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A Sustainability Themed K-5 Magnet School: An In-Depth Case Study And Evaluation

Aleidria R. Lichau
University of Vermont

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A SUSTAINABILITY THEMED K-5 MAGNET SCHOOL: AN IN-DEPTH CASE STUDY AND EVALUATION

A Thesis Presented

by

Aleidria Lichau

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The Faculty of the Graduate College

of

The University of Vermont

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Thesis Examination Committee:

Christopher J. Koliba, Ph.D., Advisor
Thomas R. Hudspeth, Ph.D.
Tao Sun, Ph.D.
Cynthia J. Forehand, Ph.D., Dean of the Graduate College
ABSTRACT

This thesis is a descriptive case study of the first sustainability magnet themed elementary school in the U.S., the Sustainability Academy (SA) in Burlington, VT. The thesis provides an in depth case study narrative of the first pilot year of the SA (2009) as well as an examination of the analytical frameworks for evaluating the efficacy of sustainability movements in schools.

A literature review is provided to distinguish between a type of static sustainability that supports the current educational paradigm and a type of sustainable education that identifies sustainability as a moving target and a deep process to transcend the current education paradigm. A step-by-step process for school evaluations of sustainability education is explored and discussed using: 1) the case study research of the SA in their pilot year; 2) the literature review on education and sustainability, systems thinking and school transformation; and 3) the exploration and adaptation of analytical frameworks for sustainability in education.
DEDICATION

I dedicate the content and completion of this thesis to my son, Arden. Thank you for giving me the courage and strength to keep pushing forward.
ACKNOWLEDGEMENT

I am so grateful to the entire Sustainability Academy community for all their contributions and for their willingness to let me observe them for an entire year. I would like to thank Shelburne Farms for all their help and support and Jeannie Collins for her time and guidance. I am grateful to my thesis committee and the graduate school for their dedication and support. I am especially grateful to my advisor, Christopher Koliba, for providing me with the opportunity to truly be interdisciplinary during my program and for allowing me the opportunity to heal and grow.

On a personal note I thank my sister, Ajna, who helped me in great times of need to keep going. Gratitude for my mother, Suzanne, for allowing me a safe place to vent and for providing edits. Thank you to Karen for finding me an affordable computer to finish writing on. DJK, thanks for reminding me that I had something to give, for checking in on me and providing positivity, support and good music. I would also like to thank Peg Boyle Single who was invaluable to helping me understand why I felt like such an anomaly in graduate school and for her guidance and coaching. A last bout of gratitude to Richard Yang for taking such good care of me and my son while I finished. Richard’s input, support and help with the most tedious aspects of this thesis was invaluable. I
could not have finished this thesis without the love and support of the people on this page and I am so honored and humbled.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEDICATION</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENT</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
</tr>
</tbody>
</table>

## CHAPTER 1: INTRODUCTION AND LITERATURE REVIEW ................. 1

1.1. Introduction ................................................................................. 1

1.2. Literature Review ....................................................................... 3

1.2.1. Purpose of Education ............................................................... 4
1.2.2. Education Reform ................................................................. 6
1.2.3. Consideration of Human Impact on the Natural Environment .... 10
1.2.4. Sustainability ................................................................. 15
1.2.5. Movement of Sustainability in Education ......................... 19
   1.2.5.1. Sustainable Development Education ....................... 20
   1.2.5.2. Sustainability Education Theories ............................. 23
   1.2.5.3. Sustainability Education from Theory to Practice ...... 25

## CHAPTER 2: RESEARCH FRAMEWORK ........................................ 30

2.1. Framework for Analysis ............................................................. 30

2.2. Research Design ........................................................................ 51

2.3. Data Collection Methods ............................................................. 53

2.4. Coding and Analysis .................................................................. 55

## CHAPTER 3: THE SUSTAINABILITY ACADAMY .......................... 62

3.1. Historical Overview .................................................................... 62

3.1.1. Lawrence Barnes Elementary School .............................. 62
3.1.2. Keeping Lawrence Barnes Open ....................................... 64
   3.1.2.1. Burlington School District Evolution ..................... 65
3.1.2.2. Creating A Magnet School ................................................................................. 69
  3.1.2.2.1. District and Community Influence ............................................................... 69
  3.1.2.2.2. Key Leadership Influence ............................................................................. 74
  3.1.2.2.3. Financial Influences ..................................................................................... 77

3.2. Pilot Year Design Process ....................................................................................... 83

  3.2.1. Management Styles ......................................................................................... 83
    3.2.1.1. District Level .................................................................................................. 84
    3.2.1.2. Key Partnership Level .................................................................................. 87
    3.2.1.3. Principal Level ............................................................................................. 89
    3.2.1.4. Committee and Staff Level .......................................................................... 92
    3.2.1.5. Parent Level ................................................................................................ 95
  3.2.2. Ethos ............................................................................................................... 98
  3.2.3. Physical Structures ......................................................................................... 106
  3.2.4. Resource Management .................................................................................. 113
  3.2.5. Community Links .......................................................................................... 122
  3.2.6. Pedagogy, Research, Learning, Inquiry ......................................................... 126
  3.2.7. Curriculum .................................................................................................... 132

DISCUSSION .................................................................................................................. 139

CONCLUSION ............................................................................................................. 167

REFERENCES ............................................................................................................. 172

APPENDIX A ............................................................................................................... 186

APPENDIX B ............................................................................................................... 188
## LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 1. Management Styles and SE Goal Modeling</td>
<td>142</td>
</tr>
<tr>
<td>Table 2. Baseline Case Study Guiding Questions</td>
<td>149</td>
</tr>
<tr>
<td>Table 3. Vision Weighting Exercise</td>
<td>151</td>
</tr>
<tr>
<td>Table 4. Key Success Factor Guiding Questions for the SA</td>
<td>161</td>
</tr>
<tr>
<td>Figure</td>
<td>Description</td>
</tr>
<tr>
<td>--------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Figure 1.</td>
<td>Nested Components of Sustainability</td>
</tr>
<tr>
<td>Figure 2:</td>
<td>Interrelated Framework for Education</td>
</tr>
<tr>
<td>Figure 3.</td>
<td>Congruence matrix worksheet</td>
</tr>
<tr>
<td>Figure 4.</td>
<td>Congruence Matrix with Sterling’s (2003) Dimensions</td>
</tr>
<tr>
<td>Figure 5.</td>
<td>Congruence Matrix Guiding Questions</td>
</tr>
<tr>
<td>Figure 8.</td>
<td>Sustaining Change in Schools-Five Key Success Factors</td>
</tr>
<tr>
<td>Figure 9.</td>
<td>Seven Operational Dimensions of an Educational Institution</td>
</tr>
<tr>
<td>Figure 11.</td>
<td>Scatterplot of Evident Implications Across a School System</td>
</tr>
</tbody>
</table>
CHAPTER 1: INTRODUCTION AND LITERATURE REVIEW

1.1. Introduction

In 2007-2008 the Burlington School District of Vermont was in the process of trying to close down two neighborhood elementary schools. Due to community push back and a change in district leadership, both schools were kept open and turned into magnet schools. One of them, the Lawrence Barnes Academy, was turned into a sustainability themed magnet school, making it the first sustainability magnet themed school in the U.S. The other school, H.O. Wheeler, was turned into an arts academy. These were the first two magnet schools in Vermont. However, magnet schools are not new in the U.S. According to the National Center for Education Statistics, in 2010-2011 there were over 2,722 magnet schools reported (NCES, 2012). Although Vermont was listed as one of the states that did not report magnet schools in 2010 (NCES, 2012), the official pilot year for both magnet schools commenced in 2009.

This thesis follows the first official pilot year of how Lawrence Barnes Academy transformed into the Sustainability Academy (SA). A literature review of what sustainability in education is and the challenges it faces is provided. This is followed by a review of the analytical frameworks for sustainability in education that are out there and the methods for how the pilot year was studied. An in-depth case study of the SA’s first year is organized using the support of theoretical frameworks from the literature on sustainability and school transformation theory. This case study is descriptive and rich with the tensions and achievements of the pilot year and illuminates the design challenges the SA community faced in 2009. The SA, now some six years later, has remained open.
and has seen many of their desired goals from their pilot year come to fruition, while others have not been met or have shifted in priority. This research is ultimately a reflective tool; the first component of a suggested process for evaluation; and a resource for any school that has already or is interested in implementing sustainability within their school. The descriptive case study offers a slice of time or baseline for the SA in order to evaluate their vision and goals for sustainability in relation to processes that have been identified in this thesis as critical if we are to affect real change in educational values and designs. The suggested process discussed as a result of this exploratory research provides provocation to redefine how we understand and evaluate sustainability within schools and the purpose for which we are evaluating and teaching sustainability to begin with. The discussion is a staring point to a topic and methodology that is missing within the current sustainability literature. This thesis attempts to address that gap using a real and existing school, the SA, as the basis of exploration.

Sustainability with respect to education is a multi-faceted and challenging topic. There is a need to understand exactly what it means when we use the term sustainability. Once sustainability as a term is understood, what sustainability means with respect to education is debatable. In order to understand the challenge, we need to understand how the design and function of education effects our understanding of sustainability and vice versa.
1.2. Literature Review

The literature review in this chapter aims to brief the reader through the initial context of education culture before the introduction of the theory and application of sustainability in education is presented. If the historical context of education reform and its challenges are ignored, then we fail to understand how that history influences how we understand and apply sustainability in education today. A complete history and understanding of educational purpose and reform efforts cannot be explored in this thesis. However, the references provided can offer more detail and further examination. This thesis is about the design process of an ordinary public elementary school that transformed into the first sustainability themed magnet school in the U.S. The design process of this school is embedded within the context of the larger picture of sustainability in education and education reform in general. They are deeply integrated and not mutually exclusive of one another. How one looks at the holistic process rather than the outcomes of a particular school is given a great deal of time and consideration. This is important to the school as a unit because it informs what type of sustainability education they are teaching, and in turn, what results will be feasible and for what purpose. This is important to education sector at large because it explores the challenges that education reform efforts face in general with respect to sustainability.

The following sections of the literature review are ordered as follows: 1) a brief overview of why we began mass education and what its purpose was; 2) a brief overview of education reform in the areas of piecemeal versus holistic change in education; 3) the increase of global environmental challenges and their impact on human life support
systems; 4) an understanding of what sustainability means and the challenges in providing a singular definition for a subjective lexicon; 5) the rise of sustainable development education goals to address environmental challenges and its limitations; and 6) the rise of sustainability in education, how it is currently defined and its inherent challenges.

1.2.1. Purpose of Education

In *History of Education in America*, John Pulliam and James Van Patten (2007) provide a comprehensive picture of the history of U.S. education and the many influences on contemporary education. When taking a bird’s view of U.S. education, the public education system has come a long way from Thomas Jefferson’s goal of creating informed citizens to what it is today. Pulliam and Van Patten (2007) thoroughly outline how world and local events, cultural influences, accelerated rates of change in modernization, and sociological belief and societal values have all influenced the way Americans look at education. For example, Thomas Jefferson believed that adequately educating U.S. citizens was “the only way to ensure that a democratic society was safe” (Pulliam & Van Patten, 2007, p.7). Jefferson’s goals for education indicated a value of safety in the form of knowledge as a societal need and education as a tool to achieve that. We still believe that today, but we have shifted our understanding of citizen. In Jefferson's time his vision was that white male American citizens should receive at least three years of public schooling (Pulliam & Van Patten, 2007). As cultural understanding of the role of minorities and women in society changed, so did the understanding and the role of education (Pulliam & Van Patten, 2007). Today there is an effort to provide
schooling in the U.S. to all of its citizens regardless of race, gender, learning ability, or religious orientation. The point being that education clearly reflects and assimilates cultural beliefs and values of the time (Pulliam & Van Patten, 2007). Jefferson’s vision for public education is over two hundred years old, yet the core issues of what to teach, how to teach, for what purpose and whom to teach remain a central discussion in American education (Pulliam & Van Patten, 2007).

Part of what impacts the evolution of education is that core values of societies change (Pulliam & Van Patten, 2007). As cultures evolve, the practices and assumptions of education reprioritize. Formalization of education is a result of "civilization, writing literature, and distinct cultural values" (Pulliam & Van Patten, 2007, p. 10). In order to talk about schooling, a discussion of societal values cannot be avoided (Jensen, 2004). Pulliam and Van Patten (2007) reference Ralph Linton—an anthropologist well recognized for his understanding of the societal relationship between ‘core’ and ‘alternative values’—as having distinguished the difference between the more early ‘simple society’, like that of Jefferson's time, compared to contemporary American society (p. 14). The change in societal complexity impacts education significantly, because in earlier times there were fewer alternative value choices in society and a much larger core of common centralized values (Pulliam & Van Patten, 2007). Today in the U.S. we have many alternative values that are not integral to common core values. As such, there is currently a smaller set of core common values and a larger set of alternative values (Pulliam & Van Patten, 2007). This makes educational needs more vast, and the demands more broad. Education now makes a larger effort to try to encompass the “many
"alternatives" as opposed to the "small core of common values" (Pulliam & Van Patten, 2007, p. 14). As a result, the quest for "pedagogical authority is more complicated in our fluid, dynamic, and rapidly changing culture than it was in our earlier history" (Pulliam & Van Patten, 2007, p. 15). Efforts to keep up with cultural changes, desires and disruption of education due to massive cultural events, such as school shootings, are more compounded than they have ever been (Pulliam & Van Patten, 2007). Values such as teaching music and the arts can become sidelined when security and safety priorities re-appropriate funding needs (Pulliam & Van Patten, 2007). Although this is an oversimplification of the many components of what drives educational goals, it provides an understanding of the relationship between value shifts and education. The method and practice of teaching, or pedagogy, tries to keep up with contemporary needs through various educational reform efforts.

1.2.2. Education Reform

A main discussion of education circles around the idea that schools is failing in their mandate and what to do about it (Jensen, 2004). Educator and author, David Orr (2004), writes that regardless of who is implementing the changes, the results are not impressive. The large-scale investments channeled into curriculum reform, open classrooms, and individualized instruction that began in the 1960's led to abysmal implementation failures (Fullan, 1993). In the 80's, the culminating concern of parents, students, researchers, and educators clamored to a political point at which the secretary of education created a national commission on education. The 1983 report, “A Nation at Risk”, defined various issues in education policy and made reform recommendations to
be implemented on a national scale. However, despite the massive reform efforts since this report, the education crisis continues (Fullan, 1993; Jensen, 2004; Orr, 2004;), perpetuating the circular conversation of failing schools. It is clear that reform processes are not working (Reigeluth, 1992), the more apropos discussion is ‘why not’.

Educators such as Marion Brady (2013) assert that American education will not improve unless curricular issues are "understood, admitted, addressed, and solved" (p.1). Peter Senge (1990) believes it is because the education sector, much like the business sector, requires a fundamental shift of mind; that the problems of education cannot be understood using the same mindset that created them (Senge, 2012). A perpetuation of the failing status quo will continue under the current way schools operate, teachers are trained, and dogmatic policy drives the decision-makers (Fullan, 1993). Under the aforementioned circumstances only short-lived and un-sustained pockets of success occur which has resulted in giving education reform a bad name (Fullan, 1993). The efforts of curriculum reform provide a salient example. Brady (2013) states the need to understand and solve curricular issues. Yet the question of how one can understand curriculum issues using the same fundamental frame of thinking (Senge, 2012) that created them is absent from Brady’s (2013) discussion. The public education system in America is conservative and slow to change (Fullan, 1993). Therefore, no matter how ‘sophisticated’ education reform becomes, it will never amount to change in an unchanging educational system (Fullan, 1993). So the system, rather than components or materials of education, seems to be the foundation that is holding effective educational reform back.
Focusing only on curriculum, as Brady (2013) suggests, is a part of the challenge; curriculum operates as just one actor within a multi-pronged system, in which all the pieces are interconnected (Lee & Finger, 2010). Educators used to refer to those other operations as ‘the hidden curriculum’ because they were not a formal part of learning instruction, but had a great deal of influence on what students were learning (Lee & Finger, 2010). Therefore, in order to really understand curriculum, one has to look beyond the formal learning instruction and into the networks of school operations that influence student outcomes as a whole. Otherwise we continue to view education from a ‘piecemeal’ viewpoint in which we fail to see it as a system (Reigeluth, 1992).

The cry for systemic change in education has been heard from educational leaders such as Ernest Boyer (1983), John Goodlad (1984), Theodor Sizer (1984), Anne Lieberman and Lynne Miller (1990), Albert Shanker (1990), and Bela Banathy (1991, 1992). Charles Reigeluth (1992, p.9) defines systemic change as “replacing the whole thing” and defines this action as a “paradigm shift”. A paradigm is a shared idea of something in the minds of a particular society that creates an understanding of how the world is (Meadows, 1997). With respect to education, the only time in the history of American education that a paradigm shift has happened was when education from one room multi-age school houses transformed into the “industrial assembly line model we have today” Reigeluth (1992, p. 9). How ‘the world’ of education is today has been built from the societal understanding of its purpose for industrialization (Reigeluth, 1992; Jensen, 2004). This statement somewhat simplifies the complex history of education and the various philosophies from idealism to postmodernism that have informed the
education paradigm. However, the Industrial Revolution is noted for its acceleration in social evolution (Pulliam & Van Pattern, 2007). The exponential rate of change is seen by futurists to continue within each coming decade (Pulliam & Van Patten, 2007). It is therefore challenging to construct a social agreement on the purpose and outcomes of education aboard a high-speed train. Pulliam and Van Pattern (2007, p. 14) point out that “the final objectives of education is not in the hands of professional educators but rests with the wider community”. As the common core values of our society become smaller and a more diverse and decentralized value system replaces it (Pulliam & Van Patten, 2007), the education paradigm is challenged to change. William Ogburn (1964) defined the tension between conservation in social habits and scarcity of invention in the adaptive culture as ‘cultural lag’. This ‘cultural lag’ creates unequal rates of change that causes ‘widespread maladjustments’ (Ogburn, 1964). The paradigmatic assumptions made by cultures are both challenged and clung to for security, and thus, extremely difficult to shift (Meadows, 1997).

Meadows (1997) cautions against focusing on paradigmatic change as a high priority, warning that, in terms of a system, it is the most challenging to affect. Alternatively, Meadows (1997) suggests looking for other ‘leverage points’ within the system that are more adept to change, thus eventually shifting the paradigm as a result. In education, the unstated assumptions of the industrialized paradigm (Reigeluth, 1992) have been challenged for quite some time. One could use Meadows’s (1997) guidance of using ‘leverage points’ to justify focus on compartmental reform efforts, such as curriculum or learning pedagogy, but years of effort have shown that this has not led
toward a paradigmatic transformation (Reigeluth, 1992). This is due to the tension between old paradigmatic beliefs entrenched in industrial and economic growth and the increasing limitations of our physical environment. The limitations of the environment require a new understanding of the way we see and operate in the world today (Capra, 1996). To understand how deeply at odds current paradigm assumptions are with current affairs (Capra, 1996), a brief overview of the two must be examined in order to understand the larger cultural context that is driving the disconnect in education reform efforts today.

1.2.3. Consideration of Human Impact on the Natural Environment

The unprecedented population growth and economic output in the last five decades has raised alarms in the scientific community (Cortese, 2014). Cortese (2014) quotes the World Scientist’s Warning to Humanity in his article “Education for Sustainability: The need for a New Human Perspective”:

Human beings and the natural environment are on a collision course. Human activities inflict harsh and often irreversible damage on the environment and on critical resources. If not checked, many of our current practices put at serious risk the future that we wish for human society and the plant and animal kingdoms, and may so alter the living world that it will be unable to sustain life in the manner that we know. Fundamental changes are urgent if we are to avoid the collision our present course will bring about. (p.1)

Cortese (2014) is one echo among the cacophony of scientists, academics, and activists that sprang to action after Rachel Carson published her seminal book, Silent
Spring in 1962. As a result, the modern environmental education reform movement was put into place in the United States in the late 60’s (McCrea, 2006). From that point, a series of educational pedagogies for the environment were adopted, funded, and integrated into classrooms (McCrea, 2006). Our recycling, littering and tree planting programs developed from this. Other programs in the mid 70’s such as Project Learning Tree were aimed at helping K-12 students “gain awareness and knowledge of the natural built environment, their place within it, as well as their responsibility for it” (McCrea, 2006, p.5). Despite the long and deeply passionate efforts of many educators to fuel consideration for the environment through education, as a society, we continue to fail to affect deep and impactful change. Daniel Blumstein and Charles Saylan (2011) say it well in their book *The Failure of Environmental Education (And How We Can Fix It)*—changes in behavior and attitude necessary to handle our environmental issues have not been cultivated by the environmental education movement, or the education system in general. Saylan and Blumstein (2011) argue that it is not theory of environmental education that has failed, but the educational pedagogies and curriculum in which it was placed. The education as a system fails to provides the necessary tools and pedagogy that instills values such as responsibility and social engagement (Saylan & Blumstein, 2011). These values and the practice of these values are deemed critical to affect change (Saylan & Blumstein, 2011). The ineffectiveness of the environmental education movement is a very good example of decades of reform efforts that hit up against the ceiling of a cultural paradigm unable to make the necessary transformation. This stagnation leaches out from our educational efforts into policies and discussions about the environment, resulting in
paralysis due to indecision and an endemic, non-commitment to change (Saylan & Blumstein, 2011).

Despite various efforts by the United Nations to address environmental problems in the ‘Brundtland Report’ in 1987, the Rio Earth Conference in 1992, and the Johannesburg Conference in 2002, developed countries continue to consume the majority of the world’s resources, while only bearing roughly a third of the population (Tietenburg 2001; Cortese 2014). Julian Simon (Simon in Pojman, 1998, p. 384) coins some ethicists, environmentalists and ecologists as ‘doomsdayers’ because of their ‘alarmist’ projections that humans have no hope of survival; we have already created such a problem for our future generations that we are an endangered species. Simon (Simon in Pojman, 1998) feels that education encourages this sense of ‘doom’ by filling grammar-school texts with unsupported assertions that mankind is a destroyer rather than a creator of the natural environment. This is but one example of the disparity of perception over environmental and social issues. It is mentioned to illuminate that consensus of values toward the environment or the impact humans are having on the environment does not currently exist. A good example is the controversy around climate change and whether or not it is actually due to human activities (Bast & Spencer, 2014).

In The Earth in Balance, Al Gore (1992) writes about the issues of seeing humans in the light of parasites on earth, as a way to continue to look at our situation as a problem, rather than simply addressing the crisis. Gore (1992) expresses concern that deep ecologists pin human beings as an affront to the natural world. Rather, Gore (1992) feels we are afflicted as a species, caught up in an addiction of consumerism, thus blinded
to the consequences on our civilization. The accumulation of material goods is at an all-time high, but so is the number of people who feel emptiness in their lives (Gore, 1992). Rather than feeling human beings are conscious of their actions, Gore (1992) argues that humans are suffering from a deep denial which leads to the desire to believe that “they can continue their addicted lives with no ill effects for themselves or others” (Gore, 1992 p. 526). He goes on to note “some theorists believe that what many addicts are trying to hold at bay is a profound sense of powerlessness” (Gore, 1992, p. 525). At the macro level, Gore believes that our civilization has become dysfunctional in relation to the environment, passing from one generation to the next an inherent set of rules that serve against our basic environmental needs and relationship to nature (Gore, 1992, p. 529). In “An Ecological Critique of Global Advertising,” Alan Thein Durning (as cited in Pojman, 1998) points out that developed nations consume: “10 times as much energy as their developing country counterparts, along with 10 times the timber, 13 times the iron and steel, 14 times the paper, 18 times the synthetic chemicals, and 19 times the aluminum” (p. 552). Therefore, the need for developed nations to address their cultural dysfunction is paramount. Rather than focusing on how much environmental and social degradation exists in the world, a more important question is perhaps ‘why’. Fritjof Capra (1996) reminds us that our current “paradigm consists of a number of entrenched ideas” that are holding us back from a newer paradigm of a “holistic worldview” (p.4). Rather than saying ‘there is nothing we can do’ Capra (1996) believes that there are many solutions to our problems, but it requires a “radical shift in our perceptions, thinking, and values”
(Capra, 1996, p. 4). This shift of perception (Capra, 1996) is necessary in order to address the crisis (Gore, 1992).

Environmental education needs to be able to integrate this ‘world view’ so that analytical and critical thinking skills needed to face these challenges can be addressed (Saylan & Blumstein, 2011). However, there are others who feel that education merely about the environment is not enough (Jabareen, 2012). Environmental education has primarily focused on the relationship between human behavior and how we use and interact with the natural environment (Jabareen, 2012). This does not cover an education to understand our inherent ethical and moral values which define our reality as Capra (1996) and Meadows (1997) suggest. There are components of society and culture that believe that we do not even need nature—e.g. that technology can replace our value for forests (Kreiger in Pojman, 1998, p. 216). Environmental issues and ecological responsibility are topics that are heavily and heatedly debated by Environmental Ethicists and Ecologists. I cannot go into the breadth of this argument for this thesis. Instead, I aim for the reader to understand how our cultural understandings and lifestyles create the lens through which we perceive our lives, and as such, limit our ability to operate differently, even when creating new tools. The ‘world view’ from which our culture currently operates cannot tap the power of new tools, and as such, is perpetuating the current paradigm (Meadows, 1997). The ‘cultural lag’ that Ogden (1964) refers to is painfully apparent in the cultural values of production and consumption versus the ability of the earth to sustain human activities. We cannot create a pedagogy for education that addresses these issues in a deep and fundamental way unless we can see how
‘interrelated’ the issues are and how our frame of thinking gets in the way of that process (Senge, 2012).

If deep social change and transformation of an antiquated paradigm are needed to sustain life on earth (Capra, 1996), then which societal tools can be harnessed for overcoming the ‘cultural lag’ (Ogden, 1964) that prevents changing the current reality? One theory is that education should help to fuel social change. In 1932, George Count wrote, Dare the Schools Build a New Social Order. Count argues for social revolution and the use of education as a means to that end (Pulliam & Van Patten, 2007). Reconstructionists seek societal correction through education (Pulliam & Van Patten, 2007). In many ways this is what the United Nations hoped to achieve through education toward sustainable development in third world countries (Jabareen, 2012). The idea that education can serve as a tool for social reform toward a more sustainable way of living is becoming increasingly popular in education reform efforts today (Jabareen, 2012). Saylan and Blumstein (2011) are convinced that environmental education can be fixed, while other educators have already moved on toward other forms of education that stretch beyond human and nature into an interdisciplinary world in which ethics, economics, and equality weave into a more systemic understanding of sustaining life on earth (Jabareen, 2012).

