could incorporate student voice through getting ideas to change the problem so that the problem is no longer there” (personal communication, March 1, 2016). Student action at the school guided and drove school change for sustainability.

The development of student's voice is a process. Fostering student voice needs to occur in a supportive manner and be considerate of the developmental capacity of the students. One student felt that "as a freshman, you don't have student voice, but it progresses, and as you get older, you realize more things about the school and have more opinions and can formulate your voice better" (personal communication, February 29, 2016). There were multiple documented

instances in which student voice occurred as a result of teacher and administrator modeling. Teachers would provide students with suggestions or prompts about different topics related to sustainability. One example of this occurred when classroom teachers asked her students about how they should engage in recycling in the classroom. Through this question prompt the students developed a plan for recycling. They explored different options and determined who was responsible for achieving the plan. Teachers felt that it is important for students first to see what was possible and then take the necessary steps to accomplish their goals. Many observed lessons were aimed at inspiring student action by provided concrete examples and then setting forth a learning task aimed at motivating action. An example of this occurred when the student environmental group worked to develop Earth Week activities. They researched possible activities and through their process of synthesis developed an action plan. They set forth the task of planning, organizing, and implementing the activities. One teacher stated that "students need to be shown things that other students have managed to implement" (personal communication, March 25, 2016). Through peer-based modeling students became inspired and motivated to take action. It was observed that students became excited about the different aspects of their Earth Week plan. This fueled their engagement. Teachers recognized their responsibility to model sustainable action. One teacher stated that modeling enabled students to make connections, find purpose, and engage on a personal level with the topic at hand,

Our responsibility is to show students that they can have an impact, we can show them by having them to listen to things they care about and asking them things they want to study and making connections with what is happening with the world outside (personal communication, February 29, 2016).

Members of the school community felt that engagement and change are attitudes that need to be learned, modeled, and practiced. One teacher felt that "service and engagement are skills that people learn through modeling" (personal communication, February 29, 2016). It was documented that teachers modeled sustainable practice by encouraging recycling in their classroom. Each teacher in the building had multiple recycling bins in every classroom. There were numerous documented instances of teachers asking students to use the recycling bin or to take an object that could be recycled out of the trash and put it into the recycling bin. This level of modeling on that part of teachers helped to build capacity for school change for sustainability.

Teachers played a critical role in school programming. In referencing their personal experience one administrator stated that "for programs to be initiated and to have long range sustainability the teacher has to have the program as their passion" (personal communication, March 25, 2016). Teachers stated that they needed time to understand, engage, and reflect on the program to buy-in to it. Through reflection it was clear that teachers required guidance and support to participate in meaningful school change. An important aspect of reflection on the program experience was that because teachers have often seen programs come and go they need to see that new programs have the leadership required to fully implement them and the resources necessary to sustain them. One teacher stated that ample resources and time were needed if "you are going to ask teachers to jump that far out of their comfort zones" (personal communication, February 17, 2016). Through the process of inventorying sustainable practices that have occurred at the school there was significant evidence of failed programs and initiatives. In researching these initiatives it was found that they often failed to be adopted by the larger school community.

These experiences helped affirm the idea that school change cannot live with a person but must be imbedded in the culture of the school.

For teachers, it is important to have consistency in messaging and support regarding the implementation of new programs. There were several documented instances of how a lack of support and transparent communication led to feelings of distrust or apprehension. This sentiment is evident in the following response provided by a teacher, "I have seen in this district that we are going to do this and here is a big acronym, and never mind we have a new principal, and then there is another obstacle that has to be addressed" (personal communication, February 17, 2016). Teachers stated that they feel overwhelmed with the barrage of new programs that they face. Teachers reported feeling confused by the administrative shifts that occurred on a frequent basis. A major factor the teachers identified that affects program success is administrative turnover. These turnovers often lead to feelings of resentment and frustration. When the focus of school improvement shifts without deliberation on the part of teachers they expressed feeling unwilling to support new initiatives. Having taught for numerous years in multiple educational settings I realize how important teacher engagement is to the success of educational programs. One teacher at the school felt that in many instances "needs have been articulated, and we have been heard but somehow we are not scratching the itch" (personal communication, March 25, 2016). Teachers stated that they feel frustrated when their needs are not entirely understood or addressed as a result of high administrative turnover.

School change occurs when members of the school community feel empowered to foster it. When referencing personal and school change, one administrator stated that "challenges provide the opportunity for learning and growth" (personal communication, March 25, 2016).

Throughout the program it was documented that dealing with barriers to programming helped participants to develop resilience. As an educator I have seen how grit and perseverance are skills that need to be developed and practiced in order for programs to be successful. Examples of resilience occurred when students and teachers worked to overcome limitations regarding time, resources and buy-in. For example a committee of students worked over the course of the sustainability plan to implement a composting system. They faced barriers regarding the establishment of composting system through food services and the set-up of the composting machine. It was documented that engaging in this initiative required both students and teachers to persevere to find innovative solutions. One administrator felt that “if I am not challenged to reflect I don’t know that I would grow otherwise” (personal communication, March 25, 2016). Members of the school community responded to adversity with a mindset of resilience (Dweck, 2006). Having a growth mindset played a significant role in guiding the attitude and approach assumed. When challenges arose specific to planning Earth Week and coordinating its many events, teachers and students worked together to accommodate schedules, identify space limitations, and resolve conflicting ideas of how the events should occur.

Teachers felt that the entire staff needed to be committed and invested in the program. Without strong degree of collective buy-in, one teacher felt that the program may not succeed. "Maybe a program fails because the culture of the school is not feeling it and they block the program, and they don't see a need for the program" (personal communication, March 24, 2016). Throughout the program teachers provided feedback on what is needed for a program to succeed. They felt that if teachers don't see a need for a program, then it is likely that the program will lack fidelity in its implementation. Teachers stated they need to know how a program benefits

student learning. "I think a successful program is one that has staying power and continues to have an interest both from parents and students, as well as staff and a program that people like to be a part of" (personal communication, March 24, 2016). The program facilitator worked with students and teachers to connect outcomes in sustainability programming to overall benefits to the school community. The program facilitator did this by referencing that resources conserved regarding paper, electricity, and natural gas would translate to additional resources in the form of curriculum materials and educational supports. When teachers felt that a program promoting sustainability would lead to benefits to classroom learning they felt more buy-in. It is important for teachers, students, and administrators to know why they are engaging in programming. One teacher stated that to feel engaged with new programming it is important that

all staff members see the value in it, and that is made clear to them and that they have a choice to see that value and that those values are not forced upon them and not just given a sheet of data and told this is important, all too often when we are dealing with programs whether it is the programs themselves or the administration that fail to give us a choice (personal communication, March 25, 2016).

When school programming supports student learning, teachers are eager to commit to programming guidelines. "The role of teachers is to look consistently at how can my students learn more and is what they are learning the key to making them engaged, excited and motivated" (personal communication, March 25, 2016). Teachers expressed a strong commitment to the planning, implementation, and the continuation of the program when they felt it benefitted students directly.

Leadership for School Change

Successful school programming relies on strong leadership. According to an administrator, “one of the key features in a successful program is that there is one peculiar person that is passionate enough to eat, sleep and bleed for a program” (personal communication, March 25, 2016). Reflection occurred on how program success often begins with a committed person but is achieved with a team. One student stated that “we all have small leadership roles, we have committees and committee leaders, to make sure the individual and little things get done” (personal communication, March 1, 2016). There were numerous instances of documentation regarding the effectiveness of committee work in achieving sustainability related outcomes. The process of committee work was deliberative and based on developing consensus. Through creating shared agreements committee members who represented more extreme views would assume a more central position that was in alignment with the majority of committee members. This process was critical to developing buy-in and trust regarding the development and implementation of new initiatives. Documentation from the committee work revealed how topics transform into actionable behaviors. The role of the facilitator was to foster shared responsibilities and integrated decision making, however they should be cautious to allow the school to guide the process of change. As a leader in this experience their role was aimed at empowering others to assume responsibility for the decisions that they made. The program facilitator needed to grapple regularly with the challenge of helping others to take ownership of the behaviors they were trying to promote throughout the school.

The classroom teacher as an educational leader is essential to the process of school change and successful program implementation. It was documented that students felt teachers

provided leadership, inspiration, and guidance. One student felt that "it takes a teacher to ask and take the initiative to get the group to talk about [the environment] and most kids are not going to talk about or take initiative to do something about the natural environment" (personal communication, February 29, 2016). When speaking about the teacher advisor to the environmental club, one student stated, "he brings in ideas and certain leadership and guidance. Since he has been here so many years he knows what is up and how it is going to go down" (personal communication, March 1, 2016). There was consistent documentation of students looking to teachers for guidance and leadership. This documentation showed how students would provide verbal and visual cues that sought affirmation from teachers when they were exploring topics or developing new initiatives. It is important for teachers to serve as mentors. Students respected teacher mentors and relied on them for support.

Inspiring and motivating others to act is a fundamental component of school programming for sustainability. In referencing the importance of motivating others, one administrator stated that "you have to make it worth their while and make them want to do it themselves" (personal communication, March 23, 2016). There was reflection in the project on how shifting patterns of behavior required implementation of approaches to sustainability in efficient and relevant ways. The ability to relate information in a manner that builds buy-in requires planning and coordination. It was observed that teacher leaders all contained a degree of charisma, enthusiasm, and kindness in their approach with students. It is important for the program facilitator to embody those same qualities. They need to be a champion for the program and to endure adversity in an effective manner. When challenges presented themselves the program facilitator would reflect on how to proceed in a manner that was embodied flexibility

and upheld a determination to maintain alignment with the goals of the program. The program facilitator often felt responsible for the program and it impacted them deeply when challenges arose. Because of the level of attachment to the success of program outcomes it is important for the facilitator to remain objective about their level of influence and to acknowledge honestly what is outside of their control. One administrator stated that "getting a program up and running does not occur in a forty-hour week, it is a lot of commitment outside the school day because it is expensive (personal communication, March 25, 2016).

Excellent communication is required on the part of a school leader to ensure program success. The school administrator outlined four steps to good communication. The first step is to be open to suggestions regarding the process of change. The second phase of the cycle is to solicit feedback. Next, you have to act on those recommendations, and the final step is to check back with the stakeholders to ensure that you performed according to their expectations. Bringing about change is about "being intentional about understanding that cycle of improvement and having intentional actions steps for each area" (personal communication, March 25, 2016). One teacher stated that effective leadership needed to be transparent and open. In reflecting on this comment the program facilitator decided to provide regular updates on the progress and development of the program to students and teachers. A teacher identified that without transparency it was hard for them to trust and honor the process of school change. Another teacher felt that the "previous administration pushed stuff down and said that they really valued us, but it was just like they just did not seem to be hearing us, they would listen but not hear" (personal communication, February 25, 2016). Several instances of documentation arose regarding the need for teachers to trust the school leader if they are going to buy-in and commit

to an educational program. When leaders engaged in the work of planning, developing, and implementing the program alongside teachers and students it imbues the program with a high level of credibility. In my own experience as a teacher and program facilitator I found that the contributions of administrators carried a great deal of weight. Teachers look to the administrator for affirmation of ideas and confirmation of proposed action steps. When the school administrator attended committee meeting, sustainability-related events, or participated in activities teachers were eager to get feedback on their ideas and confirmation that they were on the correct track. Teachers and students would seek out their feedback and assurances each time they were present.

Meaningful Learning for Sustainable Behaviors

School change for sustainability is grounded in learning. Teachers felt that the program should focus on promoting learning outcomes related to the integration of sustainability into the curriculum, one teacher stated “this type of integration is something we constantly strive for” (personal communication, February 26, 2016). Another teacher said that they want to have greater integration and collaboration, “I see that we need a much more fluid way of working together instead of as isolated parts because we will all go further” (personal communication, February 29, 2016). Applied learning related to sustainability helped teachers and students develop new ways of thinking, one teacher felt that a “meaningful learning experience is when you get a new perspective and one that you can’t go back on and that is a good thing, sometimes you develop well-rounded perspectives and you appreciate something on a different level” (personal communication, March 25, 2016). When inventoried about meaningful learning

experiences related to sustainability students referenced outdoor experiences and project-based learning. One teacher felt that this approach to learning was important because it help learning to become a part of students lived experiences. “What the students are experiencing [should] not just stay outside of them like a clean slate, it [should] a part of the entire cultural experience” of learning (personal communication, February 25, 2016). There was documentation on multiple instances of sustainability connecting to the curriculum. Connecting sustainability to classroom instruction helped students find meaning in what they learned. Students responded that they felt inspired and motivated to pursue these topics in their future college experiences and in their long-term careers. In their process of program reflection participants identified that curriculum linkages helped students to see and experience the value of learning about sustainability. Both teachers and students repeatedly identified meaningful learning experiences that occurred in nature, within the community, and through engaging experiences. Students referenced applied experiences when they reflected on what meaningful learning was. They often told me how these experiences were definitive to shaping them. One student stated that "teachers could utilize the surrounding area and natural resources, which should become a school goal, to utilize the nature resources found only here" (personal communication, February 18, 2016).

Summary of Experience at Three River Valley High School

Community partnerships were viewed as essential for programming at Three River Valley High School because they assisted with program planning and implementation. Individuals serving different community organizations provided guidance and resources.

Members of a variety of organization gave guest lectures, offered materials, and provided ongoing support. Through their engagement, community organizations infused the school program with community-based values and ideals. Students responded to different organizations by taking responsibility for issues related to watershed management, recycling, and generating public awareness regarding climate change, and engaging in different community-based topics. This process allowed for programming to occur in a deliberative and contextualized manner.

Both teachers and students asserted that school change for sustainability needed to be a process of mutual engagement and collaboration. Student voice was integrated into the process of decision making. The school community considered their input essential to successful program implementation. By giving students a voice in what and how they learn, they maintained a high level of commitment and self-awareness within the learning process for sustainability. Through promoting student voice, teachers reported feeling more engaged and responsive to student needs. The process of creating teacher fidelity to the sustainability program began by inventorying their interests. The inventory was an assessment of teacher's wants and needs related to sustainability education. Supporting teacher fidelity also occurred through regular check-ins with individual teachers using a variety of personal and digital methods. The program facilitator answered questions, provided resources, and found support materials when needed. An important insight gained from this experience was that if teachers buy-in to school change they work to support program integration within the curriculum, the classroom, and the school.

Broad goals and focused benchmarks enabled the school community to overcome adversity. The success of the program at Three River Valley High School relied on teachers,

students, and administrators being adaptive and flexible to changing school and community factors. The alignment of programming outcomes with school-based practices and cultural norms on a regular basis was an essential task of the program facilitator. The school leader demonstrated insight into what motivated participants and how to communicate with the school community effectively. The existing culture of the school influenced the approach to planning and implementing the sustainability program. The articulation of how the program connected to student learning was a necessary prerequisite for all members of the school community. Identifying pathways for curriculum integration within specific courses and amongst interested teachers provided a critical mechanism for programming. One of the best examples of this occurred within the world language department. Through collaborative planning, all of the world language teachers developed a shared thematic unit on the topics of agricultural practices, the influence of food on culture, and other topics related to sustainability. All students taking a foreign language class learned about sustainable food practices through this curricular unit.

School Change for Sustainability at Three River Valley High School

The experience of programming for sustainability education at Three River Valley High School was largely a process of coordination. Given the range of academic and non-academics programming within a large comprehensive high school, the task of the program facilitator was to align and measure the activities related to sustainability occurring at the school. High schools have a tendency to become a collection of parts, with each department and classroom focusing on the work they need to accomplish. Fostering sustainability required integration and coordination. Both public and private organizations that seek to promote sustainable practices

rely on a sustainability coordinator. Having a person focus on the tasks of coordinating the efforts of the group, documenting those efforts, and reflecting on the efficacy of those efforts is the responsibility of a sustainability coordinator.

Public education in America is changing. A new era of accountability-based progressive education is defining the educational landscape. Teachers face the task of differentiating the curriculum through varied instruction to support individualized and intervention-based learning for each student. Teachers are expected to use data-driven strategies to make instructional decisions about what, where, and how learning should occur. Administrators have the responsibility of ensuring academic and personal success for a huge range of students. Schools are being asked to provide essential social and personal services to students.

No longer is academic success enough for students to gain access to higher education. The road to college now requires extensive volunteer work and engagement in a multitude of extracurricular activities. Many students described how they were overwhelmed by the responsibilities and obligations they faced. Amidst this climate of tension, it was important for the program facilitator to frame school change for sustainability in a manner that was accessible and relevant to students. Ensuring student engagement allowed for teacher and administrative engagement. As the program facilitator worked with participants to add new dimensions to the program and adjust existing elements, it became apparent that the process of school change for sustainability was more important than the outcomes derived. The school community realized that school change for sustainability would be an enduring experience of school change that was informed by recursive processes.

The process of planning and implementing sustainability education programming at Three River Valley High School required the program facilitator to be an effective communicator. A program facilitator needs to embody a disposition of resilience. This mindset helps them to navigate with composure differences of opinion, material barriers to programming, and other limiting factors. To effectively guide program implementation, they need to establish and maintain excellent communication. Allowing participants to be heard was essential in gaining trust and commitment to the programming process. Their ability to serve as a conduit for the needs and interests of the different groups is necessary. The ability for a facilitator to be flexible is an invaluable factor in the overall programming experience. In working with a variety of community groups, they need to be prepared for differences in ideas about engaging in activities to arise. Navigating these differences skillfully without compromising relationships is critical. Honoring others and allowing them to communicate their needs is the most important role a coordinator must play in the process of navigating interests.

A program facilitator needs to develop strong organizational systems for a sustainability project to support programming and provide transparency. This project relied on organizing tasks regarding time-based benchmarks. Developing time-bound goals helps a coordinator and participants to accomplish tasks. Data emerges in the form of curriculum from teachers, weights and measurements related to recycling and resource consumption and from ideas regarding experience from the participants of the program. Managing the data requires a facilitator to take detailed notes, develop spreadsheets and construct organizational systems.

School sustainability projects also require a high degree of resilience. Conflicts are often attributable to a lack time and resources available for programming. Through the planning and

organization, it is important to set process goals and objectives that address time and resource constraints. Through maintaining flexibility and openness, it is important to reflect on ones practice as a participant observer and revise plans in order to improve their approach to engagement. Through consistent communication and good organization, school change for sustainability at Three River Valley High School was accomplished.

Case Two – Medicine Tree Tribal School

School Background

Medicine Tree Tribal School strives on help students achieve their personal and academic success through maintaining a close connection to tribal culture. The school began as a program for tribal members to receive their General Education Degree. The educational program of the school is point-based. To graduate, students are required to earn a designated amount of points. As students engage in learning, demonstrate progress, and produce learning artifacts they accumulate points towards their graduation requirement. Many students attend this school because of its independent approach to education and its tribal focus. Students develop a portfolio of work that serves to assess their learning every three weeks. Students are given feedback on their portfolios through a collaborative conference.

I selected Medicine Tree Tribal School as a case study site because of its unique features of place and culture. I learned about the school through teaching a professional development course there in the Spring of 2015. Durning this course I visited the school regularly and developed relationships with the teachers and administrators of the school. During this course,

there were many documented instances how the assumptions contained within sustainability were present at the school, such as interdependence and community-based values. These topics of sustainability were prevalent within the tribal culture at the school. The school provided a rich context to explore the intersection of school change for sustainability and tribal culture.

The school strives daily to preserve tribal cultures through educational programming. The *Home Cultures course* integrates tribal ways of knowing into the school experience for the students. The *Tribal Language* course helps students to read, write and speak their tribal languages. The school serves as a center for community activity. Throughout this project I maintained a strong adherence to cultural sensitivity at the school. I was committed to programming for sustainability in a manner that was based on collaboration and adhering to ethical practices throughout the research and analysis phases. I maintained close ties with the superintendent of the school and the broader school community. I worked with the staff to ensure that cultural safeguards were put in place.

Summary of Sustainability Education Programming at Medicine Tree Tribal School

Medicine Tree Tribal School is determined to preserve its traditional ways of knowing and tribal values. The values maintained by the school were brought to the forefront with the development of programming initiatives such as the school recycling, wellness, and curriculum integration. The sustainability initiative began with professional development sessions in August of 2015. Professional development began with providing staff with background information about sustainability, sustainable practices, and sustainability education. The teachers continued to receive monthly professional development that combined knowledge of sustainability,

technology integration, and strategies for Writing Across the Curriculum (WAC). Over the course of the spring 2015 semester, I taught a series of professional development seminars regarding WAC. The use of WAC became the curricular basis for exploring sustainability topics within the classroom. Professional development also extended into classroom visits, guest presentations for students, and individual meetings with teachers about their experience with school change for sustainability.

To begin the process of programming, I provided an overview of sustainability to the superintendent, the faculty and staff. The planning process began with an inventory of sustainable practices. The school community felt empowered and inspired by conducting an inventory of sustainability practices that were already occurring at the school. The staff's outlook on sustainability shifted as they were able to make connections to it in things happening at the school. Through a collaborative process, the school community determined that the experience of sustainability programming would emphasize traditional tribal beliefs, values and ways of living. Program development occurred by infusing tribal values into the goals and structures of the sustainability program. The values identified included care for the land, honoring animals and people, respect for mother earth, sharing stories, viewing seasons as ways of knowing, and honoring elder's wisdom.

The staff developed five committees to guide the planning, implementation, and documentation of a school-wide sustainability program. The committees focused on energy, gardening, wellness, curriculum, and transportation. Each committee brainstormed specific initiatives to engage in and established a documentation protocol. Once this initial planning phase was completed, the next step was to have a school-wide assembly. The assembly provided

information about sustainability to the students and had them engage in planning the process of school change for sustainability. During the assembly, students worked in small groups to create a logo, slogan, and mission for the sustainability program at the school. Each group presented to the school and then the student body voted on the different options of graphics and slogans available. The student body of Medicine Tree Tribal School selected the following mission and motto: *To live through our Grandchildren and Go Green or Die Trying.*

Medicine Tree Tribal School aligned itself to three pillars of sustainability education programming. They worked to reduce environmental impacts through their recycling and energy conservation plan. Effort was made to improve the health and wellness of the school by adopting a multifaceted approach to wellness that included strategic nutrition initiatives, promoting increased physical activity, and providing emotional wellness programming. Curriculum integration occurred through environmental and sustainability education. Students engaged in experiential and place-based learning that enabled them to incorporate sustainability topics into their classroom learning. Through careful attention to grade-level content alignment, curriculum integration focused on connecting concepts to personal experience. This program helped foster curriculum integration of sustainability topics in a variety of content areas at the school. One example of this occurred when students constructed and solved real world math problems by applying knowledge of geometry to create the school's emblems on the fence surrounding the school to support their tribal cultural.

Participant Responses, Observations, and Reflections

I interviewed students, teachers, and administrators to understand their experience with the process of sustainability education programming. In total, I conducted twenty-three interviews with six students, five teachers, and one administrator who participated in two rounds of interviews. The first set of interviews focused on *Community Perspectives, Nature and Environmental Resources, School Experience, and Learning & Action*. After conducting an initial analysis of the responses, the second round of interview questions I explored the topics through in-depth analysis that layered my personal observations and experiences upon the feedback received from participants. The focus areas for the second round of interviews were: *Program Success, Place-based Experiences, Curriculum, and School Change*. Over the course of the two rounds of interviews, four themes emerged from the respondents. These topics were *Conceptions of Sustainability, Role of the Community in School Programming, School Programming for Sustainability Education, Leadership for School Change and Meaningful Learning for Sustainable Behaviors*.