1.2.4. Sustainability

Sustainability is a term that umbrellas the natural environment but provides a broader and more inclusive term of other diversity issues impacting the ability for humans to sustain themselves (Jabareen, 2012). The recognition of social values,
inequality, economics, and ethics are considered an aspect of sustainability that was missed in traditional environmental education (Jabareen, 2012). The word sustainability is derived from the Latin root *sustinere* (tenere, to hold; sus, up). It is used in ecological terms for an ecosystem to maintain production and balance over time. Sustainability first became linked to Sustainable Development in the late 80’s when the United Nations World Commission on Environment and Development (WCED) released “Our Common Future” (1987), the ‘Brundtland Report’, in an effort to globalize concern for environmental degradation so that we might meet the needs of our current generation without compromising the future generations’ ability to meet their needs (p. 39). The concept of acting with future generations in mind can be referenced back to the Iroquois Constitution (Pearl, 2014). The ‘Brundtland Report’ approximated this ancient concept and tied it to global economic development. Originally, WCED’s global sustainable development goals were considered to be two parts, environmental and economic. Later a third pillar would include social equity as well to form a Venn diagram in which sustainability was the confluence of the three legs (Adams, 2006). These three pillars became known as the three “E’s” of Sustainability or of Sustainable Development and are the foundation of how sustainability is defined in business, policy, and education today (Higgs & McMillan, 2003). Many communities and sectors began to modify these three pillars to meet specific goals or to hold discourse around their practice and definition. For example, the California Student Sustainability Coalition (CSSC) has defined the three E’s of sustainability as Economy, Ecology, and Equity (Camargo, 2012). Luis Camargo (2012) claims that “[u]nlike conventional notions of sustainability that are linked to
environmentalism and dwell only in the ecology sector, [CSSC’s] three-pronged approach takes into account the fact that all three “e’s” are interconnected” (para. 2). Environmental ethicists question the original ‘Brundtland Report’ definition, asking just how many generations we must consider if any at all (Pojman, 1998). Ecological economists argue that the three pillars of sustainable development are misleading because the ‘social equity’ aspect is non-existent or misplaced (Lehtonen, 2004). Rather than being separate pillars that connect, there has been a movement for a stronger model of sustainability—without an environment neither social nor economic constructs can exist (Mann, 2011). Therefore, a newer embedded model has replaced the original Venn diagram (see Figure 1 below) so that the social and economic values are embedded within one another and constrained by the limitations of the natural environment (Mann, 2011).

Figure 1. Nested Components of Sustainability
Source: Adapted from Mann (2011)
Samuel Mann (2011) provides a comprehensive book, *Sustainable Lens: A Visual Guide*, in which he provides examples of dozens of models and diagrams of sustainability in various sectors and how they are used and interpreted. For policy analysis there are “hierarchies for sustainability” (Marshall & Toffel, 2005) and for design and manufacturing there are “sustainability cycle” and “sustainability loop” frameworks (Hay, Duffy, & Whitfield, 2014). The understanding of what ‘sustainability’ means is vast (Marshall & Toffel, 2005) and the urgency to understand which issues should be addressed when and according to which priority is critical (Marshall and Toffel, 2005). Marshall and Toffel outline the leading frameworks in sustainability as “The Triple Bottom Line”, “The Natural Step”, and the “Ecological Footprint” (p. 674). However, these frameworks focus on sustainability in business, or the impact that human activities are having in scientific terms on the environment (Marshall and Toffel, 2005). These are important tools in sustainability education, but regardless of the various models and diagrams out there, there is continued concern for the ability for these models to be put into practice (Lehtonen, 2004; Boström, 2012).

In the late 80’s, environmentalist Jay Westerveld, was credited with the term ‘greenwashing’ after writing an essay on his concerns of ‘green practices’ in the hotel industry (Motavalli, 2011). Westerveld found that the hotel industry was using environmental advertising to save money while not necessarily addressing the various ways in which they deeply impacted the physical environment (Motavalli, 2011). The term ‘green washing’ has now become common place in examining neoliberal economic gains which create loopholes for businesses to sell the idea of a ‘green’ product whose
bottom line is still focused on economic gains and less on social or environmental
considerations for the impact of the product. An example was back in 2013 when Coca-
Cola was busted for stating it was using bottles made from ‘plant based’ materials that
appeared to be ‘natural and ecofriendly’, when in fact there was no evidence of the
environmental benefits of their new product whatsoever (Zara, 2013). Sustainability as a
term for policy is challenging because it is a ‘vehicular idea’ (McClennon, 2004;
Temenos & McCann, 2012). Vehicular ideas are not static. They evolve with time, move
across contexts, and are used in specificity and open ended, vague interpretations
(McLennon, 2004). Some argue that, due to its vehicular nature, the confusion around
what sustainability means is problematic to its implementation in an educational setting
(McVaugh & Norton 2012; Jabareen, 2012). The liberty that can be applied to the lexicon
make sustainability efforts highly susceptible to ‘greenwashing’ agendas, resulting in a
‘sustainability fix’ (While, Jonas & Gibbs, 2004) whilst all the while supporting policies
and economic goals that continue to cause ecological and social degradation of global
resources (Temenos & McCann, 2012). In terms of education, sustainability has
increasingly become a selling point to attract students, faculty, and funding while not
necessarily delivering the declarations being sold (McKenzie, Beiler & McNeil, 2015).

1.2.5. Movement of Sustainability in Education

Sustainability as a selling point in the education sector is too simple of an
understanding for why such liberty is taken with the understanding and implementation
of sustainability in education reform efforts. The political agenda that created
sustainability as the zeitgeist also shaped an informed how it would be used as an
educative tool. Understanding the history of sustainability with respect to education is important to consider. It is the discrepancies in political and social value systems that create a ‘cultural lag’ (Ogden, 1964) in the understanding of how sustainability should be used as a tool in education. This section examines the historical use, transformation and growth of sustainability in education and the challenges of attempting to provide frameworks to a lexicon that is a ‘vehicular idea’ (McClennon, 2004).

1.2.5.1. Sustainable Development Education

Half a decade after the ‘Brundtland Report’ was issued by WCED, international government bodies gathered at the Environmental Conference in Rio de Janeiro in 1992 to ratify the United Nation’s (UN) agenda for Sustainable Development. One outcome of the conference was the development of Agenda 21 (1992), the first international document to list education as a priority to achieve sustainable development. Chapter 36 of Agenda 21 (1992) states four clear educational goals where Sustainable Development is concerned: (1) improve basic education, (2) reorient existing education to address sustainable development, (3) develop public understanding, awareness, and (4) training (p. 320). Agenda 21 (1992) was endorsed by nearly all the international governmental bodies (the US being the only country to withhold endorsement at the time). In order to support and further Agenda 21’s (1992) goals, the Earth Charter Initiative was put into place to create a synthesis of global values, principles, and aspirations to be used to create sustainable societies worldwide, with education being a critical component (Earth Charter Initiative Handbook, 2008). A decade after the development of Agenda 21 (1992) a review and critique of its progress took place at the United Nations Summit in
Johannesburg, South Africa in 2002. The ‘Jo’Burg’ Memo (2002), an updated memorandum from the Rio Summit, was published months before the Johannesburg Summit in an attempt to translate the values and goals of sustainability into solidified policies. The Jo’Burg Memo (2002) became the most updated UN report on Sustainable Development, which was ratified by international bodies (the US included) and continues to be used in policy reform efforts toward sustainable development.

Outside of the implementation of economic sustainable development agendas in third world countries, post Rio Summit, many educators in Western Europe and Australia implemented new curricular goals for sustainability with little success (Sterling, 2001). In 1997 the United Nations Educational, Scientific, and Cultural Organization (UNESCO) held an international environmental education conference in which UNESCO was echoing the same question they had asked in 1978: why the world had not reoriented educational goals in order to create “new patterns of behavior of individuals, groups and society as a whole towards the environment” (UNESCO, 1978 cited in Sterling, 2001)?

Stephen Sterling (2001), an educator and pioneer of sustainability education efforts in the United Kingdom, argues that the reason why the call has not been answered is because the goals are not aligned with education for change, but rather, for global economic concerns. This is the ‘sustainability fix’ that While et. al. (2004) refer to. Sterling (2001) demonstrates that the major reason why the global education community has not been able to affect the change needed is because there is something fundamental missing in the prescription (which is largely a directive from developed countries to the Third World).
The missing components are: “clarity about the vision of education for sustainability that is needed, and also a strategic sense of how progress towards such a vision could be made, bearing in mind the power of the dominant social and educational paradigms.” (Sterling, 2001 p. 36)

Sterling (2001) argues that most institutions whether government or non-governmental organizations (NGO’s) tend to emphasize using education as a change agent by “raising environmental awareness, improving literacy, basic health and quality of life” (pg. 36). Curricular changes, themes, and concepts for sustainability within a school are not enough to generate change (Sterling, 2001; Higgs and McMillan, 2003; McVaugh and Norton, 2012). The culture of the institution itself must breathe and exemplify what sustainability is and how it can be achieved (Sterling, 2001). This is the paradigm shift that Meadows (1997) and Capra (1996) refer to. Because we have not transformed our reality and frame from which we are operating (Senge, 2012), current education is ‘transmissive’ rather than ‘transformative’ (Sterling, 2001). The current educational foundation begins in a world where numbers and economics tend to define what education is, what it is for, and why we are educating (Sterling, 2001). Our education system sits squarely in the middle of the “crisis of our perception” that is dominated by an old paradigm that cannot provide the building blocks for a sustainable future (Capra, 1996, pg. 4). As such, the current infrastructure in modern education systems sustains mostly ‘transmissive’ methodologies, which tend toward an instructive nature and impose change within teaching methods as well as direct the philosophy and intention of education (Sterling, 2001). Sustainability as a concept materialized from
economic and developmental concerns, but has evolved and changed over the years in an effort to integrate it within education with more specificity, meaning, and direction.

1.2.5.2. Sustainability Education Theories

There are currently three commonly accepted terms for sustainability in education: 1) Education for Sustainable Development (ESD), which was briefly defined in the previous section; 2) Education for Sustainability (EfS); and 3) Sustainability Education (SE). MacKeown (2002) point out that depending on the geographical and political location, each term, ESD; EfS; ES, all have their place and meaning. MacKeown (2002) suggests that the three terms can be used interchangeably with a distinction that there is education for sustainability and education about sustainability. The former incites the ability to provide an education that can achieve sustainability whereas the latter is merely a theoretical component that cannot achieve the necessary transformation (MacKeown, 2002). Various forms of education for and about sustainability began to appear in the late 90’s, but little evidence to date suggests any real and lasting impact (Sterling, 2001; Murray 2011). Sterling and others (Orr, 1992; Huckle 1996) had placed a lot of emphasis on EfS being a movement from the dominant social paradigm which was tethering ESD toward a more ‘transformative’ education that embraced the for sustainability aspects that MacKeown (2002) emphasizes. An example of these efforts is Vermont’s “Guide to Education for Sustainability”—a curriculum, community and project based approach to EfS in the classroom which attempts to show how sustainability education has been there all along and can be used as a ‘lens’ through which to learn (Shelburne Farms Sustainable Schools Project [SSP], 2011). Within
Vermont’s “Guide to Education for Sustainability” is a page dedicated to what is meant by sustainability and outlines and defines which strategies can be used to implement EfS within a community and a school (SSP, 2011).

Stephen Sterling’s *Sustainable Education: Re-Visioning Learning and Change* (2001) discusses the need to move away from the focus of ESD and EfS toward understanding what we can truly ‘sustain’ in education moving forward, looking at the bigger picture, and asking educators to embrace ‘Sustainable Education’ (SE). Sterling (2001) stresses that terms and processes are irrelevant when they are placed within the same educational constructs that led us to where we are today, and as such, the process of achieving SE is necessary. Sterling (2001) and Saylan and Blumstein (2011) point out that prior educational goals that align with sustainability such as environmental education failed dismally when placed within the production and efficiency oriented framework of modern education. Orr argues that “all education is environmental education” because we implicitly or explicitly teach whether we are “apart from” or “a part of the natural environment” (Orr, 1991, para 20). Sustainability education is also implicitly or explicitly taught to either preserve unsustainable actions or to learn what sustainability is but within an unsustainable education system (Sterling, 2001; Murray, 2011; Jabareen, 2012). The US education system is lacking in an acceptable framework for sustainability education because of its “diminution of the idea of learning throughout the 20th century” (Orr, 1994, p.24). Orr (1994) refers to the US education system as one that is “long on performance standards and testing and short on how to encourage critical thinking, creativity, and ecological awareness” (p.23). Sterling (2001), MacKeown (2002) and
Vermont’s “Guide to Education for Sustainability” (SSP, 2011) all list ‘critical thinking, creativity, and ecological awareness’ as crucial if we want our youth to be prepared for their futures. Yet our education standards are limiting the ability to achieve these skills in the classroom (Orr, 1994). According to Sterling (2001), sustainable education is ‘qualitative’, ‘systems oriented’, and requires “continuous cultural shifting” at the school and community levels for it to make a difference in our futures (p.36). An education that is about change, within which Sterling (2001) embeds sustainability, requires a ‘transformational methodology’ in which learners are engaged and participate fully in constructing and identifying the meaning of their education.

1.2.5.3. Sustainability Education from Theory to Practice

In the UK Sterling (2001) laid groundwork in his publication on the subject of sustainability and education and ways to identify whether the sustainability initiatives being placed within education are ‘transmissive’ or ‘transformative’; are education for change or locked to a useless paradigm. In the US, publications like the “Education for Sustainable Development Toolkit” (MacKeown et. al, 2002) were developed to provide practical guidelines for implementation of ESD. The ESD Toolkit provides examples of necessary community, educative, administrative and political steps that need to take place to achieve ESD. In more recent years Jabareen’s (2012) “Sustainability Education Framework” was developed for higher education. Vermont’s “Guide to Sustainability Education” (SSP, 2011) for K-12 education and Higgs and McMillan’s (2003) ‘Congruence Matrix’ for modeling sustainability education were developed for K-12 schools.
It can be argued that the epistemology of ESD creates issues for some educators who feel that sustainability has become ‘greenwashed’ with little success (While et al., 2004). MacKeown et al. (2002) provide methods of application for ESD in their “Toolkit”, but the issue of how to transform an educational paradigm are insufficient to help identify how to emerge from current educational tethers. For example, worksheets are provided in the “Toolkit” to help communities identify “what basic knowledge is needed within the community to live sustainably” (MacKeown 2002, p.36). However, if Sterling’s (2003) argument is correct, then approaching these questions within the current education paradigm will only lead to the creation of programs or educational goals which fail to create any meaningful change. In the “Toolkit” (MacKeown, 2002) there is no exploration of what habits of mind are getting in the way of living sustainably in the first place. According to Sterling’s (2003) analysis he feels strongly that the future of sustainability education needs to shift from one containing sets of theory and practice to a much larger and challenging mission of “envisioning and articulating an alternative educational paradigm” (pg. 21). In the case of Jabareen (2012), an interdisciplinary framework for sustainability education is needed. According to Strauss (2013) even the very core foundations of the curriculum in U.S. education is so deeply flawed that attempts at reform are futile. This in addition to the goal of privatization of our public education systems, an argument that is often a conversational hamster wheel for educators in America (Strauss, 2013). Yet we can see that despite the current system U.S. education is operating within, there are emerging themes for sustainability throughout curriculum, pedagogy, environment, and social learning (Sterling, 2003; MacKeown
2002; Higgs and McMillan, 2006; Murray, 2011; Jabareen, 2012). In the context of a system built in an ‘old paradigm’ that no longer suits educational needs (Sterling, 2001), we might need to also look for which pieces of the current system can serve as leverage points (Meadows, 1997) to achieve an eventual educational paradigm shift. Sterling feels that one of those leverage points is what has already failed: “out of failed efforts of transmissive methods, the understanding of participative processes (transformative) have developed” (Sterling, 2001 pg. 36). In order to understand how a shift might be taking place in education where sustainability is a consideration, the whole system must be studied in order to understand how each component influences the whole (Senge, 2012).

Although educational communities share similarities, each one is also a unit of organization within a larger system, and also a system in and of itself, which can also be a leverage point for the larger system. This means moving beyond the discussion of curriculum reform to a broader context of learning that includes behaviors, attitudes, and actions (Higgs and McMillan, 2003).

Katherine Arbuthnott’s (2008) research on ESD clarifies that “if attitude change is to translate into altered behavior, education must extend beyond attitudes to assist people to act in ways consistent with their values” (pg. 152). Yet we have learned that current collective values are not congruous with the needed values of today (Capra, 1996). Educator of sustainability and author Paul Murray (2011) admits that although he works heavily in the area of promoting sustainability in his career as a professional, he has done little to nothing to incorporate what he is ‘preaching’ within his own private practices. Sterling (2001) provides some small case samples of schools in the UK that he deems
successful in their practices of sustainability education. The common thread is that they are allowing flexibility for growth and change in their model for understanding and implementing sustainability in education (Sterling, 2001). OFSTED (2009) found that the schools studied over a three-year period with a focus on sustainability showed an increase in knowledge and understanding of sustainability as well as more positive attitudes and behavior in general, and improved attendance. There is also evidence that teaching about sustainability has shown an improvement in instruction and learning (OFSTED, 2009; Porritt et al., 2009; Duffin et al. 2004). Birney and Reed (2009) found that schools that focus on sustainability build stronger ties between schools and local and distant communities. There is also evidence that when students and staff take responsibility of school operations and facilities through monitoring and auditing, sustainability is shown to become embedded within the culture of the school (OFSTED, 2009; Gayford, 2009).

The definition of sustainability within these studies ties in components of place-based learning, environmental awareness, and citizenship and community outreach (OFSTED, 2009). Higgs and McMillan (2006) claim that modeling of sustainability in education by school staff and faculty is critical for creating a long-lasting culture of sustainability in a school. Having multiple meanings of sustainability can also muddy the water of what ‘success’ means exactly and its longevity: “if a school sends mixed messages, students and faculty may be less likely to take the school’s efforts seriously, instead perceiving hypocrisy and perhaps even reacting negatively to what would otherwise be positive steps toward building an SE program” (Higgs and McMillan, 2006, p. 51). Higgs and McMillan (2006) believe that modeling in school culture is paramount to a successful
long-term outcome, noting that, “a cultural shift, promoted partly by tradition, rituals, and ceremonies, is thus likely to spark changes in other areas as well” (p. 51).

More research needs to be gathered on schools which are working to build an understanding of sustainability within their community context (Higgs and McMillan, 2003) as well as contribute to a larger understanding of its meaning with respect to the ‘old’ or to the ‘new’ educational paradigm. Statistics or articles defining what to incorporate with respect to sustainability in schools might provide some indications on what works, but it fails to answer the larger question of what kind of educational culture must exist in order for processes to be implemented or considered in real and meaningful ways. There may be a series of processes that need to be considered before certain suggested curricular, structural, or pedagogical changes can be made. The question of what to tether analysis to so that the unit of research can be examined at a systems level is an interesting one. The following chapter will address the research framework of this thesis.
CHAPTER 2: RESEARCH FRAMEWORK

2.1. Framework for Analysis

The intention of analysis of the SA is to provide a systemic and holistic blueprint of the initial pilot year to determine where the SA was at the time and where the SA was moving toward. The intended outcome is that patterns and cultural thinking documented within the case study at the time might provide insights to the school as it continues its path of transformation over the long term. Peter Senge, a systems author who contributes to the literature on schools as systems, provides multiple examples of how to identify patterns in thinking within schools and instructional practice and learning (Senge, 2012). Senge’s (2012) work is good to use at a school during professional development opportunities and to support an organization’s learning goals. Sterling’s (2003) dissertation integrates the need for systems thinking in education transformation and provides many models of systems thinking in relation to the “aspects of seeing, knowing, and doing” (Sterling, p.423, 2003). Sterling also (2003) provides guideline indicators by which a school can evaluate broadly whether or not it is working toward transformation or simply repeating current paradigmatic patterns with new sustainability themes, curriculum and concepts. Yet, it is necessary to have relevant information from the school in order to take these more normative and broad guidelines and tether them to something that is a practical tool. This is where the significance of a descriptive case study for this type of research is useful. It allows an understanding of where a school is, and, in asking questions about the short and long-term visions for the school, it can inform the school on the intended place to be. It seems natural to use the work of Sterling
(2003) to help analyze thematic structures within the design processes of schools ascribing sustainability as an educational goal. The reason is that Sterling (2003) focuses on the movement from the transmissive dominant education culture toward a transformative paradigm. This is particularly useful in public education because we can assume, based on the literature review of this thesis, that any public school would have to move from the current transmissive paradigm toward a transformational one (Sterling, 2003) and potentially be in varying stages along that path that are regressive or even recursive in nature.

I am interested as both educator and researcher to illuminate various layers of the design process of the SA’s pilot year and identify where transmissive patterns or transformative patterns are emerging, but also ground the analysis in a framework that is slightly less nebulous from a practical standpoint. In searching for a supportive framework with which to analyze my research, I was operating from three main questions:

- How can the framework best reflect a systems view of the design process of the SA in its pilot year?
- How can the framework illuminate the degree to which the vision of sustainability is being modeled within the various dimensions of the school as a system?
- How can the framework illuminate the chosen design process of the SA as a blueprint toward identifying the school culture and to what degree it aligns with the school vision for sustainability at the time?

Jabareen (2012) saw the need for an interdisciplinary framework for sustainability education in higher education. In order to develop a framework for this research, individual frameworks were transcended to create a multi-disciplinary approach to
explore appropriate evaluation processes for the analysis of the SA and other schools of SE.

Martin L. Maehr and Carol Midgley (1996) are specifically knowledgeable on the subject of transforming school cultures. Although sustainability as a school culture is not focused on in their research, Maehr and Midgley (1996) refer to sustainability in direct relation to sustaining the transformation of school cultures over time. Sustaining the transformation of a school culture is a critical foundation for achieving sustainability education (any type of education). Therefore, identifying what kind of culture exists at the SA and how it is trying to transform is imperative if the SA is to experience any long-lasting change or embody the larger systemic changes for education that Sterling (2003) refers to.

According to Stephen Sterling (2001, p.14) “most mainstream education sustains unsustainability”. David Orr (1994, p.17) asserts that a component of the “education crisis” we are faced with is its “reproduction of dominant assumptions” about the world, which severely limits educations ability to contribute to a better world. Sterling (2003) argues, “what is limiting education is the fundamental educational paradigm which informs its thinking and practice, and which derives from the context of the wider socio-cultural paradigm and its view of the nature and role of education” (p.47).

Unfortunately, public schools systems are beholden with some respect to their design. The design of public schooling has created a system of cultural beliefs and paradigmatic standing on education and a worldview that limits the ability to adjust education toward sustainability (Orr, 2004). Sterling (2003) argues that in order for
education for sustainability to truly create transformational change, education must be designed using processes by which the current culture of education and worldview are transcended. This “higher order learning” can liberate thinking processes from the “trap of unexamined assumptions that have led towards or exacerbated conditions of unsustainability” (Sterling, 2003, p.133). The culture of the Sustainability Academy (SA), is in part, one of a public school in the U.S. The SA is required to achieve the goals of standardized test scores and answers to federal and state education mandates. Therefore, understanding the transmissive paradigm as the culture of public education is essential. This has been laid out clearly in the literature review of this thesis and will be ascribed to the “baseline” of the SA in relation to whether or not they are moving from this baseline toward something that is more transformative (Sterling, 2003) or where on that continuum they were at the time.

Maehr and Midgley (1996) reflect the value of viewing schools as systems in their literature and support others (Reigeluth, 1992; Sterling, 2003) on the desire to move away from piecemeal change in education that has little lasting change. Viewing education from a systems perspective can be done with a microcosmic or macrocosmic lens. For example, a student could be defined as a system as well as could curriculum or an entire district. Maehr and Midgley (1996) argue that in terms of viewing transformation in education, “one should probably not go smaller than the school” as a system or larger because “all-encompassing change may prove overwhelming” (p. 126). Thus the broadest framework for analysis is to identify the SA as a school system and note the efforts of
change taking place within the various dimensions, models, and beliefs of the school culture as defined by Maehr and Midgley (1996).

I have incorporated the three major principles of Maehr and Midgley’s (1996) research on school transformation as foundational support or guiding principles of my analysis:

- **System Change**—briefly described above, this principle identifies the benefit of examining cultural transformation at the school level. For this purpose, my analysis will take place at the school level with dimensions of the school operations categorized from a systems perspective. The only difference is that the superintendent and district leadership is included, which has direct influence on the schools operations (Senge, 2012).

- **A Shared Theory of School**—“sustainable school change is fostered by an integrating rationale for change” (p. 129). This principle examines the shared understanding and acceptance of purpose. Maehr and Midgley (1996, p.129) cite Susan Rosenholz’s (1985) argument that “a shared perspective and a degree of cohesiveness built around that perspective is at the heart of effective schools”. This principle is used as a framework to analyze to what degree there was a shared perspective in the pilot year of SA and to what degree there was cohesive modeling of that perspective.

- **Leadership Initiative**—“people are usually found to be at the heart of change: what it will be, how or when it will get started, whether or the degree to which it will be supported” (p. 131). This principle provides a broad framework for why
my research emphasizes analysis of change agents or leaders. My research is largely focused on leadership influence, efforts and actions in the pilot year within the various dimensions of the SA’s operations.

These broad overarching principles provide a context and identify parameters for my research, which is critical to identifying the boundaries and scope of examination and depth of analysis. According to Sterling (2003) “the nesting systems model is particularly useful in helping distinguish between contextual levels and helping understanding of the relationships between them” (p. 73). Sterling (2003), not unlike Maehr and Midgley (1996), point out that where you determine where a system starts and ends is debatable. Sterling (2003, p.264) identifies an interrelated framework that he claims can be used to examine education at any system level. Assuming this to be true, Sterling’s (2003) framework can be overlaid with Maehr and Midgley’s (1996) principles to create a framework for analysis. Sterling’s (2003, p.264) framework (Figure 2) nests three main dimensions of paradigm and places them in an education context.
Below, Maehr and Midgley’s (1996) principles for school transformation are juxtaposed with Sterling’s (2003) framework in Figure 2 as to how they apply within the nested layers:

- Leadership Initiative— (praxis) as reflected in pedagogy and practice,
- Shared Theory of School—(eidos) as reflected in educational policy, theory and design,
- System Change—(ethos/epistemology) as reflected in educational paradigm and purpose.
At a broad level, this framework provides a strong foundation for which more concrete dimensions can be nested. The analysis needs to be grouped effectively to determine how the dimensions within the system interact with one another and may or may not influence particular outcomes. Sterling (2003) identifies seven dimensions that he feels exist within educational institutions during their “operational life”: ethos; curriculum; pedagogy, research learning and inquiry; organization/management style; resource management and use; physical structures/architecture; and community links and relationships (p.273). These seven operations were ultimately used as a framework for the descriptive case study as a comprehensive overview of the interrelationships at play within the SA, or the system of study. A framework that is more practical and indicative of daily practice is also an essential piece of understanding how these dimensions relate to one another. This leads to the third prong of my framework related to practice and modeling of sustainability within a school system.

Amy L. Higgs and Victoria M. McMillan (2006) propose that, “the first step for a school interested in modeling sustainability is to become aware of what the school is currently modeling to students” (p.51). Although Sterling (2001, 2003) discusses the needs of paradigmatic shifts for educational transformation, the research of Higgs and McMillan (2006) identifies the impact of a school sending contradictory messages. This is of particular importance because it addresses the questions about modeling behavior versus theoretical instruction in relation to sustainability. Higgs and McMillan (2006) identify that there are abundant piecemeal sustainability efforts to draw from but there is “limited concrete guidance on how to shape an entire school community that models
sustainability through its systems and actions” (p.240). Out of four schools researched, Higgs & McMillan (2003) identified that the more transparent the relationship is for the students around behavior and sustainability, the more success was identified in the transformation of thinking and behavior. This supports the OFSTED (2009) findings as well as other research on sustainability education (Duffin et. al., 2004). Appropriate and authentic modeling of sustainability within a school leads to policy decisions that are largely different to other sustainability education programs that are less transparent (Higgs & McMillen, 2006). Higgs and McMillan (2006, p.40) demonstrate the importance of human role models on student thinking and behavior, and in turn, how students learn to see the world. In addition to human role modeling, Higgs and McMillen (2006) also demonstrate the impact that institutional models can serve in shaping thinking and behavior. This provides the practical evidence of the impact of the social paradigms and the resulting educational culture discussed at length in the literature review section of this thesis. The benefit of modeling sustainability behavior in schools (Higgs & McMillen, 2006) is complementary to the three principles of Maehr and Midgley (1996) on effective school transformation. As a component of their research, Higgs and McMillen (2003, p. 66) developed a sustainability ‘modeling matrix’ for school self-assessment (see Figure 3).
The rows represent what Higgs and McMillen (2003) have identified as the goals of Sustainability Education (SE) that will “help shape active motivated citizens, engaged in shaping a more sustainable future” (p.2). The columns represent the six dimensions within a school in which evidence of modeling the SE goals can be identified (Higgs & McMillen, 2003). For example, a school can determine whether or not the curriculum is modeling components of: long-term thinking; systems thinking; emphasis on equity; and providing educational learning opportunities in relation to economics and the environment. As a self-assessment tool, a school would assess whether it is modeling any of the six SE goals within the six identified dimensions (Higgs & McMillen, 2003).