Conceptions of Sustainability

Understanding how the school community understood the concept of sustainability required observations to be conducted and feedback received from the school community. When asked about how they view sustainability students, teachers, and administrators expressed that sustainability relied on individuals having a profound connection with place. Teachers and students engaged in a wide array of activities in nature both during school and in their personal lives. When asked about connections to nature, one teacher stated that place-based attachment is

about "knowing the people and the climate of the place, knowing the ins and outs of the where the backroads are and all the little shortcut routes and having that feeling of home" (personal communication, March 16, 2016). It was evident through the research process that the majority of the staff had been born and raised near the school. In many regards the school community was an extended family. Numerous staff had been students at the school and felt indebted to the school and community. The staff reported that they felt connected with the school because it transformed them into the people they are today. Several teachers felt that their decision to teach and serve the school was a product of the attachment to place. As a result of constructing the sustainability inventorying significant evidence emerged of place-based connections. Students participated in a wide range of activities such as lake honoring ceremonies, citizen science projects, and other service projects. These activities enabled the school community to engage with nature on a regular basis. Participants frequently spoke with pride when they described the mountains, rivers, and lakes that surrounded the school.

Students were appreciative of place. They conveyed this by stating how essential the surrounding environment was to the wellbeing of the community. In speaking about the beauty of the reservation and how lucky they were to have it, one student stated that "people are always talking about how bad it is here. But people don't get how good we have it here" (personal communication, February 4, 2016). Participants responded that place was important to them and their community. There was documentation of students participating in litter and trash clean up events. Students and teachers referenced the activities they engaged in related to the environment. Activities that were identified that help to strengthen place-based connections in teachers and students. The identified connections included hunting, fishing, camping, hiking,

bird watching, and harvesting wild berries and plants. Every year teacher at the school would take students to harvest roots that had been traditionally harvested for generations. Through participation in this school-sponsored activity students learned about traditional practices of self-sufficiency. One teacher stated that because he returned again and again to a place he developed a strong bond with the place. He felt that "just being out there makes others feel accepted and have a bond with the community" (personal communication, March 16, 2016). Within the experience of program reflection there was documentation of how attachment to place allowed individuals to create strong emotional and spiritual connections to that area. Examples of strengthening spiritual connections at the school occurred through the telling of stories and the singing of prayers. Teachers and students were often called upon by the community to participate in ceremonies related to honoring natural spaces or providing wake services. It was observed in the tribal cultures courses that students learned traditional stories, prayers, or hymns used in different ceremonies. The teacher reported that telling a good story and singing a hymn is a skill that needs to be practiced. These experiences served to teach important values related to stewardship and honoring. It was documented that this practice served to strengthen cultural ties and create stronger communal bonds. Over the course of the year there were numerous instances of students and staff conducting participating in honoring ceremonies and providing services for community members who had passed away. One morning during a visit I observed students practicing chanting a hymn in their tribal language. The sound of the singing was rhythmic and I felt surprised by the affect that it had on me. The students sang with purpose. They were focused and composed throughout the entire experience. I remember being surprised by this. High School students are often silly and talkative. During this experience they were calm and composed. The

role of the school in providing this service was important to the community. Several members of the school community believed that values translated into service and honoring (personal communication, March 23; March 16, 2016). One teacher stated that, "our students mirror the morals of a tribal community, they may not get along with each all the time, but they always have each other's back and are really supportive of each other" (personal communication, March 16, 2016). The importance of oral tradition was documented on numerous occasions throughout the project. Oral tradition served to preserve and maintain the values held by the community. Many of these values related to the principles contained within sustainability. One teacher shared with me that she had been a student. She shared that she struggled with school and had a difficult time fitting in to a traditional school system. Her description of high school was filled with negative experiences. When she arrived at Medicine Tree Tribal School she thrived. She was given support and the resources she needed to be successful. Because of her strong command of one of the tribal languages and her role within the tribal community she was given the opportunity to teach at the school. In reflecting on this I realized how the programs she ran within the school all focused on encouraging students to serve the community. This teacher organized the annual school-based clothing drive, provided memorial and wake services with the help of students, and created opportunities for students to serve elders in the community. Her commitment to the school guided her service to students and the community. Students worked to promote conservation by reducing their ecological footprint.

In order to connect sustainability to the values held by the school community the program was designed to facilitate strong collaboration between teachers and administrators. The school administrator felt that respect was at the core of the tribes and school's values, "an elder told me

that we don't have the ten commandments but if we did the first would be respect. That is the universal tribal values, respect for yourself, for others, for mother earth, so we build off that" (personal communication, February 10, 2016). Throughout the process of school change for sustainability morals and values were highlighted within the existing culture and identify of the school.

Place-based connections emerged from tribal stories and shared experiences. One administrator felt that we have a responsibility to foster shared values when he stated "you teach the young people the values of our tribe and these are the stories that support our values, and as a group of people you have to all come together and rebuild what has been put to the side or lost" (personal communication, March 16, 2016). During the research experience at the school, there was documentation of how the story of the tribe and the natural environment was frequently told in a wide array of contexts. Protecting the natural environment became the dominant narrative that guided the development of the program. The program facilitator worked to reinforce this central guideline throughout every aspect of the program. It became a guiding framework for the development of initiatives. There was reflection on how the attachment members of the school community have with place is strengthened by their commitment to place. The oral tradition of the tribe was evident in the school. There were numerous occasions in which traditional and contemporary stories being told was observed. A primary emphasis of the sustainability program at the school was getting student and tribal elders to interact. Throughout the school year students had the opportunity to offer service to tribal elders. Students offered service by doing lawn work, cooking meals, providing rides, and providing yard work services. It was amazing to watch the care and respect that students gave to elders. The students related to them in a calm

and considerate manner. Students understood how to adjust their external behavior and mannerism in order to create a quality of presence that was in alignment with how they elders related to the world around them. Student would hold hands with an elder or take them by the arm to guide them to a seat. The students were cautious to walk in a slow and deliberate manner in order to accommodate the needs of the elders. The relationship between students and elders framed how values were shared and reinforced regarding sustainability.

Role of Community in School Programming

The community played a prominent role in the process of school change for sustainability. Through documenting interactions with school staff it was possible to identify how they felt the program directly served students and elders. The sustainability program helped to connect students more directly to the concepts of stewardship and conservation. When asked about how a school-based program could be improved, one teacher felt that the focus should be on helping students feel a stronger connection to their tribal culture and community.

I think there is always room for improvement, there is always something that can be done to improve a program. I think that reaching out to the elders to involve them more. I think that since this is a tribal school having them come in and talking with the kids about their tribes and the uniqueness of it (personal communication, February 10, 2016).

Conceptions of sustainability were evident in how participants viewed and acted to embody a disposition of stewardship. Students worked to implement recycling at the school for the purpose of saving precious resources for future generations. This is evident in the sustainability plan. The student generated plan focused on the phrase *to live through our grandchildren*. This phrase

embodies the intergenerational focus for the sustainability program that the school community adopted. In speaking about the natural environment surrounding the school, one student said: "we have mountains, it is not brown" (personal communication, February 4, 2016). The student went on to speak about how he appreciated engaging in activities in nature. It became clear to me through the process of reflection on the program that when participants felt connected to nature, they acted to preserve and maintain it. One teacher supported this notion by stating, "when I go out [in nature], and I see garbage I put it in my car. I do it because I want the place natural" (personal communication, March 16, 2016). There were many documented examples of students and teachers going out of their way to improve the cleanliness of their immediate school environment. During a visit with a teacher she told referenced walks in nature she would take with students. The teacher asked the students to pick up trash on their walks. The teacher felt that by asking students to pick up trash they would learn the value of keeping nature free from litter. By connecting experiences in nature with practices associated with stewardship students practiced sustainable action and develop the skills they would need to live sustainably. There was ongoing documentation of the recycling programs development. Students worked to improve the program at the school by recording the amount recycled over the duration of the program. One teacher stated that place-based experiences provided students with "a sense of how this is their community and that they want to keep it looking nice and they need to be involved" (personal communication, March 16, 2016). Through engaging in nature-based experiences, it was documented that students had positive responses to learning and were more engaged as learners.

Helping students to connect with tribal values is a priority for the school. Establishing and maintaining a tribal worldview was an important concept that guided sustainability-based activity at the school. Worldview emerges from where an individual comes from and "where their dead have been buried since time immemorial, what areas they go to pray, their belief systems around certain areas dictates how they live their life" (personal communication, March 16, 2016). One teacher felt that incorporating their worldview into an education belief system relied on "transferring those values that are part of who you are as a tribal nation and incorporating them into a modern world" (personal communication, March 16, 2016). Sustainability at the school was about furthering traditional beliefs in a modern world.

A significant value repeatedly identified by the school community throughout the process of sustainability programming was respect. Respect for nature, community, elders, and children framed the orientation of the program. Respect was associated with family values. "The school has a lot of family values. People talk about how we are like a family. This is because the school is small and tribal and everyone is related, and so that is built in a way that reflects tribal values" (personal communication, February 4, 2016). The reflection journal for the project conveys that having such a close community enabled topics contained within sustainability to have greater personal relevance. Themes such as intergenerational justice, interdependence, and the precautionary principle were explored in a variety of ways throughout the programming experience. Students and teachers often referenced the need to provide for future generations when considered their resource consumption or how they created waste. Interdependence and the precautionary principle became applied as students and teachers spoke about how cutting down trees for short-term gain would lead to negative impacts on the future timber economy and on the

health of the forest. It was documented how respect was evident in how the school community interacted with tribal elders. One teacher at the school who is a tribal elder commented that she felt protected all the time, "I have been here a long time, and it doesn't feel like work, it is fun and I am treated very well and I definitely see that in our community" (personal communication, February 4, 2016). When the school invited elders for events, students were assigned an elder to help during the event. The tenderness and respect by which students interacted with their assigned elder was admirable. Students would escort them to their tables, serve them food, interact with them during their meals, and provide for their needs during the event.

Programming for sustainability education relied on support from community partners. In identifying the need for community supports, one teacher stated that "we have good ideas and I have seen that in the past and I think we need to follow through with a lot of stuff (personal communication, February 10, 2016). There was documentation in the reflection journal that having community-based partners was necessary to the process of conducting meaningful and sustained programming. Two notable examples of community partnerships occurred in the program. One was with the local community college and the other was with the regional energy provider. Both of these entities provided mentoring, resources, and guidance through the process of sustainability programming. As individuals from these organizations came to the school to support specific aspects of the program they developed connections and relationships with the school community. An important strategy that was used to foster the relationship between the school and these organizations was to have regular meetings. The meetings focused on identifying shared goals and establishing a common purpose. By connecting sustainability to the goals of the college, the energy provider, and the school it was possible to buy-in to activities

that improved the school's sustainability. The college provided bins for recycling, information packets for students and teachers, and guidance in the process of behavioral change for sustainability. The energy provider conducted an energy audit and provided access to incentives for facilities upgrades focused on improving the efficiency of the building. Both of these contributions significantly assisted the school in crafting its sustainability program. Through this joint collaboration the recycling program and the energy conservation plan was started at the school. These elements of the sustainability plan were highly visible components. They helped to engage students and teachers at the school with sustainability topics. They enabled the school community to begin the process of developing sustainable behaviors by reducing energy consumption and engaging in recycling. It was evident in the documentation of the project that those relationships served to guide future collaboration and ensure ongoing program support. They would also create future pathways for students to be successful in their future college and career experiences. When speaking about school change, one administrator stated that "it takes people coming together from the community" to bring about lasting change (personal communication, February 10, 2016). One of the ways that the community provided for the school was by teaching students about tribal practices. This helped them to develop culturally-based skills. These skills related environmental conservation in that they helped students to be effective hunters, fisherman, harvesters, and overall stewards of nature. One teacher stated that community interactions were important to students because it gave students the chance to have applied experiences. "People would come here and donate their specific skill set. And share their time and even storytelling" (personal communication, February 10, 2016).

The school responded to crisis by bringing the community together for a meal, raising funds and processing the issue as a community. The experience of bringing the community together at the school helped students see themselves as community members and frame their learning experiences through the lenses of the community. During the research project there were events held at the school that supported community members in need. The students played a leadership during the events as they helped to host their guests. At these events the community would come together to share resources, stories, ideas, and food. These events enabled students to interact with a wide array of community members. The school administrator felt that students who did not see themselves as members of the community struggled personally and academically, "Students who don't think of themselves as being a part of the community rebel, if they get to feel a part of the community, they will feel motivated to do better, when you are a part of a community, it matters" (personal communication, March 16, 2016).