Higgs and McMillen’s (2003) framework complements and strengthens the other frameworks for my research (Maehr & Midgley, 2006; Sterling, 2003) and contribute a critical component that would otherwise be missing—modeling sustainability within school culture. There are other evaluative frameworks such as School Sustainability Rating Systems (SSR’s). However, Julian Dautremanent-Smith (2012) clearly provides

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Figure 3. Congruence matrix worksheet
Source: Adapted from Higgs and McMillan (2003)
evidence of the limitations of SSR’s as an effective evaluation tool. In addition SSR’s do not align with Sterling’s (2003) goals for paradigmatic shift; rather, they support current educational paradigms and piecemeal change (Dautrement-Smith, 2012).

Higgs and McMillen’s (2006) matrix can be adapted to Sterling’s (2003) nested systems framework to provide a more ‘on the ground’ tool for schools to use for self-reflection and assessment over time. As all systems must be defined by some boundary, the six areas of SE identified by Higgs and McMillan (2003) are used as the outer boundary and Sterling’s (2003) seven operational dimensions replaced the six defined dimensions in Higgs and McMillan’s (2003) matrix, making seven total dimensions across the columns (see Figure 4 below).

<table>
<thead>
<tr>
<th>Curriculum</th>
<th>Community Links</th>
<th>Physical Structures</th>
<th>Management Style</th>
<th>Pedagogy, Research, Learning, Inquiry</th>
<th>Ethos</th>
<th>Resource Management</th>
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Figure 4. Congruence Matrix with Sterling’s (2003) Dimensions
Source: Adapted from Higgs and McMillan (2003)

A hybrid of the two models, Figure 4 represents the six SE Goals (Higgs and McMillan, 2003) as a boundary of inquiry for each of the seven dimensions of an operational school
(Sterling, 2003). The seven dimensions have six “relational paths” they can take (Sterling, 2003), affecting one another and their ability to model the SE goals defined by Higgs and McMillan (2003). Analysis of each dimension and identification of the type of modeling of the six SE goals within the relational paths will create a blueprint analysis of the first pilot year for the SA.

As for the definition of the “outer boundaries”, Higgs and McMillan (2003, pg.66) provide a questionnaire (see Figure 5 below) to schools in order to use their matrix as a template to self-evaluate sustainability programs within their schools.
Questions to guide completion of congruence matrix

**Long-term perspective:** Does the school help students consider the impacts of decisions in the far future as well as in the short-term?

**Systems thinking:** Does the school help students build links between the three E’s? Does the school help students see interrelationships between issues and explore these interactions to explain particular events or behaviors? Does the school encourage non-linear thinking?

**Equity:** Does the school help students understand what social equity is, and the ramifications of inequitable systems? Does the school help students learn how to create more equitable social systems?

**Economy:** Does the school help students think about how people meet their material needs? Does it help students understand the exchange of goods and services both at a local scale and at a global scale? Does it account for different kinds of capital such as social and natural capital?

**Environment:** Does the school help students understand what the environment is and issues related to the environment? Does the school help students grasp the scientific fundamentals needed to understand environmental issues – ecology, geology, biology, chemistry, physics? Does the school help students understand human interactions with the environment?

**Well-being:** Does the school help students develop a meaningful way of understanding and assessing quality of life that goes beyond common measures such as material wealth and social status? Does the school help students consider the quality of life that they and others have? Does the school help students make deliberate decisions about the factors influencing their well-being?

Figure 5. Congruence Matrix Guiding Questions
Source: Adapted from Higgs and McMillan (2003)

The guidance questions in Figure 5 were designed to examine how four secondary schools were “teaching about and for sustainability” (Higgs and McMillan, 2003.pg. 5) with hope that other schools might be able to use a blank ‘Congruence Matrix’ template (Higgs and McMillan, 2003) and augment the questions depending on which category of the matrix they were assessing. For example, the word ‘school’ in the guiding questions
in Figure 5 would be replaced with ‘curriculum’ or ‘management’ in order to complete the matrix. The Congruence Matrix (Higgs and McMillan, 2003) was not intended to evaluate a school system. Therefore, the guiding questions in Figure 5 are more centered toward instructional content. This thesis examines the school as a system and is interested in whether the SE goals are evidently modeled in the design process at a systems level. This can be seen as a preliminary step to how they are modeled to students specifically, but more whether or not there is evidence of them being modeled within practices during the design process in the pilot year of the Sustainability Academy (SA). As Higgs and McMillan (2003) encourage adaptation to their tools for the purpose of a school’s needs, it provides some flexibility to explore the use of the matrix in conjunction with a framework that is focused on the school as a system.

Sterling (2003) does not offer a full discussion on each of the dimensions listed in Figure 5. Rather, he provides an example of how curriculum might be looked at with respect the difference between the current “mechanistic/modernist/managerial view which is often an imposed set of educational goals, content and practices” and an “ecological view of curriculum as a multi-faceted expression of an institution’s ethos and where the total learning experience is the prime focus” (Sterling, 2003, p. 274). Using curriculum as an example of the framework, the SA is both bound by the former and provided with an opportunity to explore the latter to some degree where sustainability is concerned. This is a compromise at best for the SA due to the fact that it is still beholden to the dominant culture of public education and the goals and outcomes that it requires, such as state and federal standards for curriculum. However many sustainability
educators see that sustainability standards such as the National Education for Sustainability K-12 Student Learning Standards (US Partnership for Education for Sustainable Development [USPED], 2009) can be “integrated into core content teaching and learning” due to the interdisciplinary nature of sustainability (p. 2). Shelburne Farms, a major contributor to Vermont’s Guide to Sustainability, sees sustainability as a lens with which to see and learn core knowledge from (SSP, 2011). This lens of sustainability is “a way of looking at the world, seeking to find the interconnections and interactions between the environment, the economy, and the community” (SSP, 2011, p. 5). In other words, these guides and standards are leverage points (Meadows, 2007) with which to move curricular efforts from transmissive standards toward transformative learning processes (Sterling, 2003). The SA is a public school, but through the lens of sustainability it is in a position to redefine and strategize how curricular outcomes are accomplished by thinking outside of the current paradigmatic box. In the descriptive narrative, the curriculum dimension for the SA details how curricula was being created, structured, etc., but is not isolated from the other operational dimensions. Resources and management styles, for example, impact curricular outcomes just as much as the actual curriculum does which is evident in the descriptive narrative. As Sterling (2003) does not provide an in-depth examination of each of the seven dimensional pathways of a school, the data in the case study is used to drive and best interpret each of the seven dimensions.

Other indicators identified by Sterling (2003) as guidelines to whether or not schools are transmissive or transformative in nature is also used as suggested indicators for the proposed evaluation process in the discussion section. The design process of the
SA is neither static nor binary. Sterling (2003) notes that his frameworks are not “choices between binary opposites, but a change of weighting that moves away from the dominance of the old paradigm, and transforms and conserves some of its characteristics, rather than jettisoning them in their entirety” (p. 271). Sterling’s (1999 cited in Sterling, 2003) table of eleven indicators of a system moving from transmissive toward transformative processes (see Figure 6 below) is not a check box, but can be utilized with a descriptive narrative of the design process as an evaluative tool.
Some implications of a systemic view of education and learning

A shift from:

- fixed knowledge towards recognising uncertainty and ‘other ways of knowing’
- decontextualised and abstract knowledge towards applied and local knowledge
- emphasis on cognitive experience towards valuing affective, inspirational, intuitive and practical knowing
- valuing intellect towards also valuing intuition
- information and data towards deeper knowledge and wisdom
- curriculum control towards curriculum subsidiarity and negotiation
- teaching towards learning
- content toward process
- restricted learning styles towards multiple learning styles
- passive instruction towards participating and critical enquiry
- uncritical learning towards reflexive learning
- selection and exclusion towards social inclusion
- formal education towards learning for life
- specialists towards generalists in teachers and learners
- individualism towards organizational, community and social learning
- institutional isolation towards social and community engagement
- single and separate disciplines towards more inter-and transdisciplinarity
- instrumental values towards a new integrative sense of social/ecological ethics and responsibility
- competitive values towards cooperative values
- placelessness towards celebration of place
- valuing ‘knowing’ towards valuing ‘being’

Figure 6. Some Implications of A Systemic View of Education and Learning

These characteristics are suggested to use in analysis of the descriptive narrative to examine where on the spectrum the SA was in the pilot year of their design process with
respect to these indicators. Another aspect of the analysis is based on the short and long-term visions that were identified by the participants in the case study. Tables (see Appendix A and B) were created to synthesize the ethos of the pilot year with respect to short and long-term visions. The tables serve as a reflective tool as well as a set of indicators that were designed by the school that can be examined using Sterling’s broader understanding of a “whole systems shift” in education (Sterling, p. 269, 2003) as seen in Figure 7 below.

**Basic shifts in the four P’s**

**Paradigm:** instead of education reflecting a paradigm founded on a mechanistic root metaphor and embracing reductionism, positivism, and objectivism, *it begins* to reflect a paradigm founded on a living systems or ecological metaphor and view of the world, embracing holism, systemism and critical subjectivity. This gives rise to a change of ethos and purpose…

**Purpose:** instead of education being mostly or only as preparation for economic life, *it becomes:* a broader education for sustainable society/communities; sustainable economy; sustainable ecology. This expanded sense of purpose gives rise to a shift in policy…

**Policy:** instead of education being viewed solely in terms of product (courses/materials/qualifications/educated people) *it becomes:* much more seen as a process of developing potential and capacity through life, at individual and community levels through continuous learning. This connective view requires a change in methodology and practice…

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**Figure 7. Whole System Shift: Basic Shift in the Four P’s**
Source: Adapted from Sterling (2003)
Lastly, another component to the framework of analysis focuses on lasting change. Gillian Symons (as cited in Sterling, 2001) provides a framework of key success factors to sustain real lasting change within schools using sustainability education (see figure 8 below).
Over a period of several years, WWF-UK ran a programme called The Curriculum Management Award Scheme which sought to embed education for sustainability into the curriculum, ethos and management of a number of schools, through training, funding and action research. Although the scheme included very different kinds of schools, certain common factors emerged which contributed to the achievement of real change. In summary, these are:

**Raising staff awareness of sustainability issues**: The strands are often already there in ethos and curriculum but not made explicit. The key task is to help staff and pupils fit the pieces together in order to come to a greater understanding of the whole, and from that basis, take it further.

**Taking a whole school approach**: ESD must be built into policies and schemes of work if it is to go beyond being the personal interest of individual teachers and to survive staff changes. This can only happen with the active support of senior management.

**Involving pupils in decision-making processes**: There is a need to give pupils the tools needed to participate effectively in the processes of decision-making (individual and collective) and these skills need to be practiced like any others. Schools where pupils feel valued and listened to report an improved ethos which enhances learning.

**Increasing involvement with the broader community**: ESD needs to relate to real situations, local and global. Schools have found a process of opening up to the community very rewarding – providing expertise, understanding and goodwill. Young people can gain confidence and a belief that they can make a difference, and their efforts can stimulate action by parents and the broader community.

**Taking one step at a time**: Any meaningful whole school initiative is a long term process. Even in schools where staff and governors are fully committed to introducing ESD, small measurable steps which are monitored and evaluated before moving to the next stage have far more chance of succeeding. It may start with a small nucleus of people, which can slowly begin to influence a group or department.

Gillian Symons, WWF-UK consultant

Figure 8. Sustaining Change in Schools-Five Key Success Factors
Source: Adapted from Sterling (2001)
Without lasting change then there is nothing sustainable about sustainability education. The pilot year of the SA was intense with worry, concern and hope for sustaining itself as both a neighborhood school and a sustainability magnet school. The factors in Figure 8 are a continuum, illuminating the journey or process rather than indicating a pass or fail along the way. There is also a need to grieve the ‘death’ of the formal public education paradigm. This is a critical element to the area of sustainability education research so that ‘meaning-making’ (Gillies, Neimeyer, & Milman, 2014) along the journey is possible. Meaning-making is a way for individuals in the current global, social and environmental crisis to “retain, revise, or replace elements of their orienting system to develop more nuanced, complex and useful systems” (Gillies et. al., 2014, p. 209). Sterling (2003) noted that out of what is transmissive, we are able to find what is transformative. It is necessary to grieve the ‘old paradigm’ in order to embrace the ‘new paradigm’ that we are being required and inspired to embark upon. Part of this grieving process is to understand what it is that we are letting go of and what we are moving toward. This research is only one aspect of an evolving field of sustainability education because of its vehicular nature (While et. al., 2004) and because of a prerequisite for continuous learning (Orr, 1994). This research is confined to the pilot year of the SA and is not longitudinal as a document, but provides the tools for a continued longitudinal and/or a reflective study of the SA. There are sure to be limitations to the indicators and frameworks chosen in this research. Meadows (1998) reminds us that, “there is no shame in having a wrong model or a misleading indicator, only in clinging to it in the face of contradictory evidence” (p. 10). This research is meant to be a contribution to a
constantly moving tide, in which what is useful should be picked up and integrated into newer models and frameworks for a more holistic sense of sustainability education and evaluation. Meadows (1998) wisely provisions that, “when a system is extremely complex, it takes trial, error, and learning to produce a serviceable set of indicators” (p.10). That the research on sustainability education and the practice of sustainability education can absorb the meaning of Meadows’s (1998) words is paramount to the success of sustainability, or the many successes that will lead to an eventual social paradigm shift.

2.2. Research Design

This is a qualitative embedded, descriptive, single case study (Merriam, 1998) of the pilot year of a sustainability magnet themed elementary school, The Sustainability Academy (SA), in the Burlington School District of Burlington, Vermont. This case study aligns with Merriam’s (1988) approach to case studies in that an “intense, holistic description, and analysis of a phenomenon” (p.21) was performed. The ‘phenomenon’ in this case is the pilot year of the SA. However, the boundaries of the study are inclusive of the historical events, or ‘phenomenon’ (Merriam, 1998), that led to the SA becoming the first public elementary school to have sustainability as a magnet focus in the United States. There were no other considerations for a site selection as the SA was the focus of the research due to its unique characteristics (Merriam, 1998). The unit of analysis is at the organizational level, looking at the school as a unit of study with subunits grouped by operational dimensions of the school as a system. It is a descriptive study in that it “tells
it like it is” (Yin, 1994, p. 99) and originally ‘atheoretical” (Lijphart, 1971). Lijphart (1971) defines that descriptive case studies are “entirely descriptive and move in a theoretical vacuum; they are neither guided by established or hypothesized generalizations nor motivated by a desire to formulate general hypotheses” (p.691).

My research perspective is not unbiased, and therefore, the questions framed for interviews and the nature of the research is informed by some theories but not with the goal in mind of providing “judgment” to the extent an evaluative case study would (Guba and Lincoln, 1981). I have a great deal of knowledge about sustainability theory and literature. I have written about sustainability education (Lichau, 2007) and have worked as a professional in the field of sustainability education (Puccini, 2010). In other words, some high-level theory as a broad framework (Maxwell, 1996) did influence the research because of my background. Due to the interest in creating a solid picture of the design process of the SA in its first pilot year and how it came to be, the descriptive (Yin, 1994) aspect of the research was used to explore and identify the uniqueness of phenomenon that we would otherwise not have access to (Merriam, 1998). I did not intentionally use theory to pre-construct a framework for the research. Framework theories were inductively developed (Maxwell, 1996) in relation to the data that I collected and supported later by pre-existing theory. Therefore, the methodology for the case study is a mixture of existing and grounded theory (Glaser & Strauss, 1967) and is idiographic (Gibbs, 2007) in nature. The research is “holistic” (Yin, 1994, p.39) at times, and is “embedded” (Yin, 1994) due to the final framework built to analyze and group data for
coding and final interpretations and because it builds into a multi-framework evaluation process.

After approval from the Internal Review Board, in 2009, a proposal of this case study was presented to the superintendent of the Burlington School District as well as the SA principal, the Sustainability Director at the SA and the SA’s key community partner, Shelburne Farms. A letter was written to the staff of the SA to introduce myself as a researcher and to familiarize them with the goals and purpose of the case study being conducted. A letter was provided to all participants explaining the research process, their participation, and permission for them to withdraw and retract any materials at any time throughout the study or during data analysis. Anonymity was assured in writing to each participant and they were notified that their contributions would be stored on a password protected database. Anything used in final documents that was associated with their name as a direct quote or pertained specifically to their role or position would be cleared through them prior to any distribution or printing.

2.3. Data Collection Methods

On-site, open-ended (Yin, 1994) interviews were conducted initially with the Burlington School District Superintendent who acted in part as both an interview participant and informant (Yin, 2004) to provide an initial list of key individuals and community partners who were instrumental in the development and implementation of the pilot year at the Sustainability Academy (SA). Each interview was used as a form of snowball sampling (Morgan, 2008) in order to corroborate other informant information as
well as find additional individuals to interview that were relevant to the research. Primarily, individuals that were identified as key leaders or change agents were selected for interviews. Additional interviews were conducted with individuals that could contribute to rounding out themes that were emerging from the data or to provide insight on leadership actions and behavior in an attempt to triangulate the data more effectively. For example, an interview took place with a prior member of the school board who was opposed to the sustainability theme for the magnet school. The interview was conducted to provide a different perspective of the events that took place and to identify potential barriers from community members that the SA is challenged with. All interview sampling was purposeful sampling (Patton, 1990) and all interviews were audio-recorded.

Recordings were listened to before each preceding interview in order to begin to find patterns or themes relevant to the research. The purpose of the first listening of the interviews was to identify “bigger picture” (Gibbs, 2007, p.11) pieces that could generate a broad understanding of the design process according to the participants. Other forms of data triangulation (Denzin, 1970) were achieved through participant observation, descriptive field notes, direct observations, archival documents, and physical artifacts (Yin, 1994). Data was initially inductively organized and coded in the following manner:

- **Historical**—Burlington School District Archives, semi-structured interviews, reports, evaluations, demographic reports,
- **Leadership**—collected from semi-structured audio recorded interviews, field notes, meeting notes, observations, agendas, leader produced documents and materials, professional development materials,
• Physical Grounds—still photographs, semi-structured interviews, blue-print copies, internet documents, menus, cafeteria visits,

• Curriculum—curriculum maps, semi-structured interviews, student work observations, curriculum writing group observations, documents

• Financial—proposals, budget reports, semi-structured interviews, field notes

• Partnership/Community Resources—semi-structured interviews, field-notes, observations, volunteer logs,

• Parent Engagement—PTO meeting minutes, field-notes, semi-structured interviews, observations,

• Short and Long Term visions—semi-structured interviews and documents containing missions and visions for the school.

• Management/Governance—semi-structured interviews, school documents, field notes, observations, meeting minutes, proposals.

2.4. Coding and Analysis

Data collection took place from September 2009 to May 2010. This followed the entire first pilot year of the Sustainability Academy (SA). Data was collected during school hours for specific school activities, after school hours during faculty meetings, PTO meetings and community events, away from campus during professional development workshops, district meetings and planning meetings. Interviews were re-played before each new interview in order to identify themes emerging that could be built upon. These themes or nine original dimensions (historical, leadership, physical grounds,
curriculum, partnership/community resources, financial, parent engagement, short and long term visions, and management/governance) were the first layer of coding that took place with the data. These nine dimensions were derived “inductively from the data” and were designed specifically so that “each element in turn has a causal influence on the next” (Gibbs, 2007, p.87). Additional materials from observation, descriptive field notes, direct observations, archival documents, and physical artifacts were placed within the nine dimensions. I then transcribed each of the 23 interviews using Microsoft Word and played back the interviews to transcribe specific phrases and comments that fit within the eight working dimensions. The transcriptions were typed to accurately reflect what was stated in the recorded audio interview. Random selection of six of the interviews were given to a friend who had worked as a transcriptionist and was asked to provide a transcription of the interviews using the eight dimensions identified from the data for cross comparison of my own transcriptions. These transcriptions were printed out with a general name such as ‘teacher’ or ‘maintenance crew’ or ‘food service worker’ to protect anonymity. Once all the research was completed and the initial nine dimensions were created, the literature on sustainability education provided supplementary frameworks for analysis.

The nine original dimensions were then recoded using Sterling’s (2003) Seven Operational Dimensions of a school (see Figure 9 below).
Figure 9. Seven Operational Dimensions of an Educational Institution
Source: Adapted from Sterling (2003)

This diagram of school operations is particularly valuable to this research because it shows the interconnectedness of the paths between each operational node. This allows the pathways between the nodes of school operations to be examined in relation to their influence on one another and acknowledge the interdependent relationship between each dimension so that they are not seen as separate or parts, rather than a whole. Each node of operation or dimension frames the descriptive narrative from the pre-categorized data that fell within the original eight dimensions. Sterling’s (2003) operations were adapted to add an eighth overarching dimension of this research: the historical component (see Figure 10 below). Sterling does not cover historical context in his research. Historical context with respect to the SA is a learning opportunity for the SA as well as other public schools that are interested in sustainability as a magnet theme. Differing greatly from a
charter school model which gets to build a school based on a particular vision and hires a staff and chooses a student body to carry out that vision, the SA is attempting to retrofit from a predefined structure that Sterling (2003) and others (Orr, 1994; Jensen, 2004) have identified as the antithesis of sustainability. Using just the seven dimensions of Sterling (2003) without a historical context of how the SA evolved, truncates the analysis, barring critical information of why particular aspects were decided or chosen or what barriers impacted final decisions at the time. The historical dimension is included within the boundary of the case study (Merriam, 1998) and heavily impacted the other seven dimensions of school operations. The research remains within the context of a nested system (Sterling, 2003) so that the causation is not seen as linear but interconnected as well as embedded. Meaning that history is not just history, it is part of what is and what becomes.
The framework in Figure 10 is the foundation for the descriptive narrative of the case study, which is Phase I of the suggested evaluative framework for analysis of a school in relation to sustainability. One other aspect of Phase I analysis mentioned before is that of the short and long-term visions of the SA. Although this can be grouped under the ‘ethos’ dimension of the SA, there was an interesting theme that was revealed when playing back the recordings before each subsequent interview that made them stand out from the rest of the data. Although elements of these short and long-term visions eventually fell within the descriptive analysis of the case study under the ‘ethos’ dimension, the interviewee responses to the questions “what, if any, are the short-term visions, being 2-5 years and the long-term visions, being 5-10 years that you envision for the SA with respect to how
you see sustainability at the school” were separated from the text of the interview transcription and placed at the top of each transcription document. They were later cut off of the document and then organized in terms of likeness. A third-party person was asked to group them according to how they felt they aligned with one another and then this person was asked to synthesize the aligned categories into one vision. These visions were then placed into short-term vision and long-term vision tables in rows and the seven dimensions of the SA were placed in columns to form a matrix (see Appendix A and B). The purpose of this was to create a template with which the short and long-term visions could be numerically weighted across the seven dimensions so that the SA would be able to: 1) understand which dimensions were directly influenced by these visions and what role the dimensions have toward achieving or prohibiting these visions; 2) be able to understand which transmissive processes vs. transformative processes (Sterling, 2003) would need to be shifted in order to accommodate the visions; and 3) be able to reflect on the visions and determine as a group which visions the SA was interested in pursuing.

This next chapter is the descriptive narrative of the design process of the pilot year of the Sustainability Academy (SA) in Burlington, Vermont. It is divided into eight main dimensions using Sterling’s (2003) interrelated framework for school operations. These seven operations are embedded within the outer dimension of SA history to frame the operations of the school (refer to Figure 10). The case study narrative is nested and supported by the theoretical frameworks of school transformation (Maehr & Midgley, 1996); Sterling’s (2003) framework for “whole systems change”; and Higgs and McMillan’s (2003) modeling of sustainability within school cultures. This lays the
foundation for exploring the evaluative frameworks discussed in the literature review to develop a suggested step-by-step process for further evaluation by the SA community or another school interested in this research. The next section reads as a story as well as a descriptive account of the events dating back to 2005 that led up to the pilot year of the SA as well as what occurred over the course of the 2009-2010 school year.
CHAPTER 3: THE SUSTAINABILITY ACADEMY

3.1. Historical Overview

3.1.1. Lawrence Barnes Elementary School

The story of how Lawrence Barnes Academy (LB) became the Sustainability Academy (SA), the first sustainability themed magnet school in the United States, is multifaceted. From the physical building to the leadership and community involved, the diversity issues it has faced, to its unique location within historical downtown Burlington, Lawrence Barnes is much more extraordinary than it seems from the outside.

The school building sits on a busy road on the south end of what is called the “Old North End” (ONE) of Burlington City, Vermont. In 2009 it had a small field on one side where little league baseball games were played and children chased after the neighbor’s chickens that flew over the fence. There was a small school garden made out of river rock raised beds the prior year that had been recently vandalized with new signs asking for people to respect the garden. The oval shaped beds overlooked painted support pillars of a multicultural community with the words of “embracing diversity” spread across the top. There was a small asphalt playground around the side of the building where children were playing basketball and chasing one another. In 2009, there was a buzz of commotion and energy in the school that spread out through its doors and onto the busy street in the ONE with cars and trucks whizzing by the front of the school, seemingly oblivious to the school crossing signs and the other student made signs asking drivers to slow down. Surrounding the school were small businesses and houses that were
either completely neglected or colorfully painted with bare patches of lawn or wild and diverse gardens framing old Victorian style houses.

The ONE is a historical part of downtown Burlington that houses some of the most socioeconomically challenged households in Burlington as well as a swelling refugee population intermingled with blue collar and middle class families. In 2011, the ONE was recognized as the most racially diverse place in the state of Vermont (Baird, 2011). In addition to racial diversity, the ONE has a vibrant and engaged community, actively participating in local politics and education. Many community members were union members, campaign organizers, university employees, farmers, small business owners, and members of the school board. After learning about the various skills, experience, and abilities the ONE community sustained, it was not a surprise that the community had managed to keep Lawrence Barnes open for over a decade, despite the various efforts by the district to close the school. One involved parent reflected on how difficult it became for LB in the late 1990’s when the district created a dovetail program that allowed parents who had a higher incomes to take their students out of LB and place them in a “sister” school, which only increased the level of poverty at LB and decreased student diversity and school resources. In addition to a declining enrollment due to the dovetail program from the district, there was also a bubble in student population that artificially made it seem that the student population was too low to sustain a sufficient enrollment at the school. Each year that LB was slated to close the parents would rally, pointing out how enrollment was increasing every year as the student demographics in the neighborhood shifted (there was a lag of small children in the ONE until more middle
class families began to move into the ONE as it became revitalized and refugee populations in the ONE increased). The community of LB would provide evidence of how they found diverse and creative ways to reach a student population that no one else wanted and was considered “failing” from the perspective of those who had little idea as to how much progress was really being made.

3.1.2. Keeping Lawrence Barnes Open

Keeping Lawrence Barnes open from the districts perspective was not economically viable. The Burlington School District (BSD) had already closed 6 neighborhood schools in the past 13 years. BSD was just one of many districts across the country following a trend in education that began in the 80’s and 90’s to close small neighborhood schools and consolidate students in larger buildings to handle major budget cuts (Berger, 1983; Dean, 1983). The dissonance between the community and the district was also not unique to BSD. According to Berger (1983), it is often difficult for districts to close schools for fear of community outrage and dissention. It was easy to understand, when interviewing parents who had been active in keeping LB open for years, why the district had not managed to make it happen. In a population of less than 40,000 people, it was hard to ignore a galvanized community effort as strongly oiled as the one in the ONE. The main driver for the community was that they felt their efforts to revitalize their neighborhood and provide for the local population would diminish if the school closed. This is a common fear among neighborhood residents facing the decline of neighborhood schools (Dean, 1983).
3.1.2.1. Burlington School District Evolution

In 2005, 19% of LB’s students were English as Second Language (ESL) students, while the rest of the district was only around 14% (BSDR, 2003). Special needs in the school were nearly 5% higher at LB than in the other schools in the district and 100% of the students qualified for free and reduced lunch compared to the 49% average across the rest of the district (BSD, 2003). Lawrence Barnes Academy (LB) was failing under the No Child Left Behind Act (NCLB) due to low achievement on the New England Common Assessment Program (NECAP) scores. NECAP scores are standardized tests administered annually in mathematics, reading, writing, and the sciences as a result of NCLB. In addition to unsatisfactory test scores, enrollment had decreased at LB and the costs of facilities due to an outdated heating system and lack of insulation were excessive.

The superintendent at the time, Lyman A., who had proposed to close LB in 2005, stepped down from his position prematurely and in January of 2006, passed what the new superintendent would consider “the gauntlet”, on to his predecessor, Jeannie C. The community support to keep the school open did not waiver and it placed the new superintendent into a situation that required a lot of thought and what would become years of research and planning.

There was one main aspect of the challenges of the BSD that community members and the district agreed upon that the superintendent summarized: “there should not be poor schools and rich schools in a city so small. There is just no excuse for it.” The challenge was not just an issue of whether or not LB would close; it was a social injustice.
that scarred the district as a whole. Many of the participants, although some more reticent toward her leadership than others, felt that Jeannie C. brought something unique in the leadership at the district level and did not feel that the changes made would have ever been accomplished without her vision and guidance. What was it that made her particular leadership and insight so valuable? Partly, it was due to her experience within the district and partly it was due to her own personal goals and beliefs for education, neither of which followed a traditional administrator’s track.

Being the former special education director in the Burlington School District (BSD) and a developer of three alternative programs in education, the newly appointed superintendent had a perspective that not many administrators in her shoes would. First of all, she had at least 20 years of prior experience and knowledge of the district, which meant she had been involved in the issues that the district had faced over time. Knowing the history of the district allowed her to fill the position with deep understanding of the challenges that were being placed in her hands, as well as, being able to integrate the knowledge she had gained. When Jeannie C. had first arrived in Burlington, the district had 200 ESL students, whereas in 2009 the district had more than 500 and the number was on the rise. In her own words, she took the job as superintendent particularly to, “fight for the underdog” and knew that by taking the job she would not be able to ignore the issues that needed to be addressed, “the way a person coming from outside of the district might be able to”. According to Jeannie C., the prior superintendent had begun to, “ask the tough and provocative questions” on his way out in order to force the community and the school board to begin to tackle the issues that were impacting student
achievement throughout the district. Although she felt, “it would have been very easy to drop the ball”, Jeannie C. tried to address “the gauntlet” directly because she truly envisioned a district, “where 21st Century Learning was taking place”. According to Jeannie C., that vision of 21st Century Learning meant, “critical thinking skills, collaboration, place based education, student driven instruction”. Through a lot of research and involvement in various programs related to socioeconomic barriers to educational goals, the superintendent felt that socioeconomic integration was one of the potential pathways in her district to close some of the achievement gaps among students.

The first hearing the newly appointed superintendent participated in earl in 2006 was what she called a ‘Don’t Close Barnes Hearing’. The easiest solution for any new superintendent facing major budget discrepancies would have been to close Barnes as well as H.O. Wheeler, another ‘failing’ school in the ONE, and consolidate students. Easy that is, if the community had not become a well-oiled campaigning machine.

According to Jeannie C., “the community was very opposed and begin to publicly press the issue…even the mayor of Burlington at the time, Bob Kiss, protested outside the school’s front door to bring press attention to the issue”. A neighborhood parent whose child attended a different elementary school became heavily involved in saving LB because she felt that, “Lawrence Barnes was making tremendous headway in its programs and its initiatives…to banish a school that was on the threshold of transforming seemed more harmful to the students and the community as a whole…why take something out that was clearly providing value?” Another parent remarked in memory of the events: “the decision was based on the district needing to save money, it had nothing
to do with education. Why close an improving school to save money because the building was too expensive to maintain, why not come up with an alternative. That is why this community fought hard and would not give up, because we believe education should come first’’.

The community continued to put pressure on the superintendent to dig deeper and offer an alternative solution. For the district, the solution needed to be district wide, not just addressing whether or not LB would close. Shortly after the hearing, the district asked the board to approve of a task force committee to research the issues related to students of poverty, achievement and inequality within the BSD. The task force was a composite of extremely diverse community members (parents, educators, ex-school board members) who were charged to come up with a set of recommendations based on their findings. In 2006, the task force committee submitted a full report to the school board of its findings and recommendations. In late 2006 the task force unanimously decided that the way to address poverty inequalities in the school district was through socioeconomic integration (Task Force Findings, 2006). The task force defined socioeconomic integration as: every school in the district has an equal share of both the city’s rich cultural resources and its challenges (Task Force Finding, 2006). This can be accomplished by equalizing the percentages of students qualifying for free and reduced lunch at all schools to within 5% of the district average (47%) (Task Force Findings, 2006).
3.1.2.2. Creating A Magnet School

The creation of magnet schools was one of the six main recommendations of how to achieve socioeconomic integration within BSD (Task Force 2006 Findings). Some of the recommendations, such as redistricting areas by drawing lines down the middle of streets to delineate socioeconomic status were highly opposed. Magnet schools were one of the recommendations that would eventually take hold. At the time, it was not even decided that LB would remain open, but the idea of magnet schools that could achieve socioeconomic integration eventually led to the decision to keep LB open. The sole purpose or goal for the magnet school would be to achieve socioeconomic integration as defined by the Task Force Committee. The first step was gaining support from the school board.

3.1.2.2.1. District and Community Influence

The school board was composed of 14 community members with diverse backgrounds ranging from stay-at-home moms to scientists, academics and blue-collar workers. Non-board members that were interviewed reflected that the board provided a major advantage for BSD because it offered multiple perspectives and a lot of diversity to enrich the decision making process. The district felt that there was a wealth of “good thinkers”, who were utilized for their invaluable input, and thus, the process felt natural, and according to one district member, “the next steps would just fall into place.” However, other interviews revealed that some of the board members felt there were a number of issues that had been glossed over because the district had already made up its
mind and simply created the answers that were needed to move ahead with what one ex-
board member called, “their plan”.

There was not 100% comfort level at the board level for moving forward with a
magnet school or with the socioeconomic integration research. Two board members felt
that the task force findings were not accurate and did not accurately reflect the
populations they were trying to address, using research and data that applied to
demographics dissimilar to that of BSD. Some felt that the sample sizes that were
researched were not significant enough to extrapolate to the rest of the district. Other
board members felt that socioeconomic integration was a clear route to take and felt that
the research was solid. In addition, the metrics were problematic. The very definition
around socioeconomics was limited because it did not distinguish between generational
poverty, refugee poverty, or highly educated poverty as a life choice, which meant
different things in relation to student achievement and inequality. One ex-board member
stated: “the main issue is that there is such a high population of refugee students who
have never held a pencil in their life before coming in and being expected to pass a math
test right away”. Another issue that was felt to have been ignored by the board was the
relationship between parent participation and student achievement, and one ex-board
member commented that more concentrated support was needed in parent engagement
rather than creating a magnet school. Another ex-board member said that it would not
make a difference to a child who had no idea how to read English if he were sitting next
to “someone from the rich side of town…it’s not going to get him to pass his test when he
doesn’t know what the hell he is looking at!” Some board members wanted to provide
more concentrated services to the children in need, while the superintendent said that she had seen these types of concentrated services fail the targeted population and needed to see something different happen. Before socioeconomic integration had been placed on the table, the principal at LB, Paula B., had come up with some school based indicators which were showing that the students were making significant progress despite their failing NECAP scores. The indicators were specific to the issue of language barriers which prohibited students from a fair chance at passing standardized tests which students are required to take regardless of when they matriculate in the school or what their aptitude for English is. One board member said that more effort should have been placed in researching and creating data around the “real progress being made at Barnes” rather than turning toward a new plan altogether. There were reported issues with the market research survey, describing it as leading and therefore unbiased process that, according to one ex-board member, “asked parents to define the type of school they would want to send their kid to and then at the end of the survey asked ‘would you send your kid to this school?’…of course you would…if that is not a leading question I don’t know what is”. Other interviews of parents and community members working with the district at the time reported that the survey was really thought out and that the district was reaching out to the community to get a sense of what they wanted. Despite the perception by a few parents and ex-board members that the district knew what the plan was, and simply created the conditions to move forward with it, the district did not feel they had a detailed map of where things should be at all. The superintendent described her process as: “I had a vision of the future with the next steps not yet determined”. Jeannie C. said that being
in “the process of the moment”, although unintentional and a little scary at times, worked in everyone’s favor. According to her, not having a map allowed the community to be able to participate in its design, which encouraged the community’s ongoing input and support.

The conversation had become so stale around the tension of closing or not closing LB that the superintendent felt she had to attempt to find a way to move the conversation forward. When the superintendent attended a PTO meeting at LB to address the issue without any kind of ‘map’ for moving forward, she said that she felt, “very nervous walking into the room because she had no idea how the participants would react and whether or not she would be driven out of town”. When she walked in she started by saying, “I really need your help here. I would really like to hear what your vision of Barnes is going to be”. At that time the community had fractioned off into sub-groups. Some groups were creating heavier contention and volatility with the district due to the redistricting proposal. Members of the community were attending meetings with antibusing slogans and when the district began constructing the meetings in a way that did not allow attendants to openly air their feelings, the tension increased. Other groups wanted to be able to do research and provide the district with solutions that were feasible in relation to the task force recommendations. As a response to the superintendent’s question, one community group drafted a comprehensive plan, called the Unity Plan in which they felt that socioeconomic integration could be achieved within their neighborhood; did not require children to be bused out of the district; and allowed Lawrence Barnes to remain open.
The Unity Plan proposed Lawrence Barnes and the other failing school in the ONE, Wheeler Barnes, to become magnet schools, in which Lawrence Barnes would be a sustainability magnet theme. The theme was chosen based on the already present focus of sustainability in the school that had been taking place and had been part of the improvements of student achievement. The parents and community of LB went out and petitioned for parental and community support, not just within ONE but also across the district. The Unity Plan also included research on magnet schools and the benefits it would have for the district. Concomitantly the superintendent had also invited Shelburne Farms, a long-time community partner responsible for the sustainability work within LB, to draft a proposal for a sustainability magnet school. With Shelburne Farms firmly in support and providing a realistic process to make a magnet school happen at LB, it made it difficult for the school board to oppose the plan.

Gradually, about a year after the proposal was submitted, the board backed the decision to keep LB open and rename it the Sustainability Academy. There were many other potential magnet foci that many board members were more in favor of, such as a baccalaureate program. According to a few ex-board members it was only due to the history and presence of Shelburne Farms within LB that created staying power for a sustainability focus. Lawrence Barnes would not be the Sustainability Academy without the leadership, support and historical connection with Shelburne Farms as a community partner.
3.1.2.2. Key Leadership Influence

Shelburne Farms is both a physical and pedagogical center for education. With over 1400 acres of farm land and many buildings and facilities, Shelburne Farms has not only been a physical pillar of community gatherings, employment, programs and education, it has provided over 40 years of educational opportunities to understand the human connection and link to the land (Shelburne Farms, 2014). Its non-profit mission is to “educate for a sustainable future” (Shelburne Farms, 2014). Shelburne Farms had started working with BSD in the 1970’s. At first, Shelburne Farms provided some ad-hoc project based seasonal activities for classrooms. The activities began to have a positive impact on student learning, creating a need for Shelburne Farms to increase their programs. In 2001, a grant was written by Shelburne Farms to pilot a Sustainable Schools Project (SSP). Shelburne Farm’s Sustainable Schools Project “is a dynamic model for school improvement and civic engagement designed to help schools use sustainability as an integrating context for curriculum, community partnerships, and campus practices.” (Shelburne Farms SSP, 2014).

The grant, funded by the Bay and Paul Foundation, came out of a professional development program called “Making Connections”. The grant provided funds for Shelburne Farms to implement SSP within one public school in BSD and a rural school. The criteria for selecting the schools were based on supportive leadership within prospective schools. The first school that was chosen was Champlain Elementary School, another elementary school in the BSD. Shelburne Farms was having a hard time choosing a rural school, and instead, in 2003, began to work more closely with Lawrence Barnes
because of individual teacher interest in the SSP and Shelburne Farm’s interest in working district wide. When SF started working with LB, the school did not match their criteria. LB was unable to offer any dedicated days to professional development. Under the NCLB, LB had just received federal grant money to boost reading curriculum and all the professional development time was allotted toward fulfilling the criteria of NCLB. SF had the principal’s (Paula B.) interest and support, but she could not mandate anything or make it a part of the teachers contracted day. Initially, Shelburne Farms had to tweak and adapt their own model to meet the needs of LB. Rather than the required contracted service learning time for professional development, Shelburne Farms ran an afterschool series for teachers which was voluntary. In addition, Shelburne Farms provided free summer workshops. Roughly three quarters of the staff attended the workshops and Shelburne Farms felt that through the years they were slowly watching the school adopt a culture with sustainability and education in mind. Therefore, much of the work toward the LB culture being a sustainability school had been implemented before the official pilot year of the Sustainability Academy in 2009.

When LB was slated to close in 2005, Shelburne Farms really felt that the unifying question in everyone’s mind was, “what’s best for all our students”, not only in relation to socioeconomic integration but also being interested in “what were the other problems that needed to be addressed?” In addition to their work in BSD schools and the data they had collected on their programs, Shelburne Farms involvement in the development of Vermont’s “Guide to Education for Sustainability Standards” (SSP, 2011) and national partnership work on sustainability education also bolstered their
credibility, making it much easier for their proposal to be taken seriously by the district. In addition, Shelburne Farms said that once Jeannie C. was appointed as superintendent the “door was opened… the way that she solved problems was really collaborative and open, she turned questions back to the community and community partnerships. She has never put herself in a position where she is inappropriately making decisions for everyone. I felt that prior district leadership was closed and was not an advocate…”

In order to submit a proposal to the district in 2007, Shelburne Farms worked with both the school board and the community to see what a sustainability magnet theme could look like. The proposal was primarily based on what Shelburne Farms had accomplished with their SSP projects but with more “whole school culture” emphasis. In addition to the success of the SSP work, Shelburne Farms had also been collecting quantitative (student surveys) and qualitative data (teacher and principle interviews) that was guiding their programs toward what they said, “has staying power”. Their research found that curriculum development, capacity building around curriculum, content building capacity, and work with families were the most effective areas of focus (Shelburne Farms, 2007). Shelburne Farms also invited the superintendent to attend a workshop with the Society for Organizational Learning (SoL)—a group that includes systems thinker and author Peter Senge. SoL is dedicated to providing a forum to advance institutional and individual learning from a systems perspective. Shelburne Farms said they “were trying to sell the idea [magnet school for sustainability] to the district, that it was something we could do and what we could support and would attract parents from a higher socioeconomic background”. They said the superintendent was in full support of the idea
of sustainability but needed to be given a clear picture on how it could look and how it would achieve socioeconomic integration. Shelburne Farms said that Jeannie C.’s leadership was essential in providing an “open door” for their organization to walk through with the district, making it feasible for a sustainability magnet school to be a realistic direction, not only LB, but for the entire district. Shelburne Farms was excited when the school board finally approved the proposal because it meant they could deepen their work by taking what they said was a “school-wide approach” rather than being an “option” that teachers could choose from. In August of 2008, Shelburne Farms began working with Paula B., the principal at the time, and the school to provide professional development and help teachers understand what was being asked of them. This would be the first time after years of work with LB that Shelburne Farms would be able to administer professional development within teacher-contracted hours. With it being one of the two very first magnet schools in the state of Vermont, the district and LB relied heavily on Shelburne Farms to provide the knowledge about magnet schools and how school operations would need to shift. According to Shelburne Farms, in 2009, the district did not have any expertise and knowledge about magnet schools so they were really taking direction from Shelburne Farms on how to transform Lawrence Barnes into the Sustainability Academy.

3.1.2.2.3. Financial Influences

There was a lot of concern throughout the district about the allocation of school funds and how the magnet schools would siphon funds from other school programs. However, the district was determined to ensure local funding was allocated as it had been
originally intended across BSD. Shelburne Farms provided some of the initial funding to sustain professional development and to create a “coaching” position to staff one of their employees within the school. In addition, in 2008 the BSD incorporated raising grant money for the magnets as part of the district wide strategic plan. The district also conducted a needs assessment from a facilities perspective of what it was going to cost to get all the BSD facilities up to 21st century standards and efficiency. LB was the most inefficient building in the district. The cost of updates, repairs and renovations for the entire district was upwards of 200 million dollars. This budget was intended to remain a part of the long term strategic plan of the district, but due to the staggering costs of the improvements, the property services director worked with his staff to come up with phases of improvements that would be more palatable to tax payers. The district paired facility improvement costs down to 90 million and then wound up asking taxpayers for 9.7 million with a goal to pass another bond in the future and distribute the funds across 3 schools, LB being one of the recipients. The focus for the immediate future improvements relate directly to safety, energy, and making necessary renovations to meet the requirements of the American Disability Act (ADA). The decision to create a strategic plan for facilities was not a result of LB transforming into a sustainability magnet theme. It had been a part of the overall vision of the district toward 21st century building practices. LB just happened to be one of the most inefficient and costly buildings in the district, which meant LB facilities would be among the first wave of buildings to be worked on.
The school building of LB was built in 1956. It still had the original boilers and many of the same materials in 2009. The windows were a thin plexi-glass and the heating was steam-based which was not easy to control. The cost of heating LB was $48,000 a year for a 29,000 square foot building. This is compared to a 62,000 square foot school within the BSD that was built almost a decade later that cost less than half the amount to heat.

In addition to the cost of addressing the facilities critical needs in terms of energy, the kitchen at Barnes was non-functional. The district secured a grant to upgrade and renovate the kitchen so that it could be more functional. BSD is unique in how it is dealing with the challenges of receiving restrictive federal funds for food programs while having the interest and goal of providing local and organically grown nutritious meals to its students. Primarily it comes down to a vision that has now been turned into a methodical and tightly operating system. Doug D., the director of Food Service for BSD in 2009, had championed a change in the food system for the district. Doug D.’s simple vision that, “food can be seen as a gateway to local economic health that creates a positive feedback loop” was gaining national attention at the USDA in 2010. The financial burden was placed upon the shoulders of the food department alone; neither the district nor federal funds would be able to displace costs. Using that as a framework, the food service department began one step at a time to make a local and organic based food program profitable for BSD. By linking together with community partners to form the Burlington Food Council, USDA grants were procured to provide funding for equipment and training for the staff. Most costs went into updating facilities to deal with whole
foods and the training went towards providing knowledge on how to process whole foods, which is not a typical process in school food service programs. In addition, new foods were tested on children in focus groups to see what children would be willing to adapt into their diets more readily. The food program was something that was built step-by-step and a process that the director felt “if my program returns to the community in an amount that is equal to what the community gives to me, then I am sustainable.” The approach was to transform the system that already existed slowly enough that there was never any blowback with a long-term vision of what could be achieved in mind. The day-to-day changes could be as minimal as replacing french fries on the menu with local and organic roasted potatoes that would eventually replace french fries more than 40% of the time. The goal of the food service director was that a system would be in place in which the process and program for food cultivation was clear: “If I got hit by a bus tomorrow, someone can step in and keep the ball running because we have created a system that does not rely on me to run it, it would not work any other way.” With respect to the impact on the food system at the new Sustainability Academy, it also came down to a financial need. As long as funds were procured the kitchen could be updated so that meals could be prepared to some degree in the kitchen. There had been complaints about the food provided for students at LB because most children attending the school were relying on what was being provided for the majority of their daily nutrition. Free and reduced lunch numbers were nearly 100%. However, BSD food service was still attempting to break free of a long time federally mandated lunch menu and slowly rotate out certain unhealthy foods for something that was more nutritionally valuable. For
example, typical on any public school cafeteria menu is pizza day. BSD food service program partnered with a local pizza provider so that the pizza would be made of local and mostly organic ingredients. Federal funding accounts for about $85,000 of the food budget for BSD and is heavily restricted on how it can be used to purchase food, and from which particular distributors. This severely limits BSD’s ability to fuel local farms and receive local and organic produce. However, food policy at the time was slowly shifting and the USDA was taking interest in BSD’s approach to school food programs as a national model. At the time Vermont was also gaining what Doug D. considered a “congressional leg” on food systems with new politicians from Vermont in congress vying for a change. Although BSD was facing changes in federal funding and a huge economic slump, there was still a general level of optimism for building a transformative food program. For example, the director of food services stated that “Burlington is ripe for helping out and doing the work. I think the poor economy helps our food program…all of our programs…because we are forced to look toward our ability to help one another and not rely on something or someone from the outside to save us. That is more sustainable over the long-term.”

BSD, like other US public school districts, relies on: 1) local funding—a mixture of tax payers and state education funds 85% of the district’s needs; 2) state funding—which had been frozen in prior years across Vermont by Governor Douglas in order to provide equalized per pupil spending, had left BSD with a deficit in 2009; and 3) federal funding—which had changed significantly due to the NCLBA in 2005. Federal funding was the most unpredictable at the time of the study. Schools could still receive grants for
instructional improvement and professional development, but it was provided only for areas that were considered “failing”. Once a school was seen to be making improvements in the determined areas, the funding was reduced and then eventually cut. As an example of the impact directly on LB, as mentioned earlier, the school was awarded a reading first grant. However, due to the fact that they had been seeing improvement in their scores, they were on their last year of funding in 2009/2010. The faculty had been using that funding to support their curriculum development and it was unclear where additional funds would come from to continue to support that work for curriculum development for the magnet school moving forward. In addition, at the time the budget was strategized, prospects had looked good and then the housing market crashed, which resulted in only 3 of the 8 proposals for individual grants to be awarded to BSD.

Regardless of the unexpected financial hurdles, Lawrence Barnes (LB) officially opened in the fall of 2009 as the Sustainability Academy (SA). The ideas developed and goals created in the pilot year were like the roots of a seedling reaching into the soil; the type of root structure and soil composition would determine the health and vitality of the fruit that would come to bear over the next decade and beyond. The voices, participants, and ideas changed the culture of the school from a neighborhood school to a magnet school in order to achieve socioeconomic integration. Who stayed, how decisions were made, what resources were available and how the school was evaluated would guide how the school would grow and evolve. Pressure on the district was felt as it opened up the first two magnet schools in Vermont. The SA became a model and a learning laboratory for educators and administrators looking for alternative ways to keep smaller schools
vital in their communities rather than consolidating. The SA pilot year provides the opportunity to examine how to view a school process from a systems perspective and what insights that might have on what kind of learning organization it really is. The following sections dig deeply into the seven dimensions of the SA to provide a holistic picture of the pilot year and the design process that unfolded.

3.2. Pilot Year Design Process

Sterling (2003) provides seven dimensional operations of a school that are interrelated: 1) management style; 2) ethos; 3) physical structures; 4) resource management; 5) community links; 6) curriculum; and 7) pedagogy, research, learning, inquiry (p. 273). This section explores the design process of the first pilot year of the SA within each dimensional node. However, because of their interdependent relationship with one another, it is important to keep in mind that no one dimension is unaffected by another. The sections are to provide ease of understanding within each dimension in order to understand how they interrelate. Further analysis of these dimensions will be addressed later in the discussion section.

3.2.1. Management Styles

In the first pilot year, the SA had five core dimensions to their management style: 1) district level; 2) key partnership level; 3) principal level; 4) committee and staff level; and 5) parent level with student leadership being woven within dimensions 4 and 5.
3.2.1.1. District Level

There were two somewhat contrasting views of the district leadership depending on who was being asked. Leadership figures, other than the district, such as SF, said district level leadership was, “open and approachable”. According to a school coordinator, the superintendent of BSD was, “truly one of the best assets that the district has to make fundamental change in Burlington schools”. They saw that the district’s approach was inclusive, participatory and democratic. Faculty and parents who were more removed from direct access to speaking with district leadership, felt that the management style was non-inclusive and un-participatory. One teacher said she felt she was given the order “this is going to be a magnet school” and scrambled to try to figure out what that meant. Many parents and teachers also felt that their needs and concerns were not being heard or addressed at the district level. When the staff and parents were evaluated at the beginning and middle of the pilot program they expressed their concerns during their interviews and this information was not something that was synthesized at the district level or necessarily addressed.

The district provided a new position for an enrollment and application coordinator for the magnet schools (the SA and the H.O. Wheeler Academy of Arts). Later the coordinator came to realize that his job was not only in dealing with enrollment, but also to be a channel between the two magnet schools and the districts. He felt his job in the first pilot year was mostly to deal with district-wide concerns and misconceptions about the magnet schools. The district coordinator worked more as a liaison between interested parties and the district. He would provide district presence at the PTO and staff meetings.
as well as meeting between Shelburne Farms and the SA. Initially the coordinator role was part-time and originally was thought to be sufficient time to coordinate the application and enrollment for the entire district. He was frequently seen at the SA during meetings and discussions. About half way through the pilot year of the SA his presence became sparse. He had been hired on part-time exclusively to work with the other magnet school, H.O. Wheeler, which dramatically decreased his attendance at SA related matters. However, the coordinator felt he was still able to see what he called, “a systems picture of the magnet schools and the district”. There was a great need to change the enrollment process, not just for the two magnet schools, but also for the entire district. This was a step beyond anything the district had to deal with in terms of enrollment in the past.

Criteria were being created in the first pilot year to determine what kind of system was needed. The coordinator felt it was his job to create a process so that if he left his role it would be a seamless transfer to someone else. His main concern at the time was fighting for an enrollment process that displaced as few students as possible with the new magnet model and had this to say of displacement: “this is a social justice issue…this year we had to use public buses for kindergarteners and first grade students. This is not ideal and the district will never have the money to have their own buses. In addition to that we have kids that are high need and from low income areas that had teachers at the SA that could address their needs in a way that some of the others schools in the district who are not familiar with their needs. Racism is going on at schools in the district that is not addressed whereas at the SA it is addressed. These are issues that must be worked on.” The district did not feel that the coordinator role would be needed for more than a year to
help with the piloting of the magnets, but the coordinator felt the position was necessary
to deal with the social justice issues that became unintended consequences of the magnet
schools in order to provide a fair and transparent process.