School Programming for Sustainability Education

Participants spoke about their experience with school change, curriculum integration, meaningful learning experiences, the importance of student voice and agency, connections with the community, and the role of the teacher and school leadership. All of these topics framed their experiences with school change for sustainability. Through observations and reflections it became clear that school change is an ongoing process that relies on a focused commitment from teachers, students, and administrators. Participants felt that education was at a critical juncture. One teacher felt that "public education is a major shift in a number of ways and foundationally that shift is the purpose, the purpose of public education is changing" (personal communication,

March 1, 2016). On multiple occasions, the purpose of education was brought up by teachers and administrators. Teachers were often reminded of the mission of the school. During staff professional development sessions effort was made to connect activities related to sustainability to broad school goals. This process often resulted in conversations and comments about the purpose of education. Many of the comments made focused on helping students learn essential skills related to self regulation. Teachers also stated that they wanted their students to become happy, compassionate, and engaged citizens. Many teachers expressed a sense of hope for the renewal of public education. Several teachers commented about the changing state of education. They saw a shift from focusing on standardized tests to helping the student engage in deeper learning. The program facilitator worked to connect sustainability to student outcomes related to engagement, the development of values, and environmental conservation. Teachers identified that helping students develop skills in the areas of collaboration, critical thinking, and self-management are needed to help students address future local and global challenges. Fostering school change for sustainability education required focused work, buy-in, and genuine engagement. As the school worked to start a recycling program at the school students developed new skills and behaviors that helped them to make meaningful personal connections to sustainable action. Each initiative within the sustainability education programming addressed aspects related to both local and global challenges. The motto created by the students contained this sentiment "Live Green or Die Trying." Helping the students make the elements of the sustainability program relevant was a primary focus of the program.

Instructional strategies that focused on shifting patterns of behavior towards sustainability required students to guide their process of learning. Inquiry-based instruction relied on students

having a voice in what and how they learned. One teacher stated that "in my class students feel comfortable saying let's not do this, it seems like busy work" (personal communication, February 26, 2016). The project documented that this teacher created an environment in which students guided their learning. Students played a central role in identifying problems at the school and in the local community. These problems included environmental degradation, social issues related to discrimination, and economic concerns. Students provided feedback on how to fix the problems and assumed a sense of responsibility for solving the problems. In referencing the importance of student action one teacher stated that "I think you could incorporate student voice through getting ideas to change the problem so that the problem is no longer there" (personal communication, March 1, 2016). Teachers were observed asking students to identify what they learned. Through a guided inquiry approach to learning students selected a topic within a content area, built their background knowledge, identified a means to present their learning in an authentic manner and then reflected on what they learned. Student choice in their education became the primary vehicle for student voice in the process of school change for sustainability. Teachers would talk about strategies they use to reduce their ecological footprint. Examples of the strategies they shared with students include: turning off lights when they leave a room, lowering the thermostat, using less paper by editing documents digitally, and reusing materials when possible.

Setting goals was an important aspect of program development. The program facilitator worked with members of the faculty to create a sustainability plan. This plan consisted of making SMART goals. Through collaboration broad overarching goals were identified and then focused into achievable objectives. The faculty reflected on the development of program goals every

time they met for the professional development sessions. Through my personal reflection on the process of school change for sustainability it was evident that programming that encourages positive change and sustainable behaviors through goal setting are more successful than ones that don't. When asked what makes a successful program, one student said, "I would say the successful ones are the ones that make students feel good about themselves" (personal communication, March 23, 2016). Programs that encourage participants maintain an outlook of hope and create a positive culture receive buy-in and commitment. Due to the collaborative process of programming, this program contained systems for resolving conflicts when they arose and built capacity within the school community through collaborative planning and reflection.

The ability for a school to respond to adversity with a mindset of resilience had significant implications on programming outcomes. Opportunities for reflection occurred in formal and informal contexts throughout the program experience. Due to the relationships the program facilitator developed with teachers, students, and administrators often shared their ideas, concerns or questions with him. After listening to the issues the group would often engage in a problem-solving conversation. Formal collaboration time was built into the monthly faculty professional development sessions and in-classroom visits. At the end of each Friday professional development session the faculty would engage in collaborative team planning. The teams would meet to share ideas and explore topics. The role of the program facilitator during these times was to foster planning through the use of cues, readings, and prompts. These experiences were critical to the process of creating buy-in and shared understanding about the purpose and process of sustainability programming. Without consensus building the program would have been less cohesive and aligned. In the meetings teachers had the opportunity to share

out and participate in whole group discussion. Collaboration occurred during classroom visits. At the end or beginning of the visits the program facilitator would work with teachers to get a sense of their programming experience and to respond to their questions or needs. Both formal and informal collaboration times enabled the program experience to be responsive to the changing needs of the school community. In the reflection journal it was documented over the course of the project how important these opportunities for discussion are to resolving issues in a proactive manner. Through effective communication a program facilitator can resolve problems and have healthy relationships. These two qualities are critical to successful program implementation.

Leadership for School Change

Leadership played a significant role in bringing about school change. Throughout the program students, teachers, and administrators assumed different leadership roles. When asked about the leader's role in supporting school change the administrator stated that "we are in it together and it is a family atmosphere. I don't think I am leading the way as much as we are all following the same direction" (personal communication, February 10, 2016). Students and teachers demonstrated within the process of programming for sustainability their reliance on the school administrator. Having confidence in the school leader on the part of teachers and students is essential for successful school programming. It was documented in the reflection journal that for successful program adoption to occur a school leader should be well recognized and respected in the community. Through the observations conducted in the program there were many examples of teachers and students relating to the administrator with respect. In comparison to the current leadership at the school teachers and students frequently brought up the previous

school administrator as an example of ineffective leadership. One teacher stated that he "was an outsider, a stranger and a white guy and people did not get who is this guy was and what he wanted. I think it will be more open and positive now" (personal communication, February 4, 2016). There was documentation of the leadership style of the administrator. Their respectful and servant-oriented approach to leadership had an enormous impact on how supported teachers and students felt. It was stated in the reflection journal that by having an open approach that invited suggestions and honored opinions, a holistic sustainability education programming could be adopted. Having reflected on this point I worked to implement an open approach in my communication with teachers, students, and administrators. A program facilitator should seek to listen more than they speak and to be open to new ideas regarding approaches and strategies for program implementation.

The school community supported the integration of community-based values into the school. Leadership from the community served to guide school programming for sustainability. Strategic partnerships allowed for the establishment of the recycling program, provided an energy audit, and offered both professional development and learning opportunities for student. One teacher highlighted the importance of community supports for programming by stating "you have to provide the community with tools to facilitate the values you have for education. It is not just a school thing. The community needs to be involved" (personal communication, March 16, 2016). By developing community-based partnerships the school leader draws in resources required for school programming. His position was grounded in community-based relationships. Another important insight from the program about leadership occurred when it was documented that the relationships the administrator has with the community are critical to providing the

resources and capacity for programming. Teachers utilized their relationships with the broader community to gain programming support and resources. Through the planning process teachers would often comment about knowing different community members in different organizations and how those individuals could help us with different aspects of our sustainability program. Establishing relationships with community members and local organizations provided the basis from which to meet the needs of the program.

Students felt that administrators need to be engaged and committed to them. One student stated that “I feel like administrators need to be more interested in what they are doing in order for us to feel more interested in what we are doing” (personal communication, March 16, 2016). Students need to feel supported in order to try out new things. Within the sustainability program the team often asked students to engage learning that challenged them to critically question their behaviors and their assumptions. By directly engaging with students, one student felt that school leaders inspire and motivate students “if you have someone who actually loves what they are doing and loves helping people you learn to like it, I feel like that will be key” (personal communication, March 16, 2016). When students felt connected to teachers and administrators they expressed feeling committed to school change. This sentiment was reinforced by my reflections on how leaders of educational program need to be charismatic, confident and nurturing. I often observed how interactions based on respect and encouragement motivated students and inspired them as learners. In addition to directly benefiting students, a positive approach to communication empowered students to assume responsibility for the school change.

School change required commitment and engagement from teachers. When teachers had the freedom to make decisions that directly impacted their students and classroom learning they

felt supported. When reflecting on why one teacher initially loved teaching, she teacher responded, that “I could teach what the students needed as long as I followed the general mission” (personal communication, February 4, 2016). Teachers expressed wanting to feel respected as individuals and professionals. Throughout the professional development sessions that school administrator would participate and collaborate with teachers, he often deferred to teacher suggestions about programming needs and strategies. It was documented that this collaborative approach allowed teachers to feel supported and empowered to guide the process of school change.

Many teachers spoke about previous failed programming initiatives. They identified failed programming initiatives as having the following characteristics: short-lived, lacking buy-in, poorly funded, limited community support, and not addressing the needs of the school. Teachers and students stated that when school change is planned and implemented without buy-in from teachers and students it can have negative implications for the school community. When reflecting on program adoption at the school in the past, many staff and students felt frustrated and devalued through the programming process. One teacher reflected on her experience by stating that "the entire focus of the school changed and the agenda became following the grant and testing and scores and weeding out the kids who were not falling in line” (personal communication, February 4, 2016). Staff and students felt they lost their voices and their self-worth in the process. A teacher stated that "I went through three years wondering if I was going to be able to stay here because it was not the school I had grown to love, everything changed and I feel like now we are trying to get it back" (personal communication, February 4, 2016). Students were sensitive to changes occurring at the school. At the beginning of the sustainability

program process it was documented that there existed a general feeling of apprehension and skepticism. Many students expressed that they did not have a voice in past experiences. In speaking about how students feel at the school, one student stated that “I feel like we don’t have a lot of say in things. We have zero say. It doesn’t matter what the heck we do” (personal communication, February 4, 2016). The biggest impact of poorly implemented programming at the school as identified by students was a loss of community amongst students and teachers.

Teachers and students play a primary role in bringing about positive school change. When asked about changes that have occurred at the school, one teacher stated that “I have seen it change quite a bit, everyone is more willing to help each other out and give each other a hand, there are a lot of staff that go out of their way to help the kids” (personal communication, February 10, 2016). In fostering meaningful and caring relationships teachers have created the foundation for student engagement and renewed sense of commitment through this program. There was documentation that pointed to the staff caring deeply about the students as individuals and as learners. Evidence of this occurred in the daily interactions shared between members of the school community. Teachers reached out to students to ask them in a sincere manner how they were doing and there was documentation of students talking about the personal issues that they faced. Many teachers expressed wanting to see their students succeed. Teachers were grateful that they had the opportunity to engage in personalized programming that could differentiate learning for students. In documenting different grading and assessment procedures there was evidence how teachers set the tone for learning and behavior by holding high expectations. One teacher felt that it was important for students to feel supported and believed in, “I tell them I believe in you. I don't know if it helps, but I think it does. I want to encourage them

and give them the tools they need" (personal communication, March 16, 2016). Students recognize the role teachers have in helping them and in bringing about school change. One student said "I think teachers have a big role because they are our leaders, if shit was to fall apart we look to them for guidance" (personal communication, February 4, 2016).

Students recognize the role that they have in terms of modeling and directing sustainable behaviors. One student stated that "my responsibility is to be a good role model for younger kids looking up to me because I know that definitely impacted me a lot, it was the people I had to look up to, so I feel like if I show a positive influence I hope I can break through and help people" (personal communication, March 16, 2016). The school ranges over multiple grade levels. There were several instances of documentation that showed how older students assumed a leadership role and took responsibility for guiding younger students. Many students felt committed to the school and helping it to improve. "Students have more power over change than teachers do. A student talking to another student will be more respected than if an adult was talking to that student about the same issues" (personal communication, February 4, 2016). Student leadership furthers action competencies in students. It develops in them the skills and dispositions they need to be resilient and engaged.

Meaningful Learning for Sustainable Behaviors

Meaningful learning allowed students to connect with what and why they were learning about sustainability. One teacher felt that the goal of the school was to empower students by helping them to "understand who they are and how they got there so that when they leave here having tools" (personal communication, February 10, 2016). Students felt committed to the

process of personal and school change. They enjoyed learning about and engaging in sustainable practices. It was documented that students worked with community organizations through place-based experiences. These experiential learning opportunities allowed students to connect with concepts of sustainability in applied and personally relevant ways. One example of this occurred was during the initial establishment of the school's recycling program. Students worked to share with others the importance of recycling and the need for engaging in behaviors that conserved resources. Students were given the choice to explore topics in many of their classes that interested them. Teachers stated that student engagement in the process of school change began when they saw students feeling safe and supported through programming initiatives. One teacher felt that innovative student-centered strategies were needed to engage students, "You have to come up with some fun things that will hook kids" (personal communication, March 16, 2016). Many teachers felt that having a hook provides students with a sense of purpose and meaning. During the sustainability assembly it was documented that students were engaged and felt support. They worked hard to develop what sustainability meant for them and were confident as they shared their ideas with the entire school community. When teachers connected learning outcomes with the interests of students meaningful learning was achieved. When asked about how students learn best one student stated that "for me it is communication and having one-on-one time, because if I don't have someone talking to me and showing me how to do something I will lose interest fast" (personal communication, March 16, 2016). Students wanted to learn things that are relevant to them. They often made comments about how important it was for them to prepare for their future. The program facilitator worked to connect sustainability programming to the lives of students by making it relevant and by including student input whenever possible.

School change for sustainability relied on empowering student voice and engagement. One administrator stated that "we are trying to involve them more, trying to get them to identify what their voice is. We value the youth and their contribution to the society" (personal communication, February 10, 2016). Students expressed needing to feel that learning benefited them and their community. An administrator stated, "I just believe that if they understand that they are doing it first and foremost for themselves. The rest will come. We can fill in the gaps. Half the battle is that" (personal communication, February 10, 2016). Honoring students as members of the school community was essential to successful school programming. The program facilitator worked to develop relationships with students. This occurred initially by learning the names of students. The program facilitator would then reach out to them during my visits to the school. These efforts allowed the program facilitator to learn about them as individuals and to find ways to engage them in personal and relevant ways.

Summary of Participant Experience at Medicine Tree Tribal School

Sustainability education programming at Medicine Tree Tribal School consisted of many factors. The connections that participants had with nature guided how they supported the sustainability program at the school. Honoring place connected the school community to their culture by providing a sense of meaning and purpose for programming. Respect was an important factor that guided the programming. Receiving support from the community for programming was considered very important by participants. School change for sustainability focused on providing meaningful and engaging learning experiences for students. This process strengthened how the community supported the program. Through integration of sustainability

topics into the curriculum, a new school culture began to develop. It was identified that leadership that was grounded in serving others helped to build morale, engagement, and support for the sustainability program. The leader set the tone for engaging and developing the program. Teacher and students informed the process of programming. In this way, programming became an extension of the mission of the school.

School Change for Sustainability at Medicine Tree Tribal School

The planning, coordination, and programming required at Medicine Tree Tribal School to implement sustainable practices was significant. Through direct support from the superintendent, resources were provided to ensure the program's success. Sustainability education programming at the school required perseverance. Working to develop new programming required the school community to change existing patterns of behavior and to develop new ways of behaving. The first step in this process was working with the school community to develop awareness and to critically reflect on how they consumed resources and of their relationship with nature and their community. The school examined its current practices related to sustainability. Teachers formed committees and began taking concrete steps in actualizing sustainability at the school. The role of the sustainability program facilitator consisted of facilitating teacher knowledge and building engagement. During this process the sustainability coordinator needs to document the steps being taken and reflect on the experience. When questions arise related to school programming for sustainability, teachers can go to the sustainability coordinator for direction. The program facilitator needed to be careful not to guide the planning process excessively. This outlook serves to ensure that the approach and vision of

the program are in alignment with the school's overarching mission and vision. Helping to assure integration of community-based values is a primary goal of the project. Conducting both formal and informal check-ins with the school community needs to be ongoing.

Like the experience at Three River Valley High School, the role of the sustainability program facilitator was to integrate sustainability efforts at the school. One of the chief responsibilities for the facilitator was to gather data related to the consumption of resources at the school. Creating this baseline audit will be essential to the task of identifying how the school consumes resources so that resource consumption can be reduced. The amount of time and energy required to build partnerships with community-based entities requires sustained effort and patience.

One of the major differences between programming at a large high school and in a small tribal school is the access a coordinator has with the participants. Access to participants was critical to developing meaningful relationships at the school. Relationships are essential to the process of understanding the experience of school change for sustainability. These relationships enable feelings of trust to be fostered between the participants.

Conclusion

Programming to improve the sustainability of the two schools was process-based. The process relied on developing shared understandings about what sustainability was, how programming would occur, and the extent of involvement from different school community members. Research focused on understanding the function of whole-school sustainability.

Research became increasingly oriented towards learning about the relationships shared between members of the school community. This research focus allowed for insights to emerge about the subtle cultural dynamics that framed experience and perception. By directing engagement as a facilitator on learning and curriculum integration strategies, the data that arose emphasized the importance of promoting behavioral changes. Reflections on the program experience and programming outcomes served as evidence of school-wide behavioral change. Fostering the resilience needed to continue programming when faced with adversity was critical to the continued work of the various sustainability initiatives occurring at the schools. Many barriers arose that impeded program planning and implementation. Through understanding these obstacles, the schools developed the capacity to persevere and problem solve. Applying focused strategies allowed students, teachers, and administrators to address the factors that inhibited programming. Through understanding stakeholder relationships and dynamics, focusing on meaningful learning and curriculum integration, and by identifying and addressing barriers to programming, the schools developed a framework for sustainability education programming.

CHAPTER 5

DISCUSSION AND SIGNIFICANCE

Introduction

In this chapter, the research question is revisited through the themes developed from the data analysis. The process of analysis demonstrated that school change for sustainability is a process-based experience that relies on coordination, engagement, collaboration, and ongoing reflection from all members of the school community. The goal of this chapter is to describe the insights gained from the yearlong process of planning, developing, and implementing school change for sustainability at two public high schools. Chapter 1 described the reasons and purpose for engaging in participatory multiple case study research about the applied practice of sustainability education programming. Themes were used orient and guide the inquiry of the following research question: *How did students and faculty at each school site go about the process of creating and implementing a sustainability education program?* Chapter 3 describes the qualitative research methods used to gather and collect data. Chapter 4 provides the analyzed results from observational field notes, reflexive journaling, artifact analysis, and interviews. Chapter 5 shifts the analysis away from the perspective of students, teachers, and administrators to the researcher's perspective. The research question is revisited in a manner that combines the literature on sustainability education programming and the applied experience of school change for sustainability. The emergent themes from the analysis are interpreted through a consideration of current and contemporary literature related to sustainability education programming. Suggestions for practice are provided that relate to pedagogy, curriculum, and school leadership

based on the analysis conducted. This chapter concludes with suggestions for future research, outlining the role of the researcher, limitations of the study, and a summary of the project.

Role of the Researcher

I was responsible for gathering and interpreting the data collected during this qualitative study. My role as program facilitator at each school was significant. In my role I was continually cognizant of how my decisions and behaviors shaped programming outcomes and hence the research for this project. To reduce the impact that I had in shaping the results of research I would to minimize my role through collective decision making and committee-based processes. When decisions needed to be made about the direction of the program I always turned that back over to the building level administration or the teachers. It is important to acknowledge that my values, personal experiences, and expectations played a role in shaping the research process and subsequent analysis. To ensure quality research, it was essential that any personal bias held as a researcher was evident to the reader of this work. The purpose of this study was to understand the applied experience of sustainability education programming within the context of public education at two high schools. I used a case study approach to research to achieve a meaningful and in-depth understanding of school change regarding sustainability education programming. I relied on collective decision making processes to reduce the amount of input I had in those processes. The strategies utilized to understand the research experience consisted of detailed field notes, reflexive journaling, interviews and artifact analysis. These qualitative strategies

placed me, as the researcher at the center of the process of data collection, analysis, and interpretation.

On a personal note, having grown up in the Rocky Mountains I have always felt very connected with nature. This connection drives me to safeguard and conserve natural places. Due to my experiences of living and traveling in Asia, I became a strong proponent of sustainable development. Having lived in several developing countries, I have seen how the pursuit of economic growth leads to catastrophic problems that harm both social and environmental systems. I have developed an outlook that seeks to promote environmental justice in a manner that supports the long-term integrity and resilience of communities. This perspective evolved as I began advocacy work in schools to develop and enhance sustainability education programming. I am aware of how my experiences with sustainability and the biases that I hold, have shaped my outlook on sustainability and sustainability education programming. I believe that the welfare and integrity of the social and environmental system require greater prioritization than short-sighted economic growth. I also feel that development should be the focus of environmentally sensitive business activity as opposed to growth. Education is a powerful vehicle for personal and social change. When I reflect on my life, I know that everything I have achieved and accomplished is a result of the gift of education. I view education as the primary mechanism for socialization. To foster a more sustainability society education, I believe that education must drive that transition.

Contributions to the Literature

This research project directly responds to a call to understand the applied experience of sustainability education (Kemmis and Mutton, 2012; Stone, 2010). In experiencing and engaging in the process of planning, developing, implementing, and analyzing sustainability education programming, this research project addressed the need to understand how school change for sustainability occurs within the context of two specific secondary public schools. Through the process of analysis, comparative themes and models for implementing sustainability within these specific case sites secondary schools emerged. From an applied perspective this research represents one of the first case study's regarding the development and implementation of a whole-school sustainability program.

Comparative Analysis of School Change for Sustainability

Role of Community Supports

Community support played a significant role at both schools. The process of school change for sustainability was informed and guided by community values. Intergenerational justice was a guiding value that shaped how community organizations and the school community developed their respective sustainability initiatives. Community support looked very different in each of the programs. Support from the community at Medicine Tree Tribal School consisted of direct involvement from community members. Community volunteers helped to make the different school initiatives a reality. To share elements of their tribal tradition community

members taught students how to quilt, dry meat, bead, and engage in many other activities. The school served as a focal point for tribal culture within the community. School change for sustainability was shaped by community values and needs.

Community support at Three River Valley School relied on established community-based organizations. These organizations drove the sustainability program at the school. On a weekly basis, a local environmental or community-based organization would come into the school to advocate for a particular issue or need. The students at the school would respond to the need by developing an initiative or action task. Through this process, community-based organizations assumed a central role in shaping and informing the identity of programming components of sustainability at the school. The result of this type of community interchange with the school led to a program that was broad. However, it also contributed to the lack of a coherent focus and a sense of purpose.

In reflecting on the role of community-based supports at both schools, I observed both advantages and disadvantages in both experiences. Sustainability, as defined in this study, is: *the experience of balance in which the integrity of interdependent social, economic and environmental systems is viewed as integral to providing for the welfare of the current and future generations.* This definition implies the need for a holistic approach to sustainability that considers the social, economic, and environmental implications of personal and communal activity. At both schools, the broader community played a significant role in shaping the orientation and character of the programs. Marja-Leena (2006) states that “since environmental issues are interdisciplinary and relate to lifestyle, dealing with them in a varied way requires cooperation in work communities of schools and with partners from outside school” (p. 28).

Partnerships with community organizations and the schools shaped the experience of school change for sustainability at both schools.

At Medicine Tree Tribal School, the program reinforced tribal traditions with explicit connections to nature and community. The tribal focus that pervaded the experience of school change for sustainability enabled the program to have a strong sense of purpose and a rooted sense of place that informed both personal and social identity. Deloria (1973) states that "every part of the soil is sacred in the estimation of my people" (p. 173). The sacredness of place was central to the program's focus. This was because place holds the memory of the tribe.

The community supports that guided Three River Valley High School shaped a very different sustainability education program. This program was more extensive and multifaceted. The range of programming extended over multiple topic areas of sustainability. Due to how widespread the programming components were, the program never had a clear and focused sense of purpose. Unlike the program at Medicine Tree Tribal School, the program at Three River Valley High School did not develop an identity tied to the school culture during the timeframe of this study.

In future programming initiatives for sustainability it is essential to outline the mission and vision of the program so that potential partnerships with community organizations are guided by the schools sustainability plan, rather than having the ability to shape the sustainability program. Through structured programmatic guidelines, community organizations will have the opportunity to align themselves with the programs at the school. With a clear program framework in place schools can orient community interactions in a manner that support the mission and vision of the program.