At the time of the pilot year, in 2009, the district also began to develop stronger
criteria in their hiring processes to increase the level of diversity represented in jobs
across the district. The district also began to implement a district-wide parent engagement
policy that had not been fully executed at the time of the pilot program. Although it
appeared that the leadership of Jeannie C. was imperative in order for the momentum to
continue to move toward supporting and growing the magnet schools post pilot year, it
also appeared that the staff at the district level and the people being hired were passionate
about the direction. Therefore, many felt confident that BSD would be looking for a
subsequent superintendent who would continue to push those efforts in the event that
Jeannie C. would no longer be in a position to do so. The ability for the district to provide
different time blocks for classes, which the SA was requesting, or to provide different
contracting for teachers at the magnet schools was still up in the air, but it was a
consistent and sometimes heated part of the discussion. Contracts did not change in the
first year of the pilot as many had hoped. The district faced tension from both sides, those
that wanted their contracts changed to reflect more accurately what was being required of
them and the other staff that worked in other schools in BSD who felt that the SA was
getting what one teacher said was, “perks and privileges at the expense of their own
budgets or needs”. Teacher contracts were renewed every three years and it was
undetermined whether or not they would change in three years time or whether the
magnet schools might be able to pull out and re-negotiate a contract within the three years if needed. This is a different approach to private or charter schools with a sustainability mission who have the ability to be more open with contracting and can hand select a principal and staff with the goals of sustainability in mind. As a public school system, the BSD and the SA had to find ways to function within contracts and teaching hours in the first pilot year that were not necessarily consistent with the definition of sustainability in terms of social equity that they were espousing. One thing the district was able to accomplish in the pilot year was to turn over some of the in-service days to be school-based. This allowed schools within BSD to decide what kind of professional development worked best for their needs. This process was going to increase the following year across the entire BSD.

3.2.1.2. Key Partnership Level

SF held weekly meetings with the principal, the enrollment coordinator from the district, and the sustainability coordinator at the SA, as well as the person they placed in the school to work part-time with teachers and students. SF also restructured their own staffing so that their work could be more supportive on the ground at the SA. According to SF staff, the goal was to slowly pull back once the school felt “it was on its own two feet” and to provide a more district-wide and strategic presence so that appropriate planning could move forward. This reorienting of focus would allow—with respect to creating a middle school and a high school program for sustainability—the SA students to move forward with what they had been learning at the SA. An advantage to this approach was that SF was working within the school and within the district
simultaneously, affording more effective leadership and change. According to a Shelburne Farms staff member, “change happens both bottom up and top down. We need to help it happen in both those directions. We need to work with teachers in the classroom from the bottom up. But for those teachers to be supported there has to be some top down change. This provides a support system to help teachers feel more capable of doing this.” SF has a lot of experience working across organizations in a collaborative way and so the model of leadership they intended to provide was one in which they said they were “initially holding the hands of the SA and then slowly walking side by side”. Some staff felt they were too hands off, not providing enough direction on what they needed to be doing and implementing and thinking, where other teachers only wanted SF to interact with them if they asked for the help. The on-site staff of SF was very sensitive to understanding the spectrum and making an effort to draw in other staff from SF who provided a more hands on and structured “manual” which provided a nice balance for the SA. In addition, SF has a lot of experience collaborating across organizations. This was something that the SA and also the District needed support with.

Some parents were confused as to the level of leadership that SF should have in the school. One parent commented during a PTO meeting, “SF needs to take a step back and not make so many decisions for the school.” SF response was “let us know how you see us playing a role moving forward and we will definitely respond to that. We want to make sure we are providing the community with what is needed.” Other parents felt that SF needed to play a very strong role in order to hold the school together. One parent commented that, “without SF the school would not be able to move forward in the way
that it has. It was their involvement that encouraged many of the parents in the neighborhood to give the school a try and the work they had been doing over the years with the school was one of the reasons why it made no sense for it to shut down.” Seeing their leadership as critical, the district also felt that without SF they would not have been able to get behind the sustainability theme for the SA. SF felt that their relationship with the school was not static and was constantly changing to allow for the SA to grow and for SF to grow with the SA as a partner.

However, during the pilot year, Shelburne Farms increased their presence at the SA. The part-time coordinator they staffed at the school eventually began to work full-time. This shifted SF’s involvement to become more day-to-day with the operations of the school, aiming to help facilitate the transition toward a sustainability school by aiding teachers in understanding what changes were occurring and how it would impact their instruction, if at all, within the first year.

3.2.1.3. Principal Level

There was a transition to a new principal in the pilot year, which added a new challenge to the school. Paula B., the former principal, left her position before the pilot year began in 2009. At the beginning of the year this caused some fear among the staff because Paula B. had been such a strong advocate and facilitator with Shelburne Farms in prior years. The district did not make the decision, it was a personal decision unrelated to the pilot year or the transition from LB into the SA. The new principle that was hired came out of retirement specifically for the job at the SA. She felt her understanding of sustainability came more from an internal way in which she understood life and she said
that after she looked into the job she felt: “this is a job I can do. I saw this job and this job was made for me. This is the only job on the planet that would get me to work full time again…to be principal of a sustainability magnet school. I like things that are just started. I like venturing into the unknown. I like bringing people together to fulfill a dream.”

In the summer before the pilot year of the SA the principal of the SA participated in a ‘democratic decision making’ professional development session led by Shelburne Farms. It was voluntary but a good majority of the staff attended the session. The focus of the session was to provide leadership and understanding around how decisions are made and can be made at a school. Rather than receiving marching orders from top leadership such as from the superintendent or a principal, the idea was that a leadership committee could be formed where concerns and recommendations could be channeled up from parents, students, and educators to the leadership level and then the leadership level could respond accordingly. In addition, leaders could implement a democratic process by which educators, parents, students and the school community could provide input with respect to certain decisions. This input could then inform the leadership as to the best course of action. The new principal felt that although she approached sustainability from what she said was a “heart place” she had begun to read with others about cases and other examples of sustainability in education to understand the theory. There was desire on her part to become a stronger presence in curriculum development even though she realized that the school had in place a strong system before her arrival and she trusted the ability of the staff 100%. Without an assistant principal, a good majority of the principal’s day was spent in dealing with behavioral issues at the SA. With such a tight budget, she did
not see how BSD would be able to staff an assistant principle so that the principal position could focus more on visionary and supportive leadership for the staff. The principal said she did not want to be the “final decision maker at the end of the road that could veto someone else’s ideas.” She wanted to provide a process where she could facilitate and support ideas to fruition. She advocated practices such as a ‘dotmocracy’ exercise facilitated by SF that allowed SA staff, parents and coordinators to participate in a democratic process of selecting and prioritizing goals and visions for the SA for the next five years. This process allowed more collaboration, rather than the principal deciding what would be focused on, which is typical in most public education settings. The principal at the SA said she wanted to be “an enabler and not a person who squelches peoples work”. She defined her leadership style as collaborative: “there are some decisions that are collaborative, there are some decisions that I will seek input on, and there are some decisions I need to make all on my own.” An example of this sentiment on a practical level was about who makes the decision for which kids are in which class following the pilot year. The principal developed a form and laid out a process for the staff to follow. The form was based on balance and served more as a guideline with criteria for success. Ultimately, she wanted the final decision to come from the staff with her guidance and input. She invited input on designing the form and the process and then provided a structure that everyone could use. Overall, the principal felt it was important to be invested in the process more so than the outcomes. She wanted to see systems developed that could be used from year to year so that everyone could follow a known process. One of the initial setbacks in the pilot year of trying to actualize democratic
governance was miscommunication, which created barriers to success. For example, in the beginning of the pilot year, a group of teachers put together a proposal of changes that were needed and submitted it to the district without getting any input from the principal. This act created an issue because the principal did not get a chance to review the document, provide any feedback, or have any knowledge of it when confronted by the district.

3.2.1.4. Committee and Staff Level

There were a couple of changes in staff at the SA during the pilot year. In addition to a new principal, one of the previous teachers—who had been a teacher at the school for 11 years and was originally responsible for bringing Shelburne Farms to the school—was hired as a sustainability coordinator part-time, and eventually full-time, during the pilot year. The SA was then able to hire two new teachers. When the official pilot year commenced at the SA, the district decided that rather than displacing teachers automatically, BSD would offer any teacher who wanted to leave the school a guaranteed teaching position in another school within the district. Only one teacher chose to leave LB. She left in order to work at the other magnet school, H.O. Wheeler, which became an arts academy.

Therefore, the majority of the teachers at the SA had already been working together in tight teams for years and had a system and a structure in place that worked really well for them. Although a lot of structural and management changes were taking place, the teaching teams remained the same, which helped to sustain a leadership process among the faculty that was deeply collaborative and familiar and comfortable.
during a very chaotic pilot year. The teaching teams were originally organized for the reading first grant. They had, as an attempt to benefit student learning, already began to work across curriculum so that it was more cohesive and integrated. This became an anchor that the teachers felt they had in their corner during the leadership changes at the principal level. It also provided a rich foundation for sustainability curriculum to be built upon.

At the school level there were many committees that were formed or had been formed prior to the pilot year of the SA. The committees were in charge of particular issues in the school related to food service or physical grounds. These committees had already been formed to some extent before the pilot year had begun and continued to be changed over the course of the year to better reflect school needs. One particular committee that received a great deal of consideration was one that stemmed from the guidance of educational consultant, Daniel Barron, to facilitate a more democratic governing structure for the school. At the time of the pilot it was called the ‘Transformation Team’ (TT). One staff member said the TT committee was placed in the middle of governance “with arrows going out to everyone, including the principal, with the boxes being the same size between the janitor and the principal”. People were confused by what it was, who was on it and what role it needed to play. Some felt that the TT was not suited for a public school at all because it provided too much of an open-ended style to centralized decision making. The principal commented, “I think there is a role for it [TT] and I welcome a body that will consider issues and do research. But as far as being the central decision makers and communicators it seems an unrealistic scenario”.

93
Originally the TT was structured in a way that required the sustainability coordinator, a teacher, a parent, a member of SF and the principal and someone from the district to be present. Initially, the TT meetings took place once a week. After the pilot year was half way through, the TT was still struggling with how they should be structured and what exactly their responsibility was. They decided to hold a retreat in order to determine the exact role of the TT as well as identify key goals that needed to be accomplished within the next five years for the SA. At the retreat, which SF staff facilitated, there were five identified ways in which to structure the transformation team and an agreed quorum of attendance that was needed in order for the meetings to take place. When the quorum of representatives was not reached, then the meeting was postponed. There was agreement that the transformation team would have: 1) a representational group; 2) stewards of the vision for the school; 3) action plan and hoped outcomes for school vision; 4) members who would commit to carrying out an action plan with defined roles and responsibilities; 5) decision making pathways (one of which would be a whole school referendum); 6) a town meeting; and 7) there would be clear communication to and from all constituencies. At the time of the pilot there was still transparency processes being put in place. The strategic plan on how to move forward with the ‘TT’ was still being developed. During the course of the pilot year, the TT team generally dealt with issues such as volunteers, interested community partners, proposals and requests to the district, documenting and articulating goals and outcomes for the school, and issues between committees or groups. Another area that the TT was involved in the first year was creating vernacular for the SA community. For example, a way to
differentiate between strategic partners like SF and community partners that would be involved in aspects of the school curriculum and physical grounds but not in the overall planning and visioning of the school at a strategic level.

Another group that was created was a student leadership group. This group was a group of kids that were selected to bring forth issues from the student body that needed to be addressed. In the pilot year there were 17 student representatives that participated in a meeting with consultant, Daniel Barron, to discuss their thoughts on what the SA was and how sustainability related to issues such as bullying in the school. The sustainability coordinator was also present for the meeting. The thoughts of the student representatives could then be shared directly with the district. In addition, when the Commissioner of the Vermont Department of Education, Armando V. made an appearance at the SA, the student representatives were able to share their concern for testing inequalities for ESL students. This gave the student body voice and a structured method to identify concerns or issues at the SA that could be explored by the students with a facilitator.

3.2.1.5. Parent Level

The families that the teachers and Shelburne Farms had been working with stayed relatively the same. In fact, there was only one new student that would be attending from another part of the district in the first year of the pilot. All other students were being pulled from the neighborhood. This was a huge relief to parent groups as well as the school staff and Shelburne Farms. They had known that socio-economic integration could be achieved in the neighborhood, but were not sure that the community would pull together to make it happen. Up until that point there had been a lot of parents in the
neighborhood with middle to high economic status that were either sending their children to a private school or taking them to a “sister” school as part of the dovetail program. The dovetail program allowed students within the ONE to apply to a school that was assigned as a ‘sister school’ that was a higher achieving school in the district. With the new initiative to re-open the school as a ‘sustainability magnet school’ and the presence of Shelburne Farms, many neighborhood families enrolled their children at the SA that first pilot year to achieve the socioeconomic balance of being 49% free and reduced lunch in order to reflect the district average.

Parent participation was also something that had been strained over the years and a lot of effort went into creating a more diverse and stronger Parent Teacher Organization (PTO) at the SA. There were many discussions during PTO meetings about the necessity to do more parent outreach to non-English speaking parents and to figure out how to include more diverse parent voices. A small ‘core’ handful of parents would be seen at each meeting, and generally the same voices were usually heard. There were clear parent leaders within the group and most of the other parents seemed to defer to their voices. A parent coordinator who was dealing with the non-participatory parent population was working at the school at the beginning of the pilot year, but for reasons unknown, she did not keep her job throughout the pilot. The ‘core’ group of parents were involved in the school committees and in charge of fundraising events as well as outreach to the community and parents who did not regularly attend school meetings or take part in school committees.
Many parents also participated in terms of volunteer work around the school. They were often seen participating in school projects and in the school halls or at various school meetings. There seemed to be an open door policy for parents who wanted to be involved in the school and could speak English and were aware of the meetings taking place and the decisions being made. There was definite influence from parents on school operations, which created benefits to the SA as well as tension between parents and the teachers. Ultimately, this led to a lot of discussion on how to structure the management and governance of parents so that teachers felt they were protected and supported academically. Discussions around how to allow parents to feel that their input was critical and valued was also discussed in great deal. The ‘TT’ was discussed as a potential way to allow both processes to take place. In addition, the role of SF was critical in the parent and teacher exchanges. Initially Shelburne Farms continued to strengthen relationships and said: “we have always been the bridge between schools and families and for a while we felt we were being the T in PTO”. This mediator style role of SF seemed critical and at the same time some parents felt some resistance to how much power SF had in overall decision making, asking questions from time to time, as one parent did about “when does Shelburne Farms take more of a back seat and allow us to make more of the decisions at the school. I feel like they have too much say in what is happening here.” However other parents felt the role of SF was critical and that their approach was extremely sensitive to all sides. Shelburne Farms addressed each question around their role in the SA as an open discussion and invited advice from all constituents of how they should move forward and what kind of support they should offer.
3.2.2. Ethos

When the doors at LB swung open as the Sustainability Academy in 2009, there was a buzz of change in the air. Children smiled as they were told in the hallway ‘walk please’ in an effort to model positive reinforcement as opposed to the ‘don’t run’ reaction many schools continue to offer. The building was bulging with students who were being gathered to hold a student government meeting in the staff area on what issues they felt needed to be addressed that year at the Sustainability Academy (SA). There was a cooking class taking place in one of the lower rooms next to the copy machine. Parents were evident in some of the classrooms and in the school meetings. There were elements of collaboration and teamwork and dedication that were as much a part of the ethos as anything else. There were subtle differences from the quilted sustainability banners in the cafeteria to the stack of meeting minutes and informational materials in the notebook in the entryway. To people who have never walked into another public elementary school before, they might not see anything particularly unique. To a person who has walked in dozens of public elementary schools, those subtle differences were indicators of change.

Although there was some confusion around what the SA was and where it should head, it was clear that those involved were extremely dedicated and working hard to provide a positive and enriching learning environment for the students and the entire SA community. Often times throughout the year, community events such as pancake breakfasts, ethnic events, or fundraising auctions with local or homemade products were held in the cafeteria. The PTO meetings were filled with passionate, willing and
concerned parents and teachers. It was clear that the effort to develop a deep and strong
sense of community for the school and within the neighborhood was present.

Not unlike the governance and management nodes of the SA, the many levels of
influence found within the SA all contributed toward either a common or differentiated
understanding of what the SA stood for. What the vision was and how it would look
within the next five years and beyond depended on who was responding to the question.

The district and Shelburne Farms (SF) carried the strongest visions for the SA
during the pilot year. The principal, teachers, parents and students either contributed
toward the vision, were trying to catch up to what the vision was, or were still confused
about what it meant exactly for a school to have a vision. Throughout the pilot year there
was continuous effort to communicate, agree and elaborate upon a vision for
sustainability. External to the SA community, there was feedback that indicated that the
difference of what the SA offered as a public elementary school was already unique. The
district coordinator who was constantly stepping in and out of schools across the district
commented: “the SA feels different…it stands for something. This is different than the
other elementary schools in the district…there is no common vision that holds the
community of the school together in the same way”. At the time of the pilot there were
two main “essential” visions seen by the district and Shelburne Farms and then a defined
vision for the school that the SA posted on their website.

The district’s vision of the SA was more focused on socioeconomic integration.
The superintendent said that the district vision was: “A magnet school that would act as
an incubator of excellence for sustainability throughout the district. A school that would achieve socioeconomic integration to better benefit the student community in poverty.”

Before the pilot year of the SA began, SF submitted a vision to the community of LB and to the district: “To work with community partners, BSD, teachers, parents, to support and implement a Sustainability-themed Magnet School that would be standards-based and integrative allowing for curriculum to connect disciplines and offer opportunities for unique collaboration between teachers” (Shelburne Farms, 2007). SF saw the magnet school as a way to wholly support the development of a framework to address education “in the context of social equity, economic vitality and environmental integrity” (Shelburne Farms, 2007). The hope was that the SA would serve as a learning laboratory that would promote excellence in all Burlington schools, informing and inspiring communities around the globe” (Shelburne Farms, 2007). The vision that was posted on the SA website in the pilot year was: “the shared responsibility for improving the quality of life for all – economically, socially, and environmentally – now and for future generations” (Sustainability Academy, 2009, para.1).

There was a lot of open discussion in meetings, professional development time and even in the hallway about what ‘sustainability’ meant and what they were ‘supposed’ to tell people when they were asked by parents or outside community members. The ‘deeper’ ethos that was evidenced in the SA was not so much based on the ‘defined vision’. The glue that held the community together that year was the relationships that had already been created over the years. All the teachers seemed to be dedicated to working through the transition because they felt a connection to the kids and the parents
who were involved with the school. The foundation of what grounded the school was the loyalty to the community and a desire to address a student population that was unique demographically and racially. The emerging vision of sustainability was a lens with which to continue to achieve and address a high needs student population. Hard work on turning failing literacy in the school around and managing to provide effective learning techniques were a testament to the level of determination and commitment the school felt for its students. Frustration and exhaustion were also heard and felt. Hope that a sustainability themed magnet school would improve the ability to meet student needs was pushing a lot of teachers through the first pilot year. They were grateful the school had not closed, and overwhelmed by what needed to be done in order to live up to the expectations of everyone who fought to keep it open.

As far as sustainability, aside from the leadership of the SA, Shelburne Farms and the District, many individuals had little to no idea what their understanding of sustainability was and were looking for direction. On an individual level, there were varying visions ranging from emphasis on socioeconomic integration to environment and social responsibility to thoughts as simple as the principals statement of “making the world a better place”. Some people, when interviewed, responded with a robotic regurgitation of the school definition, others shifted uncomfortably and giggled. For example, one teacher who was interviewed laughed nervously and said, “I don’t really know what it means to me, I am still trying to figure it out”. Some parents definitely felt it was more associated with environmental issues and other parents said that it was more about social justice and related it to racial inequality and behavioral challenges that the
school was facing. The principal commented that the SA “parents are mixed from families that have no clue to families that perhaps have more knowledge about sustainability than most of the teachers”. One teacher shook her head as she said, “we need to get parents to understand that we are not a science based school, that sustainability is not just about environmental sciences. I have parents expecting their children to come home with all kinds of technical terms and I don’t even know what they are talking about.” The principal felt some challenges in having to be the face of the new sustainability theme of the SA when she felt she was still learning so much herself. There was a distinct difference between individuals in the SA community who expressed a personal understanding of sustainability as what the principal described as “a way of living and seeing the world” to those who were trying to do what one teacher said: “learn” it as a “subject’. The superintendent of the district had a personal drive and interest, attending retreats tailored to strengthen her understanding of sustainability in education. Some individuals were able to understand a more holistic picture of what was happening and evolving, while others felt they were just doing their “part” and could not see beyond the pieces. This variance occurred in the layers grouped in the management styles section of this thesis. The leadership players tended to have a more intrinsic and ‘life-style’ application for sustainability, whereas the staff, parents and students saw it more as described by the Shelburne Farms staff as a “learning experience or a lens to achieve learning through”. This created some disconnect between personal actions and instruction.
There were areas in the school where inconsistencies in the vision and what it meant on a practical level were observed during the pilot year. An example is the contrast between providing homemade local food at the PTO meetings that were then served in Styrofoam bowls with plastic utensils and no composting bin. At the same time, the SA had implemented a ‘no waste’ cafeteria policy focused on teaching children to take less so that they were not throwing unnecessary food away. For this compost bins were provided. There was discussion about the need for students to understand the relationship between food choices and health and yet some staff members would have cola products and processed foods on their desks. Students quickly became aware of the inconsistencies and began to point them out in their leadership meetings. Some concerns made it up to the district level. The superintendent laughed as she said: “Now I jokingly say that my headaches come from the fact that kids are aware that we are serving non-compostable plates in the cafeteria, so they have approached us and said that we need to fix that, so we need to fix that”.

In observing the management and governance over the first pilot year, it was interesting to see how both the ambiguity and the style created deeper understanding and learning for some, while others, for example, one of the reading teachers, felt she needed more guidance and “a set of instructions that says, this is how you do this”. The retreats that were held at Shelburne Farms provided consistency between mission and vision. One staff member of SF referenced the consultant, Daniel Barron and said, “you have to run fast enough far enough that you can’t turn around…and that is what we have done this year. We have come far enough that we can only keep moving forward”.

103
Although the vision of sustainability was discussed frequently in leadership meetings, it was not the main focus of attention for the majority of people I observed and listened to over the first year. The main subject of concern, interest and passion was based on social justice issues that the students and the parent community faced. Behavioral issues were an immediate concern, and one that many staff felt had to be dealt with before ‘sustainability’ could be taught. The other diversity component that was present and central to many meetings and discussions was in relation to the poor representation of parent voices within the SA community. Another area of social justice that was a concern was for future displacement of neighborhood students. In addition, as mentioned before, teacher contracts grossly underrepresented actual hours worked. Racial discussions were frequent in PTO meetings, questioning representational diversity among parents and staff and how this may or may not impact the students and what and how they learn.

One aspect of the school ethos that was commonly identified and well articulated by a SF staff member, was that the design process for the SA was like “building a plane in mid-air”. This excited some, mostly those in leadership roles or teachers who had championed sustainability at the school. It terrified others—mostly parents, school staff and external community members. One teacher referred to the vision on the website: “I think that I am actually pretty proud of the vision. I think it’s pretty good that we came up with that in our first year. It’s not bad”. There was recognition that there was more building to come and that it would be done while the SA was “in the air”. Other teachers were frightened that they did not know how to achieve what was being asked of them and
were not even sure exactly what was being asked of them. One teacher expressed this sentiment by saying they had wished that the “whole thing had already been built, then we wouldn’t feel so much pressure”.

Toward the end of the pilot year there were more discussions around some of the practical elements of expressing the vision through actions, but most of the focus was still on how to define management, deal with behavioral issues, integrate sustainability themes in the curriculum and address diversity issues at the school. When asked what a short-term and long-term vision of the school would be, the responses were diverse and comprehensive. But when grouped, most of the short and long-term visions within the interviews were complimentary. For example, the teachers, parents, district and SF all felt it was necessary to have a place for the graduates from the SA to continue their education. Ideas around a middle school within the district supporting sustainability work were an active discussion at the time of the pilot. Yet, other visions and goals within the short term (2-5 years) contradicted one another. An example is some individuals stating the need to keep the staff the same at the SA and continue to deepen their work and understanding of the vision. Other individuals referenced a desire to see the staff replaced according to specific criteria to better drive the mission of the school. It was also clear that the short term and long-term goals were geared toward change or continued work in the seven dimensions of the school’s operations, supporting the need to look at changes and improvements within the school from a holistic level, as opposed to narrowing it to curriculum improvement or changes in management style. A complete table of the short and long-term visions of the SA can be seen in the Appendix.
Deep concern at the SA stemmed from how the district would continue to help the school transform and grow. However, as one district staff stated, the district remained confident that within 2-5 years of the pilot year they would “develop the systems and infrastructure to allow the SA to grow and to build in reputation to build and succeed as student engagement and achievement with a school full of student leaders”. In the long-term the district said that the SA would just be “a part of the fabric of Burlington” rather than a unique “sustainability” aspect of the BSD.

3.2.3. Physical Structures

At the time of the pilot, in 2009, the SA was still operating under the original building architecture from the 1950’s. This meant that it was the most inefficient building in the entire school district. Single paned plexi-glass windows were heating the outside air. Old sprinkler systems and original tiles and flooring could be seen throughout the school. Plans for immediate improvements would begin in the summer of 2010 into the following school year. Fortunately, a catholic school a block away was closing and so it provided a temporary space while upgrades were made on the building. Due to major budget constraints for physical plans in 2009, only the most essential elements of a very comprehensive strategic plan would be addressed. The SA would be receiving the first of the improvements from a purely financial perspective. The electrics, a new boiler, air conditioning and new windows would be replaced in 2010. New skylights and re-insulating the roof would triple the insulation value from what it was in 2009. New sprinkler systems and updating fire alarms as well as making the building handicap accessible were all considered immediate needs. Anything cosmetic would wait for
subsequent years. The goal was to be able to cut the energy costs at the SA to over half of what they were in 2009. Lighting sensors would be installed, as would a rooftop solar hot water heating system and geothermal wells. Sinks and toilets would be replaced with low-level water controls. A new energy management system, and according to the Burlington School District (BSD) facilities manager, “the most complex for any school in the state of Vermont will become the new facilities for the SA” would be installed. The facilities manager was making it his personal “goal to decrease carbon footprint as much as possible...and make the building more pleasant to go into. Making it easier for people to recycle and decrease the amount of water used.” This was all a part of a master plan conducted by the district to bring the physical building in BSD up to 21st century learning environments that provided the appropriate equipment and facilities needed. The facility manager felt supported by the district on a personal level for his goals of improving the systems for the physical grounds as well as finding ways to innovate and change: “I am learning stuff more and more every day and trying to work with different programs.” When he originally took the position he encountered the challenges of budget constraints due to building inefficiencies and said that: “Instead of being able to paint a school room or upgrade chemistry equipment or put in a new floor, I was losing money to single-paned windows.” The facilities manager felt that it was also the ability to have a good team and an innovative engineer working with him to develop new ways of looking at physical structures and maintenance. In addition to the implementation phase of physical improvement, plans were also being made for providing educational pieces for the students. An example was the goal to install monitoring systems that the SA community
could look at to see how much energy was being consumed or saved. This would allow the energy efficiency of the building to be placed within curriculum. Additional information would also be provided so that the community could understand what aspects from “wood to paint were chosen and why they were sustainable”. The facilities manager felt that for the long-term his vision was “for the culture to be set to be moving forward…I am challenged to think outside the box.” By implementing the efficiency upgrades at the SA, it would hopefully lead to being able to afford projects that were needed to improve the students’ learning environments, such as a new classroom extension, or increasing the green space.