Educating Students and Teachers about Sustainability

An important dimension of each program was student and teacher education. Programming focused on developing school-based initiatives in three areas energy conservation/waste reduction, health and wellness, and curriculum integration. Each school addressed the three pillars of sustainability education programming through the planning and implementation process. The pillars of programming related to recycling, energy conservation, healthy food purchasing, and promoting student activity required a needs assessment and the development of action tasks. Teachers within the sustainability teams identified the issues, constructed plans to resolve the issues, and took steps to correct the issues. The integration of topics into the curriculum required much more planning and deliberation.

Curriculum integration required educating teachers and students about the sustainable practices occurring both in their schools and in the world around them. The first step in integrating sustainable topics into the curriculum was conducting professional development with the teachers. The experience of professional development varied considerably between the two schools. At Medicine Tree Tribal School professional development was central to the program. Faculty planning and learning sessions occurred on a monthly basis for professional development. During these sessions, the entire faculty would learn about topics and engage in collaborative planning. The teachers were receptive to themes of sustainability. Robyn (2002), believes that sustainability resonates with Native Americans because it aligned with how they view nature. McFague (2001) identifies in her research on the intersections of religion, nature and action that Native Americans are perceptive to how actions committed by individuals within society lead to environmental degradation. These collaborative sessions allowed teachers to plan

how they were going to integrate sustainability topics into their curriculum and identify specific instructional strategies by which to do so. Before these meetings concluded, teachers would schedule times with the program facilitator to work them individually and with their students to explore and support the implementation strategies they had developed. On a bi-monthly basis, the program facilitator would visit teachers and their classes to support the planning that had occurred in our monthly professional development session. The program facilitator's support would consist of providing feedback on lesson plans ideas, sharing resources on sustainability topics, and helping to identify assessment strategies. When the program facilitator visited classes, he would teach lessons about sustainability topics and have them engage with them through student-centered instructional strategies. These experiences allowed me to model to teachers how grouping, lesson plan design, questioning approaches, and formative assessment could help students learn about sustainability.

Student interest drove the process of educating teachers and students at Three Valley River School. Although the principal at the school supported the program, she did not provide professional development time for teachers. The student environmental club helped spur engagement regarding the integration of sustainability concepts into the curriculum. Learning about sustainability occurred through school-based initiatives or activities. Teachers partnered with community organizations to coordinate experiential learning opportunities. The program facilitator interacted with teachers to learn about sustainability components that existed in their curriculum and how they delivered it to students. The program facilitator attended department meetings to share with them about the sustainability programming occurring at the school and inventoried what they taught related to sustainability. The school culture reflected numerous

topics related to sustainability. Even with culturally embedded practices, there was not a cohesive and focused articulation of sustainability at the school. One of the most critical components of sustainability education that occurred at the school was the Earth Week celebration. This week long learning experience consisted of multiple components: guest speakers, science experiments, art demonstrations, and many other activities. The role of the program facilitator in the process of sustainability programming was significant. They worked with the student group to help coordinate their activities and events.

Curriculum integration assumed a very different form and approach within the two school-based programs. The major factor that guided the integration of sustainability into the programs was the support and resources provided to teachers by administrators. Without a coordinated time to plan and develop sustainability integration into the curriculum, it is not likely to happen, and if it does occur, fragmentation is typically the outcome. Each school integrated sustainability topics into their curriculum to varying degrees. In synthesizing the two experiences, it clear that the ideal for curriculum integration requires consistent professional development, an established curriculum framework, a vibrant student club, and strong connections with community organizations. By merging the student-driven and administrative support aspects of the two programs, meaningful curriculum integration is possible.

Teacher and Student Empowerment

A critical distinction between the two programs was the degree to which the programs were driven by faculty and by students. The student environmental club program at Three River Valley High School drew attention to and addressed environmental and community issues. The

long-standing environmental student group enabled environmentalism to permeate the culture of the school. The group had a large weekly attendance of about 50 students with 20-30 students attending the meetings on a regular basis. Two teachers mentored the student environmental group. The mentors facilitated the activities of the group. Teacher's assumed the role of coordinator to the process of sustainability education programming. They would guide the process of decision making and create structures for consensus building. Once decisions were made and plans developed, school change for sustainability was primarily student led and initiated. Students developed committees, established goals through consensus building, and determined actions steps.

The program at Medicine Tree Tribal School was primarily teacher driven. The process of programming began with teachers creating program objectives and developing action tasks to fulfill the established goals. Through collaborative planning teachers would identify needs within the school related to sustainability. They constructed strategies for promoting sustainable activities and behaviors. The majority of planning that occurred was not informed by students and did not rely on student feedback.

Both schools struggled to bring about the level of sustainability they aspired to achieve because they did not do enough to engage both teachers and students in the process of programming for sustainability. At Three River Valley High School the students often felt frustrated by the lack of progress in the initiatives that they developed. Students faced barriers in implementing sustainability initiatives at the school. The identified barriers were often associated with scarcity of resources, limited time, and a lack of teacher and administrator buy-in. At Medicine Tree Tribal School, the teachers had the resources, planning time, and buy-in from

administrators, but they lacked a commitment from students to engage in the different components of the program. It was observed how students on several occasions were not involved in curriculum or activities related to sustainability.

The experience of school change for sustainability at both schools highlights the need to involve both teachers and students in the development and implementation of the program. Given that Medicine Tree Tribal School was developing their program, it makes sense that it would require more teacher involvement and engagement. As the program matures, it will need to create pathways for students to provide feedback and inform the programming that occurs at the school. As students become more engaged with the planning and development of the program, they will develop meaningful and personalized connections with sustainability topics. At Three River Valley High School more effort needs to be made to create the space and time for teachers to engage with the sustainability initiatives occurring at the school. Building and district level administration need to provide opportunities for teachers to plan, coordinate the different aspect of sustainability happening at the school.

An ideal program would integrate teacher guided sustainability programming and student-led sustainability initiatives. By combining the programming structures put in place by teachers at Medicine Tree Tribal School and the student-initiated projects that occurred at Three River Valley High School, a model sustainability program would emerge that was well coordinated and planned. This model program would consider the availability of resources, determine programming goals and objectives, integrate into the curriculum, and be responsive to the needs of the school and broader community. Hopkins (2013) asserts that sustainability education is a process that requires not only a focus on student learning but also on institutional

culture changes. A mature and well-established program requires both teachers and students to inform the planning, development, and implementation of the program through structures and systems.

Leadership for Whole-School Sustainability

Administrator support significantly influenced the cohesion of the program and the level of engagement experienced by students and teachers. Although leadership comes in many different forms within a school, the building administrator plays a critical role in the process of school change for sustainability. The level of support and commitment on the part of the building administrator dramatically shaped the experience of programming at the two schools. At Three Valley River High School the building administrators were very busy, and as a result, did little to support the sustainability programming occurring at the school. In communicating with the building principal and requesting opportunities to engage with staff at faculty meetings regarding sustainability programming it was clear that there was interest but very little commitment. Given the range of activities occurring at the school, it was tough to find time to connect with the staff in a large group setting. Faculty meetings were planned out almost a year in advance. Due to the scale and complexity of programming at the school, there were many barriers to curriculum integration and collaborative planning. For sustainability to be prominent at the school, it would require more resources, time, and effort on the part of the building administrator. For the program to be effective, sustainability will need to be a priority for administrators.

There was a high degree of administrative support at Medicine Tree Tribal School. The sustainability program began with a request from the superintendent to increase academic and

behavioral programming supports. Sustainability became the guiding lenses by which to promote the needs of the school. Collaboration and planning time was provided on a monthly basis to engage in program development. Teachers were provided with the resources and materials needed to achieve identified sustainability goals. Due to the small size of the school, the program facilitator coordinated and focused communication efficiently. Coordinating the schedules of fifteen teachers was manageable. Engaging students was manageable due to the small class sizes and relaxed school environment.

The leadership experience at both schools varied considerably. At Three River Valley High School sustainability programming was viewed by many at the school as an additional activity occurring at the school. Sustainability was not central to the mission and culture of the school. The sustainability initiatives occurring at the school were viewed as a series of niche experiences for some students and teachers. The school administration provided very few resources in the form of time for collaborative planning or materials that could be used in the sustainability program. In speaking about the program, the building principal held sustainability in high regard. The principal did their best to remove barriers to programming and encourage student-initiated opportunities. This approach to leadership was a result of the complexity and scale of programming that occurred at the school. Juggling multiple initiatives and programs led to an experience in which no one program became the identity of the school.

The leadership approach to sustainability at Medicine Tree Tribal School involved aligning sustainability with the mission and culture of the school. By connecting principles of sustainability to tribal values, it was possible for the school leadership to fully support the program. Not only did the school administration remove barriers to programming, but they also

engaged in the planning, development, and implementation of the program. Leadership within sustainability education programming assumed the character of servant leadership. Waal and Sivro (2012), identify humility, standing back, forgiveness or interpersonal acceptance, authenticity, empowerment, accountability, stewardship, and courage as the essential comments of being a servant leader. Fostering the open and collaborative experiences at the school regarding sustainability programming was made possible by servant leadership. The school administrators at different occasions and in different ways provided both symbolic and actual servant leadership within the programming process. Harris (2010) recognizes that symbolic gestures function to align “both staff and pupils to their particular vision of the school” (p. 18).

When administrators buy-in to sustainability their guidance enables sustainability efforts to flourish. Having leaders that serve on behalf of the program is needed to integrate sustainability into the culture of the school. Creating the time and space for collaborative planning is necessary for building buy-in by members of the school community. Teachers and students need the time to explore and investigate topics of sustainability. Whether this occurs in formal professional development sessions or within the context of school student club meetings, having the time and space to share ideas, collaborate on strategies, and cultivate consensus is a critical element in school change for sustainability. Building leaders need to create the planning and instructional opportunities for teachers to achieve school change for sustainability.

Having an outside facilitator allowed the school administrators to be a part of the planning experience as opposed to guiding it. A program facilitator provides a buffer between the administrator and the rest of the school community. When conflicting ideas arose about how the program was taking shape, teachers felt comfortable speaking with an administrator about

their concerns. An example of this occurred at Medicine Tree Tribal School. The school administrator contacted the program facilitator about a teacher concern regarding the amount of program-related responsibility they felt. Because the teacher did not see the administrator as the holder or driver of the programming, they were comfortable in communicating their needs to them. After speaking with me about the concern, we developed a plan to address it.

Teacher leadership and commitment played a critical role in engaging students and spurring their interest. As teachers became excited about the programming components, they inspired students. Through the process of programming, it was documented that teacher felt excited and empowered about sustainability. Teacher leadership served as the basis for student interest and engagement. The exploration of sustainability occurred at both schools through experiential learning. Teachers encouraged students to have a voice in the process of programming and to take a central role in the program's day-to-day implementation. These opportunities helped students and teachers to make strong personal connections with sustainability topics.

The development of student leadership was an important outcome of programming. Students implemented many of the components of the sustainability education programming. In both programs, students took charge of the day-to-day programming initiatives such as recycling, composting, and energy conservation. Students drove innovation by helping to overcome barriers to programming. Much of the outreach for the programs was student created. Students created the media that communicated different programming components to both the school and external community. Students informed and guided the process of program implementation.

Through collaborative planning and programming, a culture of leadership emerged. Administrators, teachers, and students each played a central role in the planning, development and implementation of the programs. Decisions about programming were often shared and made through a deliberative process. The whole-school approach to sustainability education programming with its three pillars required an array of coordinated programming elements. Coordinating each of the aspects of the program relied on consistent communication and motivated participation from the school community. The experience of sustainability education programming became integrated into the daily practices that defined the culture of each school.

Sustainability Programming as a Collaborative Process

A prominent theme that emerged from the experience of school change for sustainability was collaboration. Collaboration occurred in a myriad of ways and on a variety of levels. It was evident among teachers, students, community organizations, and administrators. Without a high degree of collaborative planning, teachers felt overwhelmed and confused amidst the process of program implementation. Although collaborative planning is time and resource intensive, it ensures that school stakeholders inform the process of program development and implementation. Both teachers and students stated that failed programming initiatives at schools lacked collaboration.

A program of sustainability requires both procedural and behavioral shifts to occur. Collaboration consisted of sharing ideas and taking action steps through a process of deliberation. Through consensus building, new strategies were identified to further the sustainability programming occurring at the schools. An essential requirement for collaboration

is time and space. Teachers and students need the time and space to engage in high-level collaborative planning. At Three River Valley High School collaboration occurred most often within the weekly student environmental club meeting. These sessions allowed students the opportunity to explore ideas, receive feedback, develop action steps, and reflect on their experiences to that point. Community organizations informed collaborative planning and program development. At Medicine Tree Tribal School collaborative planning assumed a more teacher-directed approach through professional development sessions. These sessions enabled teachers to work through programming ideas by considering the impact on existing programming, scheduling, and instruction.

Collaboration was a vehicle for culture building at each school. In the development of sustainability as a new program at Medicine Tree Tribal School, it was clear that the process of collaborative planning functioned as a tool to deepen teachers understanding and commitment to sustainability. Sustainability became much more authentic as teachers synthesized it into their school and classroom experiences. Students at Three River Valley High School moved beyond a cursory understanding of sustainability as they developed action steps to make sustainable practices a reality at the school. Collaborative planning allowed them to process ideas and make new connections with the world around them to sustainability topics. In this way, their understanding of sustainability topics moved from abstraction to application.

School change for sustainability focuses on shifting patterns of behavior through collaboration. Collaboration occurred on the part of participants within the context of team meetings. During these meetings, participants set program goals, established timelines, and determined strategies for implementing program initiatives. The collaborative process allowed

participants to take ownership of the program by guiding approaches to achieving the identified outcomes. Some of the challenges of conducting collaborative planning sessions were that they were time and resource intensive, and often spurred more questions than answers. These sessions provided participants with a forum to translate sustainability topics into action.

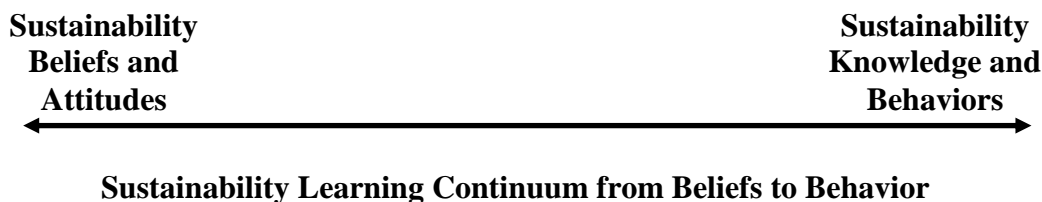
The Sustainability Education Programming Stakeholder Relationship Model

The *Sustainability Education Programming Stakeholder Relationship Model* is a product of the analysis of programming at both schools. Although the experience of programming was very different at each school, the process of stakeholder engagement was very similar. This model outlines the process the schools underwent to engage stakeholders. The first phase focuses on establishing shared vision and values related to sustainability education. As the programs developed participants learned about sustainability topics and sustainable behaviors. The next phase of the model involves the development of school practices that framed the implementation of the program. In this second phase, stakeholders move from envisioning the program to embodying it. Both the internal school community and the external community worked to bring about initial practices and actions that improved the sustainability at both schools. Phase three demonstrates how this process was furthered as participants implemented and revised school programming for sustainability education. Programming took shape in a manner the built community resilience and improved overall sustainability. Phase four highlights the recursive nature of programming. Phase two and three form a continuous feedback loop that frames the future programming experiences. The various stakeholders envisioned the program anew as

changing conceptions of sustainability emerged and as new action competencies developed. Careful attention to integrating stakeholders at multiple points within the process of whole-school programming was critical to the success of the program. Evans et al. (2012), states that sustainability within Australian "has struggled to establish and maintain a profile among a long list of other competing educational demands" (p. 122). By coordinating between stakeholder groups a more integrated approach emerged that promoted the viability of the program.

SUSTAINABILITY EDUCATION PROGRAMMING STAKEHOLDER PROCESS MODEL

PHASE 1: Establishing Shared Vision and Values



PHASE 2: Foster School-based Practices

Teachers and Administrators

Parents and Community Members

Student-Learning

**PHASE 3:
Implement and Revise Programs**

Community-based Pressures

- Community Needs
- Environmental Degradation
- Economic Constraints
- Promoting Students Engagement as Citizens

Educational Approaches

- Approaches to Learning
- Shifts in Programming
- Realignments of Goals
- Overcoming Program Barriers and Challenges

**PHASE 4:
Feedback Loop**

**PHASE 4:
Feedback Loop**

Table 5-1 – Sustainability Education Programming Stakeholder Process Model

Challenges to Sustainability Education Programming

The graph titled *Challenges to Sustainability Education Programming* highlights the major barriers to programming experienced at the schools. The availability of time and resources were the most significant factor in programming for sustainability. Overcoming this barrier required administrators to allocate resources and for the program facilitator to manage available resources in an attempt to build capacity for future programming. Evans, et al. (2012), Sterling (2010), and Stone (2010) all address the need to integrate topics of sustainability into current educational practices at schools. The authors state that this occurs by prioritizing them within the curriculum and in through instructional delivery. The program facilitator worked to build collaborative planning time into the teacher's schedules. Evans et al. (2012) asserts that a "lack of time, information, and content knowledge" are the biggest barriers to programming success (p. 123). To address obstacles that arise due to a lack of content knowledge and information, the program at Medicine Tree Tribal School integrated planning for sustainability education within professional development sessions. Weaving academic planning into program planning provided direct connections to classroom instruction.

Another barrier to programming was receiving sufficient community support. Establishing community supports required a significant amount of time and energy. Having community organizations be involved in the program was critical to their relative success. Community-based organizations served as the gate keepers for the resources required to engage in programming. Whether it was gaining access to energy data or establishing a point person to drop off recycling, organizations in the community supported the programs on a consistent basis.

Overcoming the barrier of inconsistent community support required effort to establish and maintain communication. In building relationships communication breakdowns were reduced.

Having a member of the school community that is responsible for program facilitation and evaluation is needed. The role of the program coordinator is to help support the program in a proactive and responsive manner. Whole-school integrated programming requires a facilitator who can coordinate all of the different aspects of sustainability education programming. The final barrier identified as a challenge was the development of school culture. Programming success into the future relies on the school culture that functions to support and foster the program. School culture changed at each school through the process of programming. The schools developed programs that were adaptive and responsive to student, teacher, and administrator leadership. Stone (2010) calls for the weaving of innovative programming related to sustainability into the curriculum in a manner that challenges assumptions regarding unsustainable patterns of behaviors. Through leadership informed by the perspective of teachers, students, and administrators assumptions that inhibit programming are identified and addressed.

The chart referenced below highlights the challenges faced in programming for sustainability education at both schools. The data used for this table is from three sources: field notes, reflexive journal notes, and interview responses. Another significant factor affecting both programs was the level of consistent community support offered. There were many instances of community organizations proposing to support sustainability programming at the schools, but they often lacked the ability to contribute important resources promptly. An ongoing challenge to programming was the need for direct facilitation. As programs refine and develop it is likely that these components will play a bigger role in shaping the structure and orientation of the programs.

Challenges to Sustainability Education Programming

Many factors influenced the feasibility and efficacy of sustainability education programming at Lake High School and Valley Tribal School. Through an analysis of word count frequency within interviews, field notes and reflective journal data the following barriers were identified.

Factors Affecting the Planning, Development and Implementation of Programming

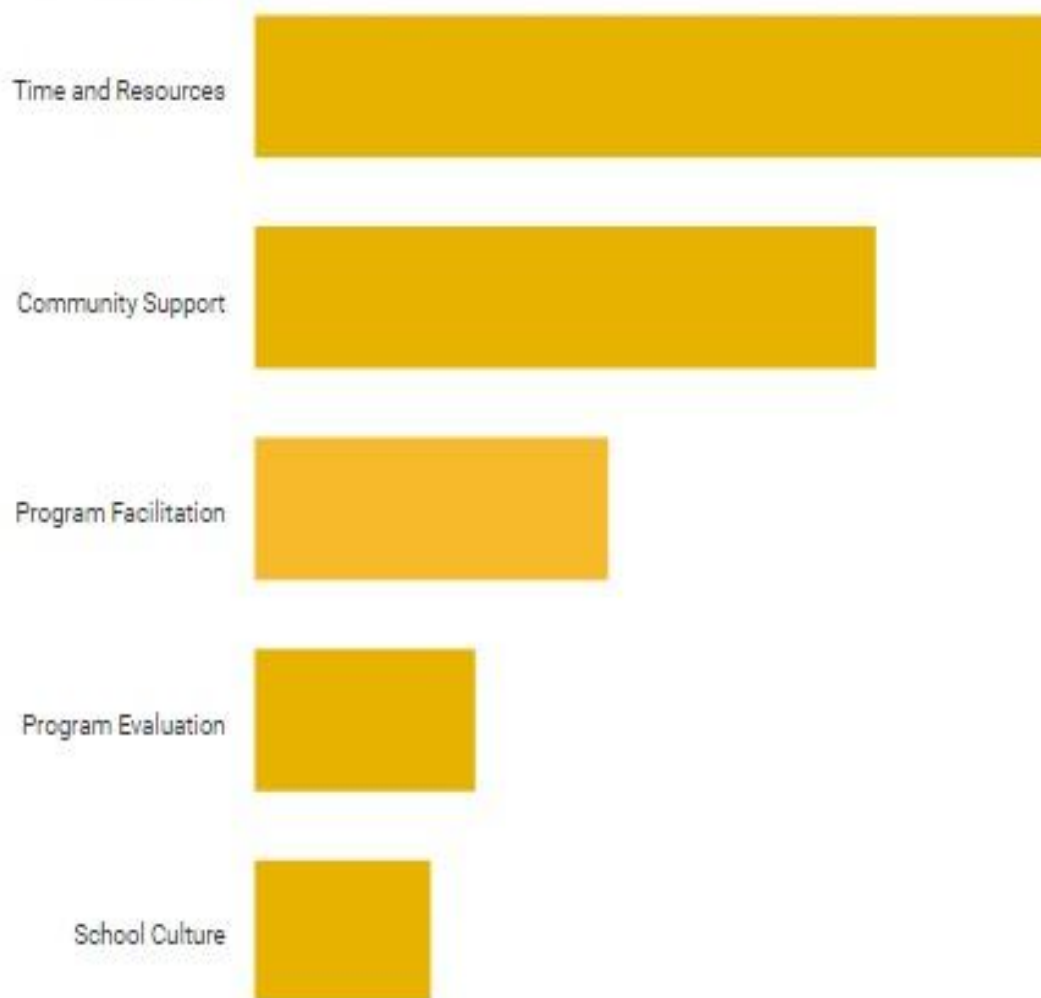


Table 5-2 – Challenges to Sustainability Education Programming

School Change for Sustainability Action Competencies

School change for Sustainability Action Competencies Chart consists of the different activities required for programming according to domains of school policy, community outreach, leadership, and school action. The action steps listed serve to provide an overview of how various members of the school community engage in the process of school programming for sustainability education. Kemmis and Mutton (2012), identify how engagement in the activities referenced in the *School Change for Sustainability Action Competencies Chart* serve to shift behaviors of participants towards sustainability. Students, teachers, and administrators demonstrated action traits throughout the process of programming for sustainability at the schools. Stone (2010) states that school change for sustainability occurs when "teachers and administrators model and students learn and practice, the skills required for cooperative decision making and action" (Stone, 2010, p. 38). By engaging in sustainability practices in multiple areas within the school evidence of school change for sustainability was found within the analysis. Through an analysis of field notes, the reflexive journal, and interview responses the domains were developed. This below referenced chart captures how students, teachers, and administrators displayed action throughout the project. The purpose of the diagram is to convey how the process of school change for sustainability is a multilayered experience.