The SA campus was only 3 acres in 2009. The majority was taken up by the building and a couple of parking lots. The classrooms were very boxy and small, making it difficult to teach large groups of students. There was a desire to open up the rooms, add on classrooms and make more open space. The outside had its limitations as well. There was limited green space for kids to play in. There was a small asphalt playground next to a busy road that crossed through town and a paved parking lot next to it. Around the other side of the building was about 200 yards of open field with a baseball mound at the far end. Toward the side entrance of the school was a small garden of raised beds.

In the spring and summer of 2009 a group of University of Vermont (UVM) students that had started an ecological design and social justice non-profit, The Ecological Institute, approached the school before it was entering its first official pilot year as The Sustainability Academy. They wanted to do an ecological design project at the school to show how space could be used differently and how it could enhance the
landscape using natural materials. When they began the project, there was very little curriculum involvement with the project. Students were asked to attend the design charrettes as were teachers, staff and parents at the SA. Although there was transparency and inclusiveness, one of the facilitators of the charette commented that: “it was not really until we started to get out there and physically began building the garden that the students really got engaged with us and began asking questions.” There was some concern from the students that the garden would take away their baseball mound or that they would not have space to run around. When they identified a dead space that was not being used as the place to implement the garden then the students became more positive. Using rocks to create a circular system of naturally raised beds, the team of college students began to slowly earn the trust of the staff and the SA community. The Kindergarten became involved as a class in planting in the garden. One of the facilitators opined that, “it turned out to be a really appreciated project, but initially it was hard to gain teachers trust that we were not taking over their jobs and to get parents to trust that we were safe for their kids to be around”. Once the group had been building for a while, then the relationships began to develop and improve. By the time the garden was finished, the facilitators were asked by the teachers, “what can you do next”. One of the volunteers from UVM decided to conduct a master landscape plan for the SA as her thesis. Several workshops were held in order to understand what the SA community was looking for in their landscape for learning environments for the students as well as from an ecological perspective. Surveys at community dinners and harvest fairs held at the school were conducted. Ideas for fruit orchards, vegetable gardens and natural streams
were discussed and communicated. The master plan included a time scale as well as a budget for each component. Students were not a part of the surveying process. Although the master plan was at the very early stages at the close of the pilot year in 2010, they had begun to implement one of the first aspects of the design plan as part of a day-of-service at the school. The rest of the plan scaled out over 5 years with maintenance built in after the 5th year as well as other ongoing projects. There was not any form of evaluation for the landscape plan at the time I conducted the interview. One element that was discussed in a small part, but largely dismissed, was the opposition from the maintenance crew of the proposed plans. One aspect that was heard from the participants conducting the research and implementing the projects was that the maintenance crew had the perception that “it would be more work because they would have to maneuver their snow blowers or lawn mowers around the landscape changes.” One of the project facilitators saw this as a minimal issue because “they just need to change their thinking around how they do their job, but people hate change, so the resistance is strong sometimes to make necessary changes that don’t necessarily involved extra work.” From the perspective of the maintenance crew, it was not just an issue of being ‘extra work’. One of the janitors at the SA felt strongly that “valuable space for kids to play sports will be taken away when they have so little space to begin with”. One of the areas the students voiced concern over during the garden project was a fear that it would interfere with their ‘green’ space. According to the maintenance crew, there was an expressed fear of how the neighborhood would respond to the changes being made. The garden had been recently vandalized and had ensued a large discussion among the students, staff and parents.
Although a janitor indicated that “things like that just won’t work in this neighborhood” the SA community as a whole made a serious effort to repair the garden with the students. After the repairs were made, the garden remained intact throughout the rest of the pilot year and it became a learning opportunity for students to discuss in class and in their student government meetings. Another area one of the janitors was concerned with was where the current playground was situated. He said that: “One of the first things we need to do is move those kids away from that busy road”. There had been discussion of buying property next to the SA in order to increase the footprint of the school. However, budget constraints limited the ability to move forward with the plans. With such little green space, the question of what would serve the student population seemed to depend on who was being asked. An outdoor learning classroom was one element of the landscape project that was brought up by many individuals interviewed in the SA community. However, very little thought seemed to reflect the increased costs of maintenance or the professional development needed to get the maintenance crew on the same page. The maintenance crew was going to be shifting at the SA due to retirement within that year. There had not been any open discussion about who would be filling the position, or what the criteria would be for potential employees.

The UVM students wanted to provide a landscape plan for the SA that could be utilized if they continued to be involved or not. This had been achieved by the end of the pilot year by the development of the master plan. Which components of the 5 years design would be implemented was not yet clear. The SA was discussing how the facilities improvements and the landscape projects could be placed within the curriculum and
extend beyond service day projects. Even though the janitor said that there was not enough space for “all that they want to do and give kids the space they need to be kids”, there were no plans to move the school to another location.

Another area of physical space that was an issue at the SA was the kitchen space in the cafeteria and its inability to provide students with a place to cook or with the proper equipment and space to provide fresh made food. The SA was not able to implement some features for meals that were available in other schools, such as a sandwich bar, due to the lack of space. The food service worker at the SA commented, “as it is we are already putting our salad bar and cooler in the gymnasium. We don’t want to upset the gym teacher any more than we have to”. A new kitchen was being put in during the summer of 2010 which would have a walk in freezer and cooler and the lunchroom staff had hope would include a steamer. In addition to the physical renovation of the kitchen, it was going to allow for the ability to cook fresh foods on the premises. The goal was to provide a kitchen that would also be open for community cooking classes. With the kitchen that existed in the pilot year, it was not feasible. The small space also made it hard to heat things in a more nutritious manner. A food service worker commented, “I have to put the vegetables in the stove with water on them to re-heat them and we know what this does in terms of taking out all the nutrition. If I had a steamer then what I served would be better for the kids”. The lunchroom staff was constantly communicating with the Food Service Director of BSD and attending trade shows in which she would point out all the equipment she wanted to have in order to run a better kitchen for the school.
3.2.4. Resource Management

The SA, like any other school, has a great number of resources to manage. Financial capital is but one of many resources. Physical capital and human capital are also largely important in schools, especially schools where the budget does not fulfill the needs of the school community and there is a demand on other resources in order to make up the difference. The way the SA considered their management of resources as well as the solutions they came up with on how to deal with limited resources was a key part of their design process. The main foundation that was relied upon or examined first was the budget and how it affected the other dimensions of the school operations and other forms of available capital.

When the pilot year at the SA began there was a lot, as the grants coordinator commented, “hanging in the air” in terms of whether or not the Obama administration would have a more positive impact on federal funding allocations for public schools. In 2009, federal funding was in the process of being ‘zeroed’ out, making it a competitive bid across schools at a national level. This would make it highly unlikely for any small districts, such as BSD, to receive any federal funding for improvements moving forward. In addition, restrictions for Title IV and IV federal funding were very limiting. Funding could only be used for supplementary services. Over 20% of that funding had to be used in professional development only in an area where the school was seen to be ‘failing’ under the No Child Left Behind Act (NCLBA). This makes it hard for public school districts to hire needed staff, requiring the presence of outside consultants to come in for a particular issue that may or may not be what was most needed by a school.
With the financial hurdles of the BSD, the pressure to compensate for inadequate funding fell heavily on the human capital in the SA community. The financial director of BSD surmised, “they are used to it, unfortunately, but they make do with what they have and then some. You could not find a more dedicated group of individuals”. Some fairly small individual grants allowed BSD the opportunity to conduct some district wide assessments and evaluation of the magnet schools in their first pilot year, of which without, assessment and evaluation would not be an option for a public school district. More barriers to federal funding were seen down the road as Title IV funds moved to a competitive grants program, effectively assuring large sums of funds for larger districts and leaving small districts such as Burlington to find funding through state or local tax payer support. Despite the challenges of funding that lay ahead, the grants department in the district felt optimistic in the push for the SA, stating that there was “really no other alternative. We need to try to provide a better education for our students and we will simply get by until something comes through.” Financial resources not only influence staffing, curriculum, physical grounds, evaluation and assessment, and professional development, but also play a larger role in what the students are fed in school meal programs to whether or not students are able to carry out a community service project or a school is able to hire translators in order to encourage non-English speaking parents to attend a PTO meeting. Finances also played a role to some degree in how the leadership style and governance within the pilot year could unfold. As the SA was making progress in terms of student improvement in the areas they had been failing under NCLB, this
meant that funding would be cut unless the Obama administration’s Growth Model improved the NCLB regulations designed under the Bush administration.

There was a lot of fear that there would be flight of what one staff member referred to as “good students” and school financial resources from the rest of the BSD to the SA in the pilot year. Major resistance from teachers in other schools in the district was felt from coordinators and liaisons that worked across school. The financial director of the district echoed this concern: “they feel that they will get the short end of the resource stick rather than seeing the SA as a resource for the district”. But, according to the district, those perceptions were not in congruence with the financial reality. Additional grant funding was used toward the SA in the pilot year rather than using local funding meant to go to the other schools. The SA received their distribution of local funding and the additional grant funds, but it was still not enough to cover the needs of the SA in the pilot year. More than one teacher commented that they were “heart-broken” when they found out “what a bum deal we got on our contracts for the next three years. All our hard work and we get even less money than we were making before. It is not right”. This severely brought the moral of the teachers down, and despite the acknowledgement from Shelburne Farms (SF) about the inequality of the teacher contracts— it was an issue that one school coordinator said “would result in the failure of the SA. If we cannot get better teacher contracts, it is a clear social equity issue that is inconsistent with the vision of the school”. This of course, was funding dependent.

The last of the federal funding that had been used for curriculum mapping, curriculum retreats, planning and professional development under the auspices of the
“reading grant” would end in the pilot year of the SA. The SA had depended heavily on these funds prior to the pilot and during the pilot to make changes in the school. Discussion of securing further funds to continue to support faculty learning as well as the ability to have time set aside for planning and development were a large part of the conversation in leadership meetings. The district coordinator said, “they are crazy if they think they can maintain a magnet school on the current budget they have. It is impractical to think they can sustain themselves moving forward unless some additional funds are found”. The dilemma that the SA faced was having the requirements of any other public school and having, in addition, the need to perform as a magnet school for sustainability. This required a process by which the school would transform its operations beyond what is provided within a public school budget and find the necessary funding in order to do so. Shelburne Farms played a large role in providing necessary resources in the first pilot year with the goal to continue to get funding for subsequent years. Their relationship with grant providers, such as the Bay and Paul Foundation, who are more invested in long-term education outcomes, was critical. The grants coordinator for the district felt very worried about securing more funds for the SA, “we are making our absolute best out of scraping the barrel. We are very lucky to have the partners we have, we could not be doing this without them and with them there is a lot we can do, even with a relatively small amount of money”. Despite the lack of funding and the clear impact it had on how much could be done in the pilot year, there was plenty of evidence of initiative and creativity in maximizing the benefits of financial support at the SA. An example was the transformation of the library, continuous work on curriculum mapping, and leadership
whose objective was to leave faculty knowledgeable, capable and empowered to continue their work. Shelburne Farms staff would work beyond their allocated hours. Teachers would work beyond their allocated hours as would the principal and even the superintendent as well as the district coordinator and just about anybody that was interviewed. Human capital was not in short supply, which made up for the deep financial deficits.

After the initial budget for facilities improvements was denied by the city, the district went back to the taxpayers asking for 9.7 million dollars for immediate improvements and the bond was passed in 2009. This initial 9.7 million dollars was prioritized to the three schools that were most inefficient, the SA being foremost on that list. Lowering waste of heat and electricity helps taxpayers in the long run because of the resource demand on the lake for water and the natural gas being burned and future savings. In addition to reluctant taxpayers, there are also reluctant employees of the BSD who have been in the district for over 20 years and do not have the knowledge or skills to understand the needed updates or changes and how it benefits the entire city. How many modifications or improvements could be made moving forward would depend mostly on community partnerships and parent participation rather than financial support.

Another area of resource management was purchasing new products for the school and finding a way to afford them. Toward the end of the first pilot year all the Styrofoam plates were replaced with more expensive compostable plates. The plastic silverware were replaced with metal silverware. Food as a resource was discussed a lot because the Food Service Director of the BSD had been slowly implementing a more
local and organic food service for years in the BSD. However, there were considerations that needed to be made for the student demographic at the SA that were different to other school districts. Kids went through a series of food tasting pilots before new foods were introduced and the kitchen staff at the SA would notify the director whether or not particular menu changes would be successful. Because the SA was feeding a demographic that may or may not have adequate supplies of nutritious food at home, the priority was focused more around making sure the students would have a full meal. There had already been menu changes happening long before the SA initiated its pilot year, but there were considerations for decreasing sugary breakfasts at the SA more than in prior years, and dramatically in comparison to other schools in the BSD. There were many products that were being offered by local companies such as Seventh Generation for free, such as cleaning products that could be piloted at the SA and the ‘TT’ was tasked in the pilot year to manage the decisions of what types of products were going to be approved for the school.

There were a great number of volunteers and visitors that came into the building in the first pilot year. Sign in sheets showed an average 19 volunteers and visitors a day walking through the doors of the SA. Farmers came to provide tastings during lunch of local farm grown produce; para-educators from local colleges helped in classrooms; researchers such as myself observed and took field notes; journalists; other school representatives; and local businesses looking to form partnerships would all come through the doors of the SA. University groups would help design landscape plans, Shelburne Farms would send staff over for a meeting, district coordinators would speak
with the faculty or a camera crew would be walking around to make a video on sustainability education at the SA. There were so many people going in and out of the SA during the first pilot year that the sustainability coordinator mentioned that, “it became overwhelming to manage”. The Transformation Team (TT) would have discussions about who should be in charge of all the interests the school was receiving and what sort of protocol and processes needed to be in place in order for volunteers and visitors to enter the school. During the pilot year, proposals were submitted to the TT and decided upon or taken to the larger SA community for feedback. However, the TT felt that there needed to be some other way to organize and also track who was coming and going into the school. There were sign-in and sign-out sheets for the school that provided data that could be used for grant reporting. However, there was not anyone at the time with the ability to coordinate volunteer and visitor information.

Parent participation in the school had increased during the pilot year. There were more parents actively involved in fundraising efforts and in volunteering for projects and field trips. There was a lot of discussion in the pilot year of how to increase parent engagement and participation. In PTO meetings the issue that was frequently brought to the table was language barriers preventing parents to participate. Another was racial issues which needed to be addressed in classes and workshops. There were outreach activities assigned to parents as well as a parent coordinator for part of the pilot year. When interviewing members of the SA community that were not Caucasian and were not native English speakers, there were varied responses to the lack of parent engagement from their demographic. One minority parent stated that “most of the refugees parents,
their kids are in school and they are in work…some women are taking care of three for four kids. They do not have the time”. There were issues with language barriers that were felt as well. One minority para-educator stated that “sometimes it’s very hard, really hard, for a parent who doesn’t understand English to understand what the policies of the school are, what are the expectation and what the school’s expecting from the parents”. An African father commented, “I have been away for a bit for about a year because I work at night”. When asked what he felt was most important at the school he said, “The afterschool program. I need my kids to stay longer for the English…is 2nd language for them and they need to catch up”. Although individuals who were not able to participate directly in the school felt as one parent commented: “there is a lot of help for my children at the school”. One refugee parent illuminated the challenge of cultural differences in the understanding of the purpose of a school. To some non-native parents, it was expected that they should allow the school to operate in a way that only teachers made decisions and were involved in the school. Therefore, the understanding that the parents were a resource to the school was not an element of their understanding as it was seen as interference from their perspective. A suggestion on overcoming the barrier to more diverse parent participation was to ask for specific things from the parents who were not involved. This meant a coordinator to reach out directly and ask for a parent to participate in a specific matter. To many at the PTO meetings, they felt this would be hierarchical, placing their privilege in front of others. To some refugee parents and minority volunteers interviewed, this was needed so that parents felt they could be clear on how they could help.
Another area of interest in resources was that of the teachers themselves. Some non-native speakers said that it might be useful to have hiring practices at the SA and other schools in the district that prioritized hiring refugee students who graduated from a teaching college or who were interested in education and could volunteer in the schools to help with language barriers and providing some familiarity to ESL students. A minority para-educator said, “I am able to relate to someone who is having difficulty because they cannot speak”. In addition a lot more training programs were needed for parents who could not speak English so that they might be able to help their children with homework assignments or, as a para-educator said, “ask them the right questions”. The parent coordinator in the pilot year had been offering training to parents that did not speak English and it was seen as very helpful. However, due to budget issues her position was cut in the middle of the pilot year, making outreach to the larger parent community more of a challenge. The district was making more of an effort to provide funds for translators to be available for some of the school meetings, but in the pilot year a meeting that included non-English speaking parents was not witnessed during this research.

In the pilot year the SA had one student that was coming from outside the neighborhood. The rest of the students that attended were from the Old North End (ONE). In addition there were not any students in the neighborhood that wanted to go to the SA that were turned away. However, toward the end of the pilot year the enrollment for the following year had shifted, and middle class students in the ONE were wait listed at the SA and there was the possibility of children from low socio economic classes having to be bused. Busing in the district was an issue because private busing was too
The district relied on public transportation buses that had a designated route with school staff riding the route with the students. In terms of environmental and financial resources, enrollment in the future for the SA might prove challenging, and determining an enrollment process that might have to consider factors for enrollment unique to the SA was part of the discussion in the pilot year. There was concern by the district coordinator that “one injustice is being replaced with another. What happens when our enrollment defies the idea of a neighborhood school and the concept of sustainability is not being modeled by our transportation needs”. In addition to transportation to and from the school, the SA needs additional transportation because of their emphasis on community service projects and place-based learning. Restrictions in transportation budgets impacted how well project based learning opportunities could be integrated within the curriculum. How the district is going to deal with transportation needs was not clear in the pilot year.

3.2.5. Community Links

The school had been involved for a number of years prior to the pilot with various community groups and programs. The SA was a part of the BSD community garden program that was featured in the local news. Service learning work had already taken place, taking the students out into their communities at least once a year as part of the curriculum and their partnership with SF. There were community dinners and harvest parties that were hosted at the school. There was a community pancake breakfast at the school in the mornings so that parents could eat with the principal. These efforts
continued throughout the pilot year of the SA and were envisioned to continue in the future.

Toward the end of the first year of the pilot, the TT began to look at how to define partnerships with the community. There were long-term partnerships with the SA, such with Shelburne Farms. This type of partnership resulted in providing strategic direction for the school. Then there were more project-based partners, such as the Ecological Institute, which partner with the school to achieve specific tasks or service learning projects. At the time of the pilot year there were over 20 partners and sponsors that could be easily identified as being involved with the school. Local paint companies, farms, and community groups were acknowledged for their support in fliers at the school during a day of service. Shelburne Farms also worked to foster relationships with the SA and the community in the pilot year. SF brought forward new partnership possibilities or individuals who wanted to volunteer to the front steps of the SA. One particular area in which community links were vitally important in the pilot year was community service projects and helping them grow in strength. One teacher commented, “the curriculum is filled with community service units as well as opportunities to visit community areas and learn about community processes and how students are influenced by and can influence them”. However, community links were sometimes difficult to achieve at the SA. Many teachers at staff meetings brought issues such as this comment made by a teacher: “how can we focus on teaching sustainability in service learning activities when we are worried to take out children into the community because the behavioral issues we are experiencing do not yet allow a learning opportunity to take place?”.
External to the SA community there was a lot of parent support from other school communities as well as the Burlington community at large. I was interviewing someone in a coffee shop and overheard a random parent saying, “I wish that my daughter’s school was more like the SA. There, they actually care what parents think and want them to be involved. At Edmond’s [another elementary school in the district] parents are kind of encouraged not to participate”. In contrast, there was also some community resistance being felt from people not involved with the magnets, obtaining an ‘outsider’ perspective that was not aligned with the reality of what was actually taking place. One coordinator mentioned that the local paper had written an article saying “why would I want to send my child to a school where they learn how to compost?”. Other individuals noted that at district meetings tension was felt between the teachers from other schools and the faculty from the SA. A lot of work was being done to find solutions to providing more understanding to the community about what the SA actually stood for and how it served the community as a whole. For example, one consideration was how many resources could be saved by the SA that impacted the greater community—such as water consumption from Lake Champlain or natural gas resources.

There were also place-based educational components in the curriculum that got students out into the local neighborhood. The ONE has a rich historical context for student learning. Students were able to walk their neighborhood in an educational context and share personal experiences with their peers about the ONE. Indirectly, the place-based aspect of the curriculum places emphasis on the revitalization of the ONE. This dovetailed the impact that the city had on the SA because it was located in the ONE, due
to Burlington’s housing policy programs. There was a lot of discussion and acknowledgment of the need for the Community Economic Development Office of Burlington to look at their housing policies for the city so that it could better serve the goals at the SA and the school district in general by allowing a more socioeconomically diverse housing strategies that would naturally achieve socio-economic integration within districts, rather than relying on schools to bus and move students around to achieve the desired demographic mix.

Many parents sat on community boards or were members of community organizations, ran or worked in local businesses, or volunteered for various community needs. This provided a diverse and deep pocket of community connections that were incorporated into planning or discussions for the SA. For example, one parent worked at the University of Vermont in the maintenance department and had direct knowledge of facility improvements at UVM that contributed to the districts facility plans for the SA. The SA was also geographically in a position to welcome the local community because it was conveniently located on the edge of downtown Burlington. Therefore many community members who did not have children at the SA were seen at the community events. The SA location also encourages more parent participation because of its ‘walkability’. According to the district coordinator, more parents were involved at the SA than any other school in the district, with the exception of H.O. Wheeler. The geographical convenience of the SA allows the potential to expand and grow the SA as a community hub, which is one of the visions for the school.
3.2.6. Pedagogy, Research, Learning, Inquiry

The pedagogical nature of the SA in the pilot year was complex. As a public school it lends itself to standard public education practices and as a magnet for sustainability it is asked to transcend standard practices. Efforts to address pedagogy within the school had already been in place for a number of years before the SA was formed due to failing test scores in the school. The district clearly voiced a desire to move toward 21st Century learning skills (Partnership for 21st Century Learning [P21], 2014), place-based education, critical thinking, and engaged and active learning. Efforts to use sustainability as a lens with which to view learning had been slowly forming between SF and teachers at the school prior to the pilot year of the SA. Applying these efforts as a whole school approach to teaching was how pilot year at the SA set a new tone for pedagogy at the school. Helping faculty and staff to understand the meaning of sustainability and its context within an educational framework was a goal and a vision for the SA.

In the pilot year of the SA, there were definitive gaps between the seeds that had been planted for new methods of teaching, new methods of instruction and new outcomes for learning. Some educators understood what they needed to do and used the professional development time to apply what they learned. Others failed to see how their particular needs or subjects they wanted to teach could be applied to the concepts of ‘sustainability’ and worried that what they said were “real subjects like math and reading” would become less of a priority. There had been a tremendous success in turning around the literacy program in the years prior to the SA, and some teachers felt
like they were “just getting somewhere” and felt uncomfortable about the perceived expectations that the SA community had for student learning outcomes. Sustainability was often seen in black and white, either connected to a more liberal form of education or it was tied to a more vocational education that was rooted in environmental sciences. For others it was clearly more focused on social justice and equity. The vision for education at the SA was to have an integrated form of teaching that used sustainability as a connection between standard requirements and learning process. Sustainability was seen as a lens in which core subject matter was looked through. Yet, among the faculty at the SA there was a lot of confusion about what that meant. This was recognized at the leadership level by Shelburne Farms and was an aspect of their discussion around what makes sustainability something you know as opposed to something you are taught to do.

A member of SF tried to explain the difference: “I want it to be something that people embody rather than something they think about…not something on a piece of paper, but something they just get that is a multitude of experiences”. She felt that if “teachers could just get it [sustainability] in themselves, then they would not have to ask questions or question it…just as you don’t think about it before you remove your hand away from a hot oven…or when you know you like somebody”.

Within the curriculum, there is evidence of inquiry-based teaching practices (Stephenson, 2015). Observations of student work displayed in the hallways showed signs of students using inquiry as a lens for research and learning. The faculty interviewed around curriculum made statements about their own learning as “ongoing, iterative, continuous, adaptive, flexible”. The pedagogy shows signs of reflective
practices as well as differentiated learning and a curriculum design that places learning outcomes as a priority using backward design (Wiggins and McTighe, 1999). Those interviewed took part and participated in professional development and district workshops to improve instruction and teaching methods. District level staff development took place for *Understanding by Design*, a backwards design approach to curriculum instruction which explores how to make learning a process rather than bound to a curriculum that may “interfere with the cultivation of student understanding” and deep learning (Wiggins and McTighe, 1999, p. 12). Differentiated learning was also a focus of district workshops, providing knowledge for teachers on how to create “rich learning experiences” that “amplify intelligence” and produce learning instruction in different ways in order to reach more students (Tomlinson, 1999, p.4). In the district leadership change that had taken place before the SA, changes had already been started in pedagogy in BSD. Technical training programs were offered to teachers to view curriculum development differently than the disconnected rote instruction they had been accustomed to. There was also district understanding of the need to move away from standardized instruction methods: “The problem with public education is we build a box and try to fit kids in it rather than adjusting the box to fit the kids”. Both the sustainability coordinator at the SA and the coordinator from SF worked to help with curriculum mapping, community resources, and act as a liaison between the school and community partners for external and authentic learning opportunities for the students.

Daniel Barron, an education consultant brought in by SF, attended a PTO meeting in the first year of the pilot to help teachers and parents identify some goals for the school
and discuss some of the concerns that were creating barriers. He reminded them of their prior work with him regarding structural tension and democratic leadership. It was unclear at the time whether or not he would continue to be a consultant for the school moving forward after the pilot or he was simply there to aid in the transition. When Daniel facilitated parents to ask themselves, “what do we as families want to achieve at the school this year” one response was, “helping to be citizens of the world and the local community—one piece of it but no more or less valuable that anything else”. Daniel Barron then asked questions such as, “what evidence would we see that would show accomplishment of that goal?” The approach was helping the present parent leadership examine larger essential questions. Then Daniel Barron would guide them toward examining potential unintended consequences of a particular solution and to begin to ask questions that had not been considered. These professional development practices would then be applied back to curriculum design and educational goals and outcomes for the SA.

From a district perspective, active professional development was not just isolated to what the SA needed in their pilot year. It was a district wide approach to teaching and learning in an attempt to develop “schools as learning organizations” (Senge, 2012). This extended out to other staff such as BSD’s facilities director who said he was, “constantly learning something new”. The district would actively provide professional development that allowed the staff of the district to be able to learn relevant information to improve upon their understanding and continue to grow and learn. The director of the foods program would allow the cafeteria staff in the district to take professional development
time to learn new cooking methods or to attend workshops or conferences to increase their understanding about local food and nutritional needs of students.

In addition to providing curriculum development, capacity building around curriculum, content building capacity, and working with the families, SF continued to direct a lot of evaluation in order to determine next steps. Some questions that were still hanging in the air at the end of the pilot year were asked by SA staff such as, “how much permission do we have to be different in ways that conform with what mission the school district has given us?” For many, if they were not able to “do anything differently” then they felt they would become too discouraged to move forward. One salient question that a teacher asked in relation to the learning practices at the SA was, “how can you be different if you are not allowed to make any systems changes or structural changes that will enable you to do the things you think you should do?” One of the main issues that needed to be developed to achieve what SF staff said was the, “type of learning that we all agree is essential” was a set of appropriate assessment tools. Shelburne Farms felt that the SA would have the ability to act as a prototype to build those kinds of assessment tools, using the resources already out there and building upon what they had been developing in the 4th and 5th grades before the pilot year began. A SF staff interviewee noted, “real assessment is when we see that these children have grown up and they are in the news for something they changed for the better in the community they are in”.

Another SF staff member commented, “we will know that we have succeeded in teaching these children something right when we have to vote for them because they are running for mayor”. In their first year, there was a lot of expectation around what sustainability
education could achieve at the SA. One ex-board member said, “we will know if this was a good direction if standardized tests improve in the pilot year”. Other individuals were looking at how evaluation could take place for a more meaningful understanding of what students were learning and the efficacy of teaching practices on student outcomes. In the meetings and discussions, open questions of, “why are we educating” and, “what do our students need from us” were brought up. The hope at the time was that the discussions would remain active, the questions would continue to be asked, and that the pedagogy would continuously grow and change as the school culture changed, educational expectations shifted, and the physical environment of the SA shifted.

To help this process, the district as well as Shelburne Farms had begun a series of “field trips” to other schools that could provide a learning opportunity for members of the SA. Some parents attended the field trips as well as the SA staff and administration. These experiences allowed the SA community to be able to understand how similar their questions and struggles were with other schools that had similar demographic issues or budget constraints. The information was then brought back and shared with the rest of the faculty and discussions were held about potential solutions that were presented by the other schools. This also took place at the district level, such as the professional development that the superintendent participated in with the Society for Organizational Learning (SoL). SoL allowed the superintendent to tap into a learning organization that brought together superintendents from multiple districts around the country that wanted to and were implementing sustainability education. There were many faculty members
that were not able to participate, but felt that a clear direction and strategic plan was crafted from what they said, “others were learning when they went out there”.

3.2.7. Curriculum

One of the outcomes of the Reading First grant money was to be able to allow teachers to get together and work on curriculum that was not fragmented and allowed continuity across grade levels. Initially the goal was to achieve this for reading and literacy. Curriculum retreats took place three times a year and curriculum working groups were formed in the school in order to begin to create curriculum maps and design units of study. During the pilot year, the faculty continued on the work they had done in curriculum development in the previous six years. In addition they committed to a goal of completing two units of design a year that integrated the pedagogy that they had learned in their professional development time and toward integration of sustainability. Most of the teachers were on board and were exceeding the expectations of the coordinators at the school. The curriculum was also seen as a moving target, with improvement and change and more long-term goals in mind. The interviews indicated that curriculum design was an ongoing process and would continue to be. With respect to sustainability content, it was seen by those interviewed as a lens that required “concepts being woven into” the curriculum rather than “adding it on top”. Questions were raised in the interviews of how much ‘sustainability’ should be the focus of the curriculum and under what timeframe. One teacher identified that there was an, “expectation that the curriculum should be this new thing all about sustainability, when it is a more subtle and slow process that is much more about working over time to make changes and to continue to try to make sure that
we are providing the basics (math, reading and writing)”. There was some ambivalence as to how much of a lens sustainability could be when compared to other areas of curriculum that were viewed as more important. For instance, some participants believed that more immediate goals should be focused around providing a curriculum that could address the language barriers that exist for the students who are coming in with no ability to read or write in English and building an appropriate environment for these students to gain competence in Math and Reading. Behavioral issues getting in the way of open classroom learning structures or community service work were brought up as well. There were indications that the participants felt that behavior in certain years required taking a step back from ‘sustainability’ content to work on how to get students to behave enough to be able to just, “show up to learn”. One interview identified that the student cohort of the pilot year was particularly challenging from a behavioral standpoint and that a lot of attention had to be focused on classroom structure that would address some of these fundamental issues before emphasizing the sustainability concepts. This sentiment was also expressed in discussions at Parent Teacher Organization (PTO) meetings and school leadership meetings. There was discussion within the writing workshops on how ‘sustainability’ concepts could be interpreted in the curriculum in a way that made sense for the younger grades; some of the faculty felt that the ‘sustainability’ concepts were inappropriate for the younger children whose main focus was on learning about self and community. One parent said that there was tension between parents and teachers because parents were, “ready to move faster and deeper than the staff”. The teachers felt that they needed to “slow down” in order to ensure that they were doing a “good job before adding
on other layers”. Conversations on how much parents should participate in curriculum design took place in staff meetings. Issues, which focused on social justice and diversity, were desired by the parents, while the teachers needed, “acknowledgement for what they already accomplished”. Another aspect that had transpired over the years was creating grade teams so that there was continuity for the students to have two years with the same teacher. One teacher affirmed that, “it made a huge improvement in learning outcomes” because “our kids come from high poverty and single family homes where there is no stability. They need consistency and that can only be built over more long-term relationships”. In one interview with one of the teachers, she described the uniqueness of the community at the SA in its ability to collaborate effectively around the curriculum and work together in comparison to other schools in the district she had been involved with. According to the teachers most involved in curriculum mapping, the ability to become more serious in integrating ‘sustainability’ concepts within the curriculum framework during the pilot year seemed to be a natural part of an already thriving process. For those less involved in the mapping, there was more confusion around how ‘sustainability’ fit in their lesson plans.

There was some question of how the ending of the Reading First grant would affect resources for time to design curriculum. There would also be some leadership transition around the curriculum due to the funds no longer being available and the role becoming redundant. One leader in the curriculum design process that would be leaving to fulfill another position mentioned that it had been her goal to, “work herself out of a job so that she no longer needed to be there”.

134
Despite the difference of perception among the SA community about what should be taught and how, the curriculum maps created in the pilot year inform the SA as to how they saw sustainability \textit{at the time}, and in turn, it helps shift the culture and ethos of the community, which in turn informs the curriculum. An example would be that the pilot year curricular maps did not demonstrate sustainability in K-2 as concrete concepts, but that from 2\textsuperscript{nd} grade moving forward, it evidenced in social studies and science units. The curriculum map emphasizes the assumptions of the school’s pilot year culture about what ‘sustainability’ means. At the time of the pilot year there was an effort to try to increase place-based learning activities and service learning projects that could engage students in civic responsibility. There was also emphasis to make it a goal to be able to teach through project-based learning, but this would take time, and as one teacher said, it would, “require the behavioral issues to be resolved at the school first, because you cannot do projects with students who are out of control”.

The curriculum map that was provided for this research was the May 2010 iteration. The map included units for literacy, science, and social studies across the grades from K-5. Specific content indicating sustainability in the curriculum starts in grade two in social studies and science and ends in grade three. Other curriculum writing was being done at the time but was not completed by the end of this research. The Literacy Coach headed curricula mapping sessions with a core group of teachers as well as the Sustainability Coordinator at the SA. The goal was to have a continuous revision process that created a non-static curriculum. Specific units dealing with sustainability are aligned with Vermont state standards, indicating that the efforts at the SA are to use sustainability
as a lens in order to address specific state standards, rather than adding sustainability standards in addition to what is required to be taught. The use of Vermont’s “Guide to Education for Sustainability” is evident in the curriculum maps. The “Guide to Education for Sustainability” provides a scope and sequence of ‘big’ ideas in sustainability: sense of place; self efficacy and responsibility; community; cycles; diversity; systems; change; interdependence; equity; limits; and long-term effects (SSP, p. 13, 2011). This scope and sequence was starting to materialize in the curriculum maps in 2010 but was not fully present. A lot of community service units of study as well as economics and environment units were present. Equity units as well as units on long-term thinking (based in community), economics in relation to sustainability, environment in relation to systems and sustainability and units on well-being are evident within the unit descriptions, including some indications of them within the literacy curriculum not labeled as ‘sustainability curriculum’. An example is a two-month unit for 2nd and 3rd grade students on a study of the change over time of the street in front of the school. Economics, systems, diversity, patterns of change over time, and stewardship are some of the big ideas within the unit. Observations of student work in the halls of the SA during the year demonstrated that students were making the connections associated with community projects and concepts of well-being and citizenship. In grade one curriculum there was evidence within the units of connecting learning to the physical grounds at the SA. One example is a unit on mapping the playground and gardens at the SA and a different location for comparison. Another unit is dedicated to the materials cycle within the SA
and how students can contribute to the reuse as well as disposal of materials on the school grounds.

In terms of assessing evidence of learning about sustainability, some faculty members said they didn’t “have much to say about assessment”. Other educators were looking to reflection being a big part of assessment and students helping to design assessments of their own work, such as rubrics or other self-assessment tools. A particular challenge identified by Shelburne Farm staff was “how to assess habit of mind”. An example is how to show students are developing good habits of mind toward their communities and the environment. There were also other assessments that a SF staff member commented could be used to assess sustainability components. An example he gave was citizenship assessment tools that had been, “developed a long time ago and then dropped to focus on math and sciences, but are still there and can be used a prototypes for assessing and improving upon”. One aspect of assessment that was present was for civic engagement for the 4th and 5th grades.

To some parents they could not tell what the difference in the curriculum at the SA during the pilot year. Some of the staff felt that things had pretty much stayed the same. Those involved with curriculum development felt the changes were small but meaningful and that it would be a long and slow process. One parent noted, “the way that science is taught at the SA is very different form the other schools…it is a systems orientation to science”. This showed evidence that the scope and sequence of Vermont’s “Guide to Sustainability Education” was influencing the outcomes of core subject areas in a way that parents were noticing.
At the beginning of the pilot year, the 4th and 5th grades at the SA were asked to research a specific question of interest to them at the school. Their research question became ‘why do the ESL students have to take a test after the first day they arrive…why can’t they have a grace period so they have some time to adjust before they take their math test’. They researched the issues and presented it to the commissioner of education when he came to visit the school in its pilot year. The grants coordinator of BSD commented that, “this is what makes the SA unique…a chance to explore your own ideas and with an emphasis in social justice and following it through with the commissioner in education”.
DISCUSSION

The design process of the pilot year of the SA was heavily influenced by the public education system in the U.S., the school community’s various leaders, faculty, staff and parents, the history of what was happening with the school, Burlington School District, and Shelburne Farms. These can be seen as ‘actors’ (Senge, 2012) that generate and influence a system in which sustainability education (SE) at the SA is operating from. These actors influence the seven operational dimensions of the SA and how they interact with one another.

Sterling’s (2003, p. 264) Interrelated Framework for Education identifies that: 1) ethos/epistemology—as reflected in educational paradigm and purpose; 2) eidos—as reflected in educational policy, theory and design; and 3) praxis—as reflected in pedagogy and practice, are nested within one another to form a system in which the SA is operating from. These three big picture pieces and how they were designed in the pilot year of the SA provide a ‘baseline’. This ‘baseline’ contains a blueprint of where the SA was in relation to moving from transmissive education paradigms towards transformative education paradigms (Sterling, 2003) at the time.

The narrative of the case study organized as seven interrelated dimensions is an analysis of the pilot year of the SA and its design process. The content of the narrative is supported by a collective theoretical framework from the sustainability literature in the following ways: 1) it identifies the SA’s pilot year design process using the seven operational dimensions of Sterling (2003) and the ‘eighth’ historical dimension to look at
“system change” at the SA (Maehr & Midgley, 1996) in relation to sustainability education (SE) as defined by Sterling (2003); 2) the narrative exposes the tensions around “a shared theory of school” (Maehr & Midgley, 1996) or the shared understanding and acceptance of purpose that existed in the first pilot year of the SA and how this influenced each dimension; and 3) the case study illuminates the “leadership initiative” (Maehr & Midgley, 1996) that facilitated the design process of the pilot year and influences the changes taking place at the SA.

This narrative will be examined in relation to a recommended process for the SA to evaluate its own baseline from the pilot year using: 1) Some implications of a systemic view of education and learning (see Figure 6) which provide ‘shift’ indicators from transmissive toward transformative (Sterling, 1999 in Sterling, p. 271, 2003); 2) characteristics of a “whole systems shift” (see Figure 7) outlined by Sterling (p. 269, 2003); and 3) Symons (in Sterling, p. 68, 2001) “five key success factors” for long term change in SE (see Figure 8).

Another component of significance as argued in the literature review is to what degree SE goals were being modeled in the pilot year of the SA. The framework intended for analysis was Higgs and McMillan’s (2003) Congruence Matrix Worksheet with the adaptation of Sterling’s (2003) Operational Dimensions instead of the original six dimensions provided (see Figure 4). In order to analyze the seven dimensions using Higgs and McMillan’s (2003) Congruence Matrix, the dimensions need to be discussed in relation to one another because they operate as a school system. Examining them as
singular dimensions provides little contextual meaning to how the relational paths influence and even determine outcomes for one another.

An example is the impact that resources had on management decisions made in the pilot year of the SA with respect to teacher contracts. This led to decisions being made around professional development, which in turn, impacted curriculum development. By influencing curriculum development this cycled back around to informing management decisions. The sustainability coordinator at the SA summed up a definition of her role well when she said, “I work in a series of cycles that are all connected to one another”. Modeling can be seen as evidenced by what instructional practices are in place for students to learn from, or it can be seen as evidenced in the design process of an entire school system and how that might impact the modeling of SE in instructional practices. This case study describes the design process during the pilot year of the SA, so in terms of a metric, the seven operational dimensions of the school as a system are of interest, not the instructional practices divorced from the interrelated framework. Therefore, the guiding questions (see Figure 5) originally intended to aid an evaluator at a school to complete Higgs and McMillan’s Congruence Matrix (2003) need to be adapted to reflect the interrelated framework of school operations (Sterling, 2003). A brief example of this adaptation is provided below in Table 1.
Table 1. Management Styles and SE Goal Modeling

<table>
<thead>
<tr>
<th>SE Guiding Question (adapted from Higg’s and McMillan, 2003, pg. 66)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Long-term perspective:</strong> Did the design process in the pilot year of the SA consider the impacts of decisions in the far future as well as in the short-term?</td>
</tr>
<tr>
<td>[Original guiding question: Does the school help students consider the impacts of decisions in the far future as well as in the short-term?]</td>
</tr>
<tr>
<td>This guiding question is asked with respect to one of the seven dimensions. For this example, management style is used.</td>
</tr>
<tr>
<td><strong>Management Style:</strong> There were numerous indicators in the pilot that showed reflection of management decisions and their long-term and short-term impacts.</td>
</tr>
<tr>
<td><strong>Evidence of modeling:</strong> Making the decision to keep the existing teaching teams intact for the grades. This modeled an understanding of short-term and long-term benefits of students having the same teachers for two years. This was identified as a benefit toward learning and instruction in the long-term.</td>
</tr>
<tr>
<td><strong>Lack of modeling:</strong> a group of teachers made a decision to set forth a ‘needs assessment’ to the district without passing it by the principal of the SA. This created a great degree of miscommunication and oversight in which the short-term and long-term impacts of how this action would impact the ethos of management style was not considered.</td>
</tr>
</tbody>
</table>

As can be seen from Table 1, the original guiding question does not have relevance to the school design process. One could argue that Higgs and McMillen’s (2003) framework can only be used at the level of instructional practice. Although it might initially appear that way, Higgs and McMillen’s (2003) framework is an essential tool that can be used to determine whether SE goals are being modeled in a school system—it just needs adaptations (these are discussed later). When looking at the example in Table 1, it can be confusing to understand how SE goals that are modeled or not modeled in the design process of a school, impact students. This is where it is important to remember the literature review with respect to the design of a system and what the system delivers.
based on the design (Meadows, 1998). This influences the ethos and culture of a school, which is absorbed and felt by students. This is similar to the impact on a child that witnesses their parent eating standing up and then telling their child that they must always sit at the table to eat. The messages are inconsistent and students pick up on implicit messages implied within the culture of a school’s operations. Murray (2011) advocates that in the field of sustainability, we must be able to practice what we are educating for if we want it to make any real lasting change. When SE goals are not modeled at the design level of the school as a system a tension is created between the design of the school and the expected practices and vision of the school. Ultimately this impacts student learning. An example from the SA is the issue of having a vision for social justice set against the design of standardized testing requirements. Due to standardized testing mandates, all students at the SA must pass the same reading test at a fixed date in time regardless of how long they have been exposed to English. This is an issue since there are a great number of students at the SA who are refugees from non-English speaking countries. By the design of the testing requirements at the SA because it is a public school, a tension is created between the requirement and the vision of social justice embedded within their sustainability mission. The teachers at the SA are then beholden to pass or fail a student based on the testing requirements, rather than the student’s aptitude for learning. This tension creates an indicator of where on a continuum the SA is of transmissive or transformative process (Sterling, 2003). A further indicator would be whether this tension remains unevaluated, producing unintended consequences within the system (Senge, 2012) that remain unrecognized. The students at the SA have recognized this tension and
have brought it forward as a question to the leadership at the SA as well as the BSD. This can therefore be seen as the students modeling a practice of SE goals that the school system at the time was not.

Higgs and McMillan (2003) indicate in their own research that the modeling of SE for students might be a multi-stage process. In this research the need for an analysis of modeling behavior in the design process of the school is a more salient leverage point than evidence of modeling SE in instructional practices. Therefore, evaluating modeling in the design process of a school can be seen as a pre-requisite to modeling SE for students so that it encourages an appropriate school system for SE.

Another challenge encountered with Higg’s and McMillan’s (2003) matrix (see Figure 5) for this research was its binary nature. For example, when looking at whether or not long-term perspective was being modeled in ‘management style’ at the SA, there was not any clear definitive ‘yes’ or ‘no’ answer. There were both. This can be seen in any of the dimensions of the descriptive narrative of the SA. The framework requires a scale so that the SA can understand where on a continuum they are of modeling particular SE goals across the seven dimensions. How to create that scale is beyond the scope of this research. This research is intended to explore the design process of the pilot year of the SA to provide a descriptive baseline to use as an evaluative tool. A longitudinal study would afford the time and dedication to have continued to work with the SA to come up with an appropriate 3-point or 5 point scale with which to analyze their case in relation to evidence of modeling SE goals.
The goal of this research was to conduct an exploratory descriptive case study of the SA’s pilot year. It is a slice of time, rather than a continued research relationship. In addition, after writing the descriptive case study narrative I realized that the scope and sequence used in the curriculum maps that is taken from Vermont’s “Guide to Sustainability Education” (SSP, 2011) should be used for the row values in Higgs and McMillen’s (2003) matrix. The scope and sequence of the “Guide” (SSP, 2011) is a more appropriate place to find SE goals for the SA because it is already influencing their curriculum and pedagogy. By using their own scope and sequence to find SE goals to evaluate for modeling at the school level, the SA creates a continuous tool that can inform instructional practice with respect to modeling the SE goals chosen. This realization indicates that Higgs and McMillen’s (2003) assertions that the congruence matrix should be adapted to fit a school’s individual needs is accurate and it also aligns with Meadows (1998) comments about the need to let go of indicators that are not appropriate in order to better reflect a system.

The next part of this discussion of the analysis covers the “systems” shift aspect of the framework in which Sterling’s (2003) from transmissive toward transformative process is explored in relation to the SA. How to use the characteristics from Figures 7, 8, and 9 to analyze the descriptive narrative also requires a participatory process with the SA or with a school being evaluated using these frameworks. It is pointless for an external researcher to evaluate these processes for a school where sustainability is concerned. The bias of the researcher’s understanding of sustainability may not fit within the system of the school or how they understand sustainability. A truly appropriate
evaluation for sustainable education requires a school to understand the characteristics that are being evaluated and collaborate as a community to define where, how and for what purpose they will use the analysis to continue to learn, grow, and transform as any learning organization is required to do (Senge, 2012). Rather than provide an evaluative analysis of the case study of the SA in relation to the “system’s shift” aspect of the framework based on what I can observe from the data, the SA community can use the descriptive analysis in conjunction with the framework for evaluation that will be outlined in order to evaluate where they are. In this way, the school is be the ‘holder’ of longitudinal work, which takes out the instability of relying on external researchers such as myself.

This research’s end point is on exploring and recommending a comprehensive evaluative process by which a school can determine where they are on the continuum of an SE education that is rooted within a transformative paradigm as discussed in the literature review of this thesis. Due to the value of the case study as a ‘baseline’ for the SA, this process could be facilitated by the SA community themselves, or by another researcher interested in testing out the efficacy of the proposed evaluation framework process. Continuous updating of this evaluation framework process will be needed so it does not remain as a ‘fixed” construct. This is merely a starting point for looking at complex evaluative frameworks for SE using a holistic, systems oriented approach as defined by Sterling (2003). There are other frameworks in relation to change theory and school transformation that can be incorporated, but due to Sterling’s pioneer work on the difference between “Sustainable Education” and other forms of sustainability in
education and their limitations, this thesis explores Sterling’s (2001; 2003) frameworks in conjunction with the modeling and school transformation frameworks of Higgs and McMillan (2003) and Maehr and Midgley (1996). This suggested process is merely utilizing frameworks from the literature that appear to align best with the case study narrative and the goal of transformative education values with sustainability education in mind, and does not suggest that other frameworks are incompatible with transformational change toward sustainable education practices. An outline of a comprehensive evaluation process using adaptations of Sterling’s (2001; 2003) Sustainable Education theory, Maehr and Midgley’s (1996) school transformation theory and Higgs and McMillan’s (2003) SE modeling framework is provided below. Samples from the case study of the SA are provided to solidify the steps of the process in a practical and applicable context. The examples are meant for the understanding of how to apply the process, rather than provide a definitive evaluation of the SA’s pilot year.

**Step 1 – Creating a School Baseline Using Descriptive Case Study Analysis**

Create a ‘baseline’ descriptive case study to use for analysis. For this research the SA design process was documented in its first official pilot year. However, a school does not need to be in its pilot year to conduct a ‘baseline’ study. A similar ‘baseline’ could be conducted at the SA now and achieve the same purpose, with hopefully, dramatically different data. The baseline provides a ‘slice of time’ in a school system that allows the community to reflect on its practices, visions, successes and barriers in relation to school transformation with respect to sustainability education. The case study needs to be conducted by a neutral third party that does not have political or social influence within
the school and can conduct qualitative research. Although an external qualitative researcher brings their own bias (Merriam, 1998), their ability to “tell it like it is” (Yin, 1994) is more likely than a community member of a school. In addition, individuals being interviewed are more open to discuss issues honestly with a neutral party (Yin, 1994). The case study should be provided to the school or community being studied once it is complete in order to complete the process outlined.

The case study of the SA reflects and is supported by Maehr and Midgley’s (1996) framework on school transformation with respect to: “systems change”; “leadership initiative”; and “shared theory of school” (p. 129) within each of the eight interrelated dimensions of school operations that provide a whole systems view using the adaptation to Sterling’s (2003) seven interrelated operational dimensions (see Figure 10) or the original framework (see Figure 9). Therefore, any school interested in using the same framework for their baseline case study should aim to answer the questions provided below in Table 2.
Table 2. Baseline Case Study Guiding Questions

<table>
<thead>
<tr>
<th>Baseline Case Study Guiding Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does this case study encompass the seven interrelated operational dimensions of the school’s system (Sterling, p.271, 2003)?</td>
</tr>
<tr>
<td>Are the seven interrelated operational dimensions embedded within a historical context for the school as a system of change for an added eighth, interrelated dimension?</td>
</tr>
<tr>
<td>Does the case study reflect the leadership initiative within the eight interrelated dimensions?</td>
</tr>
<tr>
<td>Does the case study reflect the “shared theory of school” within the eight interrelated dimensions?</td>
</tr>
</tbody>
</table>

Using the SA as an example, the guiding questions in Table 2 can be answered at a broad level in the affirmative. The description in the case study is rich with detail on the various leadership positions and how they influenced the design process of the SA. There are a great number of examples in the case study narrative where “shared theory of school” is identified as an issue that creates tensions among the actors in the SA community and within the interrelated pathways of each of the seven dimensions analyzed. An example is that there is a defined theoretical vision and definition of sustainability for the SA, which the SA has placed on their website (Sustainability Academy, 2009). However, in the pilot year of the SA, there was still a tremendous amount of anxiety and confusion around what ‘sustainability’ meant for the actors in the SA community. This meant that at the time of the pilot year, a deeply defined shared theory of school at the SA had not yet been established. Three main components created both tension and glue: magnet to achieve socioeconomic integration, school for sustainability education, and neighborhood school.
These three prongs are a foundation with which to build a stronger shared theory of school and how that process continues for the SA will determine to what degree they are moving from transmissive practices toward transformative ones (Sterling, 2003). The narrative from the case study informs the SA community that they need to work on deepening and establishing a shared theory of school. The ‘baseline’ delivers valuable information to a school about the “ethos/epistemology”, “eidos”, and “praxis” (Sterling, p. 264) of the school culture at that time in relation to shared theory of school.

Another component during the development of the case study needed to understand the desired school culture for sustainability is the short (2-5 years) and long-term (5-10 year) visions for sustainability in the school at the time. In this case study, short and long-term visions were requested at each of the interviews as described in the coding and analysis section. This data created a ‘vision baseline’ of sustainability for the SA. This data is an invaluable tool that the SA can use to inform their progress and to examine the shifting in their thinking as their design process continues. These shifts of thinking might create a need to change and adapt visions, better align them, and/or move toward a more common and shared vision. The short and long-term visions of sustainability at the SA were aggregated according to similarities using a third party who had no involvement in the case study research or any knowledge of what the SA was. I am not sure whether this step is necessary, but because I had been so involved over the year with the SA and because of my background in sustainability, it was important to mitigate bias as much as possible. The short and long-term vision templates for the SA
are provided in Appendices A and B. A small section is provided below in Table 3 to demonstrate its purpose as an evaluative tool.

Table 3. Vision Weighting Exercise

<table>
<thead>
<tr>
<th>Management Style</th>
<th>Ethos</th>
<th>Physical Structure</th>
<th>Resource Management</th>
<th>Community Links</th>
<th>Curriculum</th>
<th>Pedagogy, Research, Learning, Inquiry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diversity focused hiring practices</td>
<td>1</td>
<td>2</td>
<td>7</td>
<td>3</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Continuity in Staff &amp; Faculty</td>
<td>2</td>
<td>1</td>
<td>7</td>
<td>4</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Curriculum design Retreats</td>
<td>2</td>
<td>5</td>
<td>7</td>
<td>1</td>
<td>6</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 3 provides the “Seven Operational Dimensions of an Educational Institution” (Sterling, p. 273, 2003) across the columns and the short-term visions of the SA’s pilot year data in the rows. Table 3 is a truncated sample of the short-term visions of the SA taken from Appendix A. The long-term visions are provided in a separate template, found in Appendix B. A numerical value system, ‘1’ being the strongest and ‘7’ being the weakest, is used to identify which of the dimensions most directly influence the actualization of the visions in the rows. ‘Diversity focused hiring practices’ at the SA was an issue that was discussed at length by the SA community throughout the pilot year. As the BSD stated they had a management style that believed in and supported sustainability education, shifting hiring practices to encourage more diversity in the school district would be a way to move from the transmissive state that hiring practices were at during
the pilot year toward a more transformative state. The dimension having the most direct impact on this vision being achieved is the ‘management style’. The SA management style was seen to have five sub-dimensions at the time of the pilot: district level; key partnership level; principal level; committee and staff level; and parent level with student leadership embedded within committee and parent level. So for the case of the SA, the ‘management style’ dimension would be further broken down to those five sub-dimensions and weighted on a numeric scale from ‘1’ being the strongest to ‘5’ being the weakest in terms of influence on adapting diversity focused hiring practices. It might seem that some of the dimensions do not influence the desired vision, but because the dimensions are interrelated, this is not possible. Take the example of ‘continuity in staff and faculty’ in relation to a value of ‘7’ for ‘physical structure’ (as seen in Table 3). Classroom location and physical design of the learning structure at the SA do cause some issues in relation to continuity among the faculty and staff because the building has small classrooms that are segregated from one another. Although this might not be a core issue for achieving the vision, there is a degree of influence because they are interrelated.