Typically, topics such as policy and leadership are seen as the responsibility of school administrators, however as evident in the chart below, students and teachers demonstrated action in the areas of policy and leadership. Leadership for sustainability according to Shrivastava and Berger (2012) occurs "in the form of frameworks for decision making, and, in some cases, as

mechanisms for converting ideas into action” (Shrivastava & Berger, 2012, p. 250). In identifying the range of action competencies required to engage in school change for sustainability, it is possible to take steps towards facilitating and building those competencies in others. In the domain of school policy students demonstrated action through committee work and student government, teachers expressed action by enacting school policy through procedures. School administrators responded to the needs of the school community by creating policies and procedures that fostered sustainability. Evidence of community outreach was present in how teachers, administrators, and students created, developed, and maintained partnerships. Leadership occurred largely through creating, developing, and implementing new programming initiatives at the schools for sustainability. Throughout the process different stakeholder groups took steps to achieve sustainability at the school.

School Change for Sustainability Action Competencies Chart

Domains	Students	Teacher	Administrators
School Policy	<ul style="list-style-type: none"> • Student Clubs: Environmental, National Honors Society, Key Club • Student Government • Involvement in school committees 	<ul style="list-style-type: none"> • Align classroom practices • Advise student clubs • Promote student's voice • Reinforce behavioral strategies and school procedures • Involvement in school-based committees 	<ul style="list-style-type: none"> • Develop school policy according to stakeholder feedback • Enforce school policies • Remove barriers for energy and resource conservation
Community Outreach	<ul style="list-style-type: none"> • Create and establish community partners • Participate in community service experiences • Volunteer with community organizations • Engage in school-based activism 	<ul style="list-style-type: none"> • Form partnerships for programming • Provide service learning opportunities • Support community-based learning experiences • Integrate community members within classroom-based learning 	<ul style="list-style-type: none"> • Remove barriers to community-based learning experiences • Invite the community into the school • Provide forum for community feedback
Leadership	<ul style="list-style-type: none"> • Student developed initiatives • Guide programming components by providing direct feedback • Articulate the needs of students and the community 	<ul style="list-style-type: none"> • Provide guidance to both students and administrators • Develop practices and procedures to support sustainability initiatives • Create a conduit of communication between students and administrators 	<ul style="list-style-type: none"> • Support the creation of innovative programs through community, students, and teacher partnerships • Frame the Vision and Mission of the school towards the achievement of sustainability
School Action	<ul style="list-style-type: none"> • Implement programs such as recycling, composting, etc • Collaborate with teachers and administrators • Develop and conduct service projects • Apply for, development and implement grants 	<ul style="list-style-type: none"> • Establish curriculum connections with sustainability • Foster student-centered learning experiences • Provide place-based and experiential learning • Create outdoor learning opportunities 	<ul style="list-style-type: none"> • Budget for programming resources • Provide collaboration planning time for teachers • Coordinate support and resources for school programming related to sustainability initiatives

Table 5-3 – School Change for Sustainability Action Competencies Chart

Sustainability Education Programming Process

To begin the process of successfully implementing a sustainability education program within a school, it is important to establish consensus, develop shared agreements, and engage in deliberative planning. Establishing consensus served to create a baseline of understanding about the topic of sustainability and the experience of sustainability education. Creating shared beliefs about sustainability, sustainability education, and the process of school change was the primary factor in building consensus. Through professional development and information sessions, teachers became informed and engaged in the process of programming. Individual teachers at the schools developed a school-based inventory of the sustainable practices. Through this process, the school community made meaningful connections between the values and behaviors associated with sustainability and school programming. In realizing that they were already engaging in a multitude of sustainable practices, participants felt relieved that the perceived burdens of new programming were alleviated. Inventorying sustainable practices occurring at the schools became a process of reflection, refinement, engagement, and celebration.

Critical to maintaining the deliberative process of school programming for sustainability education was having consistent meeting times in which teachers could plan and receive professional development. Without these allocated times much of the work and collaboration needed to conduct sustainability education programming could not occur. On the other hand, school programming often consisted of fragmented initiatives. This approach to programming lead to initiatives that typically lacked the resources and support needed to achieve their long-term goals. Given the holistic nature of sustainability education programming as underpinned by

the concept of interdependence, programming should be ongoing, integrated, and contain long-term supports. An essential element of programming support is teacher training. For teachers to feel capable and confident in integrating programming into their instructional practices, they need meaningful, sustained, and focused professional development. Curriculum integration allowed students and teachers to transform abstraction into practice. Through coordinated planning, teachers made the space and time for program development and implementation.

Programming supports played a central role in the process of programming. These supports consisted of coordinating communication with internal and external stakeholders, scheduling meetings, planning the agendas for collaboration meeting, documenting programming successes, and reflecting on programming challenges. Program supports were provided through school leadership and by community organizations. Having a strong commitment from the building administrator at Medicine Tree Tribal School ensured engagement on the part of the school community. School administration needs to serve as a champion for the program. They need to prioritize the program and provide resources in the form of planning time and materials. Community organizations extend programming capacity significantly. In many instances, community-based organizations provided experiential learning experiences. These experiences helped the school community to connect sustainability education programming at the school to social and environmental contexts.

The *Sustainability Education Programming Process* is a model that outlines the process of programming that each of the school's engaged in, to varying degrees. The first step of the process consisted of creating a baseline of information about sustainability. Knowledge, interest and potential levels of engagement were determined by stakeholders. This process involved

reaching out to members of the school community to establish their level of commitment through surveys, meetings, and conversation. Upon gauging interest and establishing commitment, it was possible to inventory school-based sustainable practices. This initial step involved reviewing the ways that the school community worked to reduce waste, safeguard the environment and promote community wellbeing. By conducting an inventory of sustainability, the school community became aware of sustainability occurring at the school and drew attention to why it is important for the welfare of the school. The next step consisted of planning, collecting data, analyzing data, and implementing the program. Each of these steps requires collaborative planning time, identifying the responsibilities of individuals, and documenting programming experiences. In this step of the process distributive leadership became the operational norm for the program. Each member of the school community played an important role in programming. Through clear communication and transparent expectations, individuals worked to accomplish designated tasks. The final step of programming involved revising and reflecting on action steps. Through the reflection process individuals envisioned ways actions could occur that used fewer resources. Celebrating the achievements of the school community in fostering sustainability serves to honor the hard work and commitment to the program given by individuals. Both schools were honored by receiving recognition for their respective programs.

Sustainability Education Programming Process

The process of sustainability education programming as outlined below highlights the experience of planning, developing and implementing at the respective schools. Each school approached the process of programming through these outlined action steps.



Table 5-4 – Sustainability Education Programming Process

Limitations

Through conducting this study, I developed a rich understanding of the experience of planning, developing, and implementing sustainability education programming at two schools. In reviewing the outcomes of this research project, it is important to state that there are major limits to the generalizability and application of the research findings. The experiences at the schools were case-specific because they relied on a relatively small target group. The ability to generalize the experience of these schools to other schools is problematic given the ways in which different factors shaped the experience at the schools and the process of school change for sustainability. Although programming occurred on a school-wide basis, the study utilized small participant samples. Each school developed their program in a unique and context-specific manner informed by the culture held by the school and the community. Understanding those unique experiences required adjustable research lenses that were capable of responding to the changing factors and conditions within the schools.

Due to the project relying on a solo researcher it was limited in terms of resources and time. Although there were advantages to this approach, such as being totally immersed in and privy to each aspect of the project, the research process, and subsequent analysis, the process of data collection and analysis would have benefitted from a more collaborative approach in which team members provided regular feedback on research methodology and the outcomes of the study. Receiving regular feedback from members of a research team would have provided me with new ideas about how to conduct research and analyze the resulting data. To reduce the

impact of this limitation on the research project, assumptions were viewed in light of external feedback through a process of coding and member checking.

One major limitation of the study is the short time frame in which it occurred. Although the programming experience occurred from August-April of an academic school year, it by no means represents a complete program experience. School programming takes extended amounts of time. Understanding the impact of a school program is something that occurs over a period of years, not months. The level of participation needed to fully engage as a participant observer was hindered due to my personal time constraints and commitments. Conducting a multi-year study in which programming was planned, implemented, evaluated and refined would assist in understanding the process of schools change for sustainability.

There were limitations to the analysis conducted on the data. Assumptions, background knowledge, passions, and personal biases shaped the analysis of the data. The belief in sustainability as a mechanism for social change had an influence on this project. Sustainability was viewed as both a guiding ethos and behavioral orientation for living in balance with the natural systems that sustain humanity. Strategies such as reflective journaling, an extended duration of study, multiple case study sites and having multiple data sources for analysis were employed to limit bias and reduce its intrusion into the analysis. There are numerous instances in which this occurred within the project. Although this research represents every effort to accurately respond to the research question it is not an exhaustive account of the data gathered and analyzed.

Recommendation for Further Study

Extending the research conducted within this project could occur in multiple ways. One direction is to continue working with the schools to deepen programming for sustainability education. Through this process, further insights would emerge regarding programming refinement and ultimately evaluation. Another avenue for future research would be to take the intra-national approach utilized for this project and extend it to an international comparative case study approach. Understanding the experience of sustainability education programming in different contexts would provide meaningful insights into the case specific components of programming and the universal dimensions of sustainability education programming.

From a methodological perspective, one approach that could be utilized to expand the range of participants for the study would be to employ survey instruments to capture different perspectives of the experience regarding school change for sustainability. The primary methods utilized to gauge participant perception and feedback for this study occurred through observations and interviewing. Survey instruments were not used in this study in order to maintain direct connections with participants. Understanding behavioral changes requires in-depth connections to be established and maintained. However, through the use of survey instruments, more information could be gathered and utilized to inform the process of school change for sustainability.

In focusing on the recommendations for practice related to curriculum, pedagogy, and leadership more exploration of those areas related to sustainability education programming should be conducted. Through understanding how sustainability education curriculum is

developed and applied through instruction new insights regarding integration could be established that help connect sustainability to mainstream content areas. Based on the feedback from students and teachers new integrated curriculum could be developed to support sustainability education programming.

Summary

The reality of climate change, resource scarcity, and environmental degradation are shaping our world in dramatic ways. How we respond to these challenges will determine our shared future. Through engaging in sustainable practices, it is possible to reduce our personal and collective carbon footprint, resources consumed and the degradation of environmental systems. Fostering sustainability relies on cultivating behavioral shifts. One strategy for promoting sustainability in society is engaging in school-based programming. Sustainability education has the potential to influence people to live in a more environmentally and socially balanced manner.

The purpose of this study was to understand the experience of sustainability education programming at two different schools. I selected a comprehensive high school and an independent tribal school for this purpose. I made regular visits, collected data, and described the experience of school change for sustainability in an in-depth manner using a variety of qualitative methods such as field notes, reflexive journaling, and interviewing. Through these data collection strategies, I developed a rich understanding of the programming experience at each school. The subsequent analysis relied on numerous iterations of identifying patterns and themes within the data. From the analysis, I developed conclusions and engaged in discussion. I

stated the implications that the analysis may have for future research, theory and practice for the purpose of guiding future engagement in sustainability education programming.

The theoretical contributions of this study to the field of sustainability education and critical pedagogy allow each of these domains to continue their movement from abstraction to application. This project consisted of an applied experience conducted by practitioners of social, community, and school change. This study served to reinforce the usage of student-centered learning strategies aimed at shaping individuals and the communities in which they live. How people learn, relate to the natural world and their community, and experience personal transformation are all elements of the theoretical grounding used to orient this study. In many ways this study served to support the claims of critical pedagogy through the process of planning, developing, and implementing school-based sustainability programming.

I realized through conducting this research project that this project was about understanding the process and experience of school change. Schools undergo change on a daily basis and are responsive to the needs of individuals, the local community, the state, the nation and the world. All of these factors influence how schools operate, what the schools decided to teach, and how the schools relate to the experience of learning. Through engaging in an interpretive and inquiry-driven research experience I learned that effective school change could occur through engaging in deliberative processes, in which teachers, students, and administrators develop shared goals based on the values of community and collaborate on a consistent basis to accomplish those goals. School change for sustainability occurs when the school community shifts behaviors towards the promotion of the health of social, economic, and environmental systems that sustain humanity and nature. It also consists of providing for the current and future

needs of the community by developing sustainable knowledge and skills in its future citizenry.

A school administrator synthesized the experience of school change for sustainability by stating,

“I predict that as sustainability becomes a way of life in our community that we will see the integration of sustainability in all content areas. As we read and write about sustainability, it will become integrated into everything we do” (personal communication, March 1, 2016).

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