With respect to the short and long-term visions: in Step 1 only the creation and numerical valuation of the short and long-term visions across the dimensions of a school should be accomplished as demonstrated in Table 3. Figuring out the transmissive and transformative elements that influence the actualization of these visions can only be done after completing the readings and scatterplot activity in Step 2 of this framework process. The numerical valuing is subjective, and therefore, if it is done in groups it allows for
cross-comparison, discussion and final agreement that can be reflected in a final table to use for further analysis at anytime after Step 2 has been completed.

**Step 2-Reviewing and Discussing Selected Indicators for Sustainable Education**

School community participants read the following sets of indicators and participate in the recommended exercises for each of the following readings:

1. characteristics of a “whole systems shift” (see Figure 7) outlined by Sterling (p. 269, 2003).

These broad characteristics of a school’s “systems shift” (Sterling, 2003) are useful indicators to guide a school toward understanding the difference between systems reflecting transmissive process versus transformative processes (Sterling, 2003). There are four “P’s” which define this: “paradigm”, “purpose”, “policy”, and “practice” (Sterling, p. 270, 2003). The four “P’s” are dynamic and interrelated. This means that the practices of a school form a new root metaphor of being at the paradigm level, replacing an old paradigm that is rooted in mechanistic and reductive approaches to education (Sterling, 2003), and vice versa. In order to better understand how to apply these characteristics in an evaluative process, ‘paradigm’ will be used below as an example in relation to the SA case study.

**Paradigm:** instead of education reflecting a paradigm founded on a mechanistic root metaphor and embracing reductionism, positivism, and objectivism, it begins to reflect a paradigm founded on a living systems or ecological metaphor and view of the world, embracing holism, systemisism, and critical subjectivity. This give rise to a change of ethos and purpose… (Sterling, p.270, 2003)
It was established earlier in this thesis that the SA was founded in the “mechanistic root metaphor” (Sterling, 2003) because it is a public elementary school. The ‘old’ education paradigm, which is the one that the US public education system largely still operates from, is reductive, positivist and objectivist (Sterling, 2001; Orr, 1994). Before the pilot year began, the SA had already begun moving toward at least holism and critical subjectivity which can be seen in the school’s interest and willingness to work with Shelburne Farms (SF). According to one SF staff, SF could finally take a “whole school approach”. This interest is indicative of leadership, understanding and the need to begin to transform an entire school culture, rather than working through just the curriculum or service learning pieces, or with one or two teachers as SF had done in the past. The initial work between SF and the SA—prior to the school being a magnet school for sustainability— is rooted in what Sterling (2003) refers to as the ‘ecological paradigm’. Evidence of this can be found in the mission and vision of Shelburne Farms and their Sustainable Schools Project (SSP) (Shelburne Farms, 2015) as well as the actions and steps they took to be involved and to collaborate in the pilot year of the SA. The principal’s understanding of sustainability as well as many of the staff members reflected aspects of a ‘new’ paradigm for education and expressed frustration and resolve to find ways to move past the mechanistic barriers they perceived to be in their way of creating a more relevant school culture that was sustainable, healthy, and met the needs of the student body. The districts coordination and interest in sustainability was another indication of this paradigm ‘movement’ in which the leader of the district envisioned deep and meaningful change, not just for the SA, but for the entire district. Efforts of
local and organic food programs in the cafeterias and maintenance strategies to update buildings that were creating economic and environmental issues are also indicators of this shift at the SA. This also showed the beginnings of a systems approach to the education in BSD, not just an approach to the SA or to one magnet program. There was recognition by the key leadership in the pilot year that the efforts needed to be expanded out into the larger community of Burlington and that the community of Burlington needed to have value for this type of cultural movement. There was also a lot of acknowledgment from the SA that there was still work to be done. Behavioral issues with the students created barriers to open classrooms and project based teaching. Teacher contracts that were inflexible and unrealistic to the requirements of an SE school were still in place and there were diversity issues in terms of district hiring that were being discussed. There were also questions around the continued time blocks for appropriate professional development and the need to change the learning block schedules in the school for students. These are only a few examples of areas in which the SA was still closer on a spectrum to the ‘old’ paradigm structure. They are not intended to provide a judgment or evaluation of the SA but an example of how the SA can use the case study conducted in conjunction with the framework for a self-evaluation of their school. Ideally, a school would read the 4 “P’s” (Sterling, 2003) and have some kind of group discussion to understand what they mean and identify areas in which they see these characteristics within their school. This information is then preserved and compared to the ‘baseline’ case study that was performed in Step 1. This would be a priming exercise for the community to begin to understand transmissive vs. transformative concepts and evaluate what type of continuum
their school is on and where they were at on that continuum at the time the ‘baseline’ was completed.

2. “Implications of a Systemic View of Education and Learning” (see Figure 6) (Sterling, 1999 in Sterling, p. 271, 2003)

These implications take the broader characteristics from the first reading and provide some practical indicators that can help a school identify their ‘shift’ from transmissive toward transformative processes. Sterling notes that these are “some” implications (Sterling, 2003), implying that indicators are not exhaustive and a school might come up with additional indicators that are not in Figure 6. There are a total of twenty-one implications in Figure 6. A school can read through and discuss which indicators are applicable and prioritize according to their needs at the time or come up with their own set of implications and use the reading as a guideline. A school must evaluate for themselves what they are ready for.

In the case of the SA, choosing a small set of indicators from the twenty-one would be an appropriate start because of the level of ambiguity that was felt in the pilot year around ethos, eidos and praxis (Sterling, 2003) toward SE. Once the set of implications/indicators are chosen, they should be assigned a corresponding numerical value based on priority next to the implication/indicator—such as ‘1’, ‘2’, ‘3’ and so on (1 being of most importance to the school). The implications/indicators selected are then provided to each group participating in reviewing the case study. Each group can then use the number associated with the implication to make annotations in the narrative of each dimension of the case study where the indicator is evident. If it is not evident, then the
annotation for that implication/indicator should not be made. This exercise can be done in many styles. For example, one group can divide the indicators across group members to annotate and then combine at the end or have each individual in the group annotate for all the indicators and then compare the group findings and create a master annotation within the group.

The first implication/indicator in Figure 6: “a shift from fixed knowledge towards recognizing uncertainty and ‘other ways of knowing’” (Sterling 1999 in Sterling, p. 271, 2003) is a good example to use with the case study of the SA because of its priority in their design process. One could assign this indicator a numerical value of ‘1’ and then annotate for it within the SA case study. I have pulled out some annotations of where this indicator showed up and where it was absent as an example of the annotative process for the SA below.

The historical dimension of the case study indicates a dramatic shift from “fixed knowledge toward recognizing uncertainty and ‘other ways of knowing’” (Sterling 1999 in Sterling, p. 271, 2003). In 2005 the district was in a position to close the school and felt economically justified in doing so. It took a tremendous shift from this “fixed position” to embrace the alternative of keeping it open. The change in leadership in the BSD in early 2006 opened a door to embrace ‘other ways of knowing’. Contrastingly, historically and in the pilot year, the SA community expressed ambiguity as to whether Jeannie C., the superintendent of BSD at the time, was open to ways of knowing beyond her own fixed ideas. The case study narrative suggests that both perspectives hold some truth. The new superintendent shifted a fixed decision to close the school by responding
to the community, and how she shifted the school from closing may have been a mixture of her own fixed ideas on socioeconomic integration and interest in sustainability. However, the result was that Lawrence Barnes went from a neighborhood school that was going to close toward a sustainability themed magnet school that stayed open. There was evident tension for the SA in the pilot year around whether they could remain a neighborhood school—a professed desire among some participants— or would need to let go of that vision due to the magnet school pulling students from throughout the district. The unintended consequences (Senge, 2012) of this shift are not to be ignored. In 2009 there was only one student that came from outside the neighborhood. There was hope that socioeconomic integration could continue to be achieved from the neighborhood.

Recognizing where and how these indicative shifts occurred in the baseline, how they impacted each dimension of the school and identifying unintended consequences (Senge, 2012) informs the 4 “P’s” (Sterling, 2003) in the first reading. With this knowledge, schools are able to ask deeper questions and continue to shape and shift their culture for SE toward transformative processes. In the case of the SA, they can ask some of the tough questions around the social equity aspect of SE in their vision in relation to having to bus kids and turn away neighborhood kids from the school to fulfill their magnet criteria.

The exercise of ‘implication/indicator annotation’ across the dimensions of the baseline creates a natural weighting system of a school’s shift from transmissive toward transformative processes (Sterling, 2003) with respect to the chosen implications
identified *at the time*. The absence of a shift *from* transmissive *toward* transformative processes within specific dimensions of the school is equally informative. A scatterplot can be created to show a visual of the continuum the school is on *at the time* in relation to a “whole systems shift” (Sterling, 2003). This can be done by placing a large sheet of paper in the room and having each group of participants place the recorded number of dots for each implication across all the dimensions. The result is a visual tool that provides an evaluation of the ‘baseline’ as to what degree the school is operating *toward* a transformative paradigm for SE. An example of how a scatterplot for this activity would look is seen in Figure 11 below.
The scatterplot contains arbitrary values and is meant only to visually demonstrate how the data from this process can be aggregated to identify a school continuum in relation to SE. According to the information garnered from the scatterplot a school can use it to further shift their design process toward a transformative school culture for SE.

3. Symons (in Sterling, p. 68, 2001) “five key success factors” for long term change in SE (see Figure 8)

This reading is designed to identify success factors for long-term change in SE. The five success factors can be used as guiding questions that a school can respond to according to
what they evidenced in their annotation of their ‘baseline’. An example of guiding questions of the five key success factors for the SA is provided below in Table 4.

<table>
<thead>
<tr>
<th>Key Success Factor Guiding Questions for the SA</th>
<th>(adapted from Symons in Sterling, p. 68, 2001) “five key success factors”</th>
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</thead>
<tbody>
<tr>
<td>4. Is the SA community raising staff awareness of sustainability issues?</td>
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<tr>
<td>5. Is the SA taking a whole school approach?</td>
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<tr>
<td>6. Is the SA involving pupils in decision-making processes?</td>
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<tr>
<td>7. Is the SA increasing involvement with the broader community?</td>
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<tr>
<td>8. Is the SA taking one step at a time?</td>
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</tbody>
</table>

The guiding questions adapted from the “five key success factors” of SE change in schools (Symons in Sterling, p. 68, 2001) can be answered in a discussion. Examples from the ‘baseline’ case study narrative are used to demonstrate evidence of these factors, or a lack thereof. With respect to the second question in Table 4, the scatterplot will help to inform a response for this question. The answers to these questions are meant to drive the analysis of the scatterplot toward a design process built for success. A set of implications for continued work in these five areas can be created as a document that can aid in driving essential goals for the school system.

**Step 3—Determining the Degree of Modeling of SE Within School Culture**

Now that Steps 1 and 2 are complete, the framework for modeling SE values at the systems level of a school can be accomplished. The congruence matrix of Higgs and McMillan (2003) can be adapted and placed within a ‘school system’ context for SE. As
mentioned earlier in the discussion, the SE values chosen by Higgs and McMillan can be used in conjunction with reframing the guiding questions (see Table 1 for an example) of the congruence matrix to demonstrate modeling of the SE values across Sterling’s (2003) seven operational dimensions. In addition, in cases like with the SA, where they have a defined scope and sequence, the SE values in the rows of Higgs and McMillan’s matrix can be adapted to better suit a school’s specific SE goals. The question now is how to create a scale by which a school community can determine to what degree it is modeling a particular SE goal. The scope of this research cannot answer what type of scale it should be; whether it is some type of Likert scale or it should be a numerical scale. What is clear from this research is that it cannot be binary. Another possibility is the formation of some type of modeling rubric that can be used to evaluate each of the dimensions. How to create a scale for modeling SE across the dimensions of a school is not achieved by this research, but the knowledge that it is critical to show to evidence of modeling SE goals within the dimensions in this evaluation process has been argued for and supported by the framework in this research.

*Step 4—Examining Short and Long-Term Visions in Relation to the Whole*

This step is not necessarily the 4th and can be done anytime once Step 2 of the evaluation process is complete. Short-and long-term visions can be reviewed with respect to the ‘state’ of each dimension in relation to evidence of transformational processes (seen in the scatterplot for the chosen implications). This can be used to prioritize visions, better align the visions to the need of the school in achieving a balance, or in recognizing the limitations of the school *at the time* and choosing less advanced visionary goals.
Creating some intermediary steps more aligned with the schools capabilities at the time might be appropriate.

As an example for the SA, it was clear in the pilot year that behavioral challenges at the school were creating a barrier to move toward more transformative pedagogical practices. This made some of the teachers feel that they could not achieve ‘sustainability’ until the behavioral issues in the school were resolved. This tension placed behavioral problems outside of ‘sustainability’ at the school, rather than making it their primary focus for their vision at the school in relation to meeting the social justice component for sustainability (Sustainability Academy, 2009). OFSTED (2009) found a correlation of the increase in SE in schools to improving attitudes and behavior, so it might be that, in time, as the SA evolves, the pedagogy might shift behavioral issues as much as focusing on behavioral issues as a component of sustainability might shift the pedagogy. This requires a deep understanding that sustainability is a ‘vehicular idea’ (McClenonn, 2004; Temenos & McCann, 2012) and interrelated within all the school dimensions (Sterling, 2003).

This growth in understanding of ‘sustainability’ as an idea can then influence the ethos and pedagogy of the school culture toward more transformative processes. Meadows (1998) reminds us that often times it is the indicator that creates a barrier to the system we want to create. In this case the SA’s set of ‘indicators’ for how to define ‘sustainability’ in the pilot year were a barrier to creating the system they desired. However, the SA was, at the time, deeply committed to removing “fixed ideas” as a construct for design process. The SA was actively recognizing “uncertainty” and embracing “other ways of knowing” during the pilot year (Sterling, 1999 in Sterling, p.
This shows movement from transmissive constructs toward a systems approach of “seeing, knowing and doing” (Sterling, p. 423, 2003), thus creating transformative constructs.

**Step 5—Creating Appropriate Measures to Achieve Transformative Goals for SE**

A school can use a ‘dotmocracy’ exercise, or some other form of group prioritizing method to choose which dimensions, implications, and success factors the school will focus on first, or to develop a timeline. To do this the: 1) vision template from Step 1 and 4; 2) scatterplot from Step 2; and 3) five successes document from Step 2 can be used to generate a final evaluative tool and recommended process for SE.

Leverage point (Meadows, 1997) or other systems (Senge, 2012) and visioning materials such as those by Robert Fritz (1999) can be use to aid in prioritizing and determining what ‘next steps’ or ‘processes’ are feasible for a particular school. For a ‘dotmocracy’ exercise—a tool that Shelburne Farms used with the SA in their pilot year—participants place dots or ‘votes’ next to the dimensions and implications they would like to focus on most. There can be a limitation to the number of dots or ‘votes’ each participant can have or it can be unlimited. The ‘votes’ are then counted and the implications with the most dots for each dimension advance to a final document.

*Note: it is good to use a democratic process for determining what should be focused on because it fits within SE goals (Sterling, 2003), but it also depends on the schools management style. If a school has a more hierarchical management style at the time of the evaluation, it might be that the areas are only chosen by one person, or by a small group of people. This only further informs a school as to where they are on the*
continuum of transmissive toward transformative processes (Sterling, 2003) in relation to management style. In the case of the SA, they had a core group of parents, teachers, and school leadership that would consistently attend workshops with Shelburne Farms to further the design process of the SA. A goal of increasing parent engagement and community participation is apparent from the case study. So, the core group of participants at the SA might eventually shift toward one with more diversity and an increase of participation from the whole SA community, and therefore, provide wholly different outcomes during the evaluation process. Alternatively, the SA might shift back toward more transmissive decision making processes and the implications might be chosen by one or two key leadership figures.

This part of the process provides next steps for a school and increases knowledge and awareness of where the school was at the time of the evaluation in relation to “whole systems change” toward SE (Sterling, 2003). A final document should be created in terms of a timeline or a flow chart or a hierarchy of needs for the school to focus on in order to continue to shift toward transformative processes.

Being able to use this evaluative framework to deeply and systemically define where a school is with relation to SE paradigms is critical to understanding whether the school is contributing to the creation of a ‘new paradigm’ (Capra, 1996). The evaluative framework developed from this research proposes a step by step process by which the broad frameworks of: 1) school transformation of system change, leadership initiative, and shared theory of school (Maehr and Midgley, 1996); 2) interrelated operational dimensions of a school, implications of a systemic view, basic shifts in the four ‘P’
(Sterling, p. 270, 2003); 3) five key success factors for sustaining change in school (Symons in Sterling, p. 68, 2003); and modeling of SE (Higgs and McMillen 2003) can be used to analyze the ‘baseline’ of a school for where they are on the continuum of a “whole systems shift” toward SE. These broad frameworks were adapted to build a practical ‘on the ground’ step-by-step evaluative process for school communities interested in or already practicing SE to participate in.

This evaluative process is proposed in order to avoid further ‘greenwashing’ of SE efforts in education that merely provide a ‘sustainability fix’ (While, et. al. 2004) which occur by continuing to operate in a paradigm that is not designed for deep and meaningful change (Orr, 1994). The suggested evaluative framework can help a school self-assess and identify, at the systems level, realistic leverage points (Meadows, 1997) to focus their change efforts on— given the parameters of the school system at the time of the ‘baseline’. This type of iterative and participative evaluation can be used to continue to build toward the cultural paradigm shift of SE identified in the literature review of this research.
CONCLUSION

In 2004, The United Nations declared 2005-2014 as the decade for ESD and called for government bodies, NGO’s, businesses and educators to begin to form ways of implementing education for sustainable development as a global initiative (UNESCO, 2013). It is now 2015. The move from a paradigm that undermines movement toward deep and meaningful change as a culture is upon us. Educators and learning institutions are being asked to cast aside beliefs and dogmatic roots that inhibit them from being vehicles for the social change movement of sustainability.

As an educator and a parent, I see that the following decade must try to capture the many experiences and stories that educators, schools, and communities have to offer to one another so that change might continue—so that preservation of what works can be shared. How to capture these experiences is as important as the experiences themselves. If we are to incite whole systems change within education, then we must also ‘capture’ evidence of this change in a systems oriented context that is deep, practical and uses a foundational framework that is of a ‘new paradigm’. Otherwise the lens that we are assessing or evaluating from is not capable of providing evidence of real and effective changes taking place.

The analysis of education studied as a separate discipline, even in the area of sustainability, only results in a narrow understanding of the whole (Banathy, 1992). This thesis was my attempt to explore how to examine the design process of the SA with a systems view to identify evidence of “whole systems change” (Sterling, 2003). A lot of
research frameworks from others have been used to identify what type of evaluation process could capture a holistic and meaningful picture. This picture informs the continued growth and work within a school. The process I have developed from this research is not perfect, it is a starting point and an exploration that needs to be tested in context and therefore, somewhat incomplete. Interviews and frequent visitations or ethnographic studies where a researcher lives within a culture for a lengthy period of time are very valuable ways to research organizational culture (Maehr and Midgley, 1996). Unfortunately, due to personal life changes, I moved away from the BSD and could not complete the entire process. This thesis is a template for where to pick up the ‘ball’ and continue this work.

The SA as a community can use this thesis as a baseline and a suggestion of how to move forward and reflect and continue to learn and grow. A school interested in or practicing SE can use this research as a method to evaluate their own school at a systemic level for indicators of change toward the transformative paradigm that Sterling (2003) and others in this thesis refer to. The frameworks identified as moving toward this paradigm shift were broad and theoretical, difficult to use ‘on the ground’ from a practical standpoint to create a holistic picture. The suggested step-by-step process for evaluation outlined in the discussion is an effort to apply the broader theoretical constructs in a way in which school can really learn from them.

This is my best answer as to how we can achieve what Sterling (2003) is asking of us at this time. More work needs to be done. I was not able to perceive an appropriate scale for modeling of SE within a school system. I feel this is something that would be
worked out ‘on the ground’ where community participation can provide the intelligence and relevance needed. Longitudinal studies in education are few and far between because of funding barriers and researcher limitations such as my own. I am asserting here that longitudinal studies will be key to appropriate evaluation of SE in any community due to the ‘vehicular’ nature of sustainability and the natural course of social evolution. The rapid and alarming rates of change in our natural environment and the pressure that places on us will also influence to what degree our understanding of ‘sustainability’ deepens and becomes effective as a new social paradigm.

Another area that was brought up during the pilot year of the SA and that I have seen in my work as a major focus, is that of replicability of a school’s design process for SE. I do not believe we can achieve replicability of any SE program. As seen from this case study, the complexity of actors involved in shaping and defining the SA cannot be replicated anywhere else. However, deep insight can be gained from understanding their design process from a systems lens. An evaluation process such as the one built from this research can be used in any school to develop an understanding of what their unique idea of sustainability is and how that is reflected in the ethos of their school community.

Although I am no longer directly connected to the SA community, I continue to research their achievements. There are many articles in the last couple of years which evidence students from the SA impacting community decisions and helping to shape local policy. Links to these achievements can be found on the Shelburne Farms website (SSP, 2011) as well as the SA’s website (Sustainability Academy, 2009). In my professional life I have been through the doors of many different types of schools trying to implement
Education for Sustainability. I have rarely found in all my years of consulting and research a school which could potentially embody “the heart or feeling” of sustainability. When I interviewed someone from Shelburne Farms, they had said, “they wanted the SA to know sustainability in their bodies”. At the time of the pilot, the SA community was struggling between what they knew and what they felt they should understand. I directly witnessed the core elements of how I see and define sustainability evidenced in their continued struggle and I believe that they are a school of change. I think that they need to be realistic about how long it might take before they can clearly see this articulated in their ethos and practice. It will take the SA a great deal of time to break out of the current education paradigm they are beholden to as a public elementary school. However, I feel that the focus of the community at the SA should turn toward its beautiful process thus far for guidance and reflection as to where they are on the continuum and how to build a sustainable design process along the way.

My understanding of ‘sustainability’ is ‘vehicular’ just as anyone else’s. I began this research in 2009, and along the way, my own perceptions and views of sustainability have also shifted and grown. Since 2009, I worked as a consultant with hundreds of teachers who were frustrated with the frameworks provided to implement SE. During my professional days working as a consultant, I became less prescriptive and shifted toward a more participatory process for defining sustainability with schools. This reflects the approach that Shelburne Farms is taking with respect to the SA, and although it takes more time to solidify constructs, it is about long-term change that will last and be successful. The suggested process in this research is in no way a prescription for schools;
it is a process that utilizes the knowledge already out there to have some kind of starting point to move toward more transformative experiences in education.

Since 2009, I have become a mother, and as such, I have begun to see sustainability through the lens of parenting. I see the same tension between transmissive and transformative paradigms in parenting theories and practices that I do in the education sector. I, like Paul Murray (2011), have witnessed my personal actions often not aligning with what I have taught professionally about good sustainability practices. I see evidence of that in my family choices, my purchasing choices, and my daily behavior. I am also somewhere along the continuum and it is not a linear process— it can be quite recursive at times. My job as an individual ‘system’ is to identify where on the continuum I am today and to find some small leverage points I can use to shift myself toward the transformational paradigm I am seeking. This is really the deeper work that needs to be done to create what Murray (2011) refers to as the ‘sustainable self’. But that is another subject matter, or is it?
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185
### APPENDIX A

Short Term (2-5 year) Vision and Goals Template for the SA

<table>
<thead>
<tr>
<th>Management Style</th>
<th>Ethos</th>
<th>Physical Structure</th>
<th>Resource Management</th>
<th>Community Links</th>
<th>Curriculum</th>
<th>Pedagogy, Research, Learning, Inquiry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diversity focused hiring practices</td>
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<td>Continuity in Staff &amp; Faculty</td>
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<td>Curriculum design Retreats</td>
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<td>Additional Shelburne Farms units per year</td>
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<td>Continued Leadership from Shelburne Farms</td>
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<td>ESL Program for Parents</td>
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<td>Anti-Racism Training</td>
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<td>Maintaining a sense of Joy</td>
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<td>Working with diversity of staff interests</td>
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<td>Core curriculum Improvement (Applied Sciences &amp; Math integrated, Critical Thinking)</td>
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<td>Local Food &amp; Gardens at school</td>
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<td>External evaluation of efficacy of instructions &amp; curricula</td>
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<td>Improvement in Standardized test scores</td>
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<td>Benchmark for evaluation with strategy for improvement</td>
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<td>Well articulated summary of what the Sustainability Academy is and its visions</td>
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<td>Professional development for teachers</td>
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<td>Dialogues regarding progressions in learned lessons to next steps</td>
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<td>Protocols for evaluation</td>
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<td>Iterative curriculum that adapts</td>
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<td>Data metrics measurement and analysis</td>
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<td>Building infrastructure need to match sustainability understanding</td>
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<td>Critical conversations between parents and teachers</td>
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<td>Documentation of actions taken for curriculum, systems, behavioral issues.</td>
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<td>Increase parent engagement</td>
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<td>Community center with outreach programs for family home life</td>
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### APPENDIX B

Long Term (5-10 year) Vision and Goals Template for the SA

<table>
<thead>
<tr>
<th>Management Style</th>
<th>Ethos</th>
<th>Physical Structure</th>
<th>Resource Management</th>
<th>Community Links</th>
<th>Curriculum</th>
<th>Pedagogy, Research, Learning, Inquiry</th>
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</thead>
<tbody>
<tr>
<td>A school people want to be part of</td>
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<td>Focus on instruction and student achievement</td>
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<td>Continued devotion to school and students</td>
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<td>School is seen as part of whole community drawing parental engagement</td>
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<td>Staff buy in from onset increasing integration and collaboration; meanwhile reducing reliance only on Shelburne Farms</td>
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<td>Instilling community responsibility for students in the long term</td>
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<td>Respond resiliently to change</td>
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<td>Continued future assessment</td>
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<td>Flexibility in framework</td>
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<td>Teacher practice profile</td>
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<td>Organic learning toward service and place based education</td>
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<td>Teacher mentoring other teachers up and down the grade levels</td>
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<td>Forward looking development for the kids in regards to middle school and then high school</td>
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<td>Student involvement through developing passions toward making the world a better place</td>
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<td>Fewer behavioral challenges</td>
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<td>Less absenteeism</td>
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<td>Higher graduation rates</td>
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<td>Pilot assessment on how students can improve standard scores through sustainability work</td>
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<td>Public transportation system for kids and families</td>
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<td>Longitudinal research to track what kids are doing as an indicator of success</td>
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<td>Exploring work in higher education options connected to sustainability theme</td>
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<td>Measure students’ abilities in thinking and seeing patterns and integrated solutions</td>
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<td>Strong principals who are strong advocates for the community</td>
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<td>SA as a community hub</td>
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<td>Living wages for people living in the district</td>
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<td>Sustainability curriculum in middle and high schools</td>
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<td>Metrics and data collection to facilitate evaluations</td>
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<td>Meet changing population needs in Burlington</td>
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<td>Update understanding of sustainability as it changes over time</td>
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<td>Differentiated teacher contracts</td>
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<td>Twice monthly professional development between faculty and staff</td>
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<td>Outdoor education program scaffolded across grades.</td>
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<td>Hiring of an assistant principal</td>
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<td>More flexibility with funding</td>
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<td>More fluid job entry and exit</td>
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<td>High schools continuing sustainability lesson efforts</td>
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<td>Bring entire district facilities around</td>
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<td>Additions to LB to increase class sizes</td>
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<td>Improving physical infrastructures to meet green goals</td>
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<td>Community and Kids in the kitchen</td>
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<td>SA becoming a community magnet for local non-profits in terms of food</td>
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<td>Extended trips to natural areas</td>
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<td>Additional outdoor curriculums</td>
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<td>Curriculum nights for parents and teachers</td>
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<td>Goal setting conferences with students and parents</td>
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