AN ETHNOGRAPHIC CASE STUDY OF THE ENACTMENT OF ACTION GARDENING IN AN URBAN MIDDLE SCHOOL AGRICULTURAL SCIENCE CLASS

by

HEATHER ANN RUDOLPH

(Under the Direction of Deborah Tippins)

ABSTRACT

The purpose of this study was to examine garden based science learning in an eighth grade agricultural science class. This ethnographic case study sought to understand how a group of eighth grade students and their teacher experienced enactment of the theory of action gardening as they worked to relate agricultural science concepts to their lives, including supports and constraints. Place conscious education (PCE) was used as a theoretical framework because it calls for a sense of agency in learning, emphasizing the importance of relevant knowledge as well as active and democratic community participation, all of which are tenets of the theory of action gardening.

Data collection methods included informal and semi-structured interviews, participant observations, fieldnotes, reflective journaling between the researcher and teacher, and a separate researcher journal. Data was organized and interpreted through summative and in-progress memos, visual organization, and in-depth analysis. Five main themes are discussed: community, family and peer relationships contributed to shared common values; community supports of garden based learning (GBL) contributed to the perception of school as a valued place of

learning; curriculum structured around relevancy and physical activity encouraged students' active involvement in the learning process; and GBL promoted problem solving, critical thinking and displays of student autonomy.

Findings have implications for further research, particularly the need for a longitudinal study of students continuing into high school to determine how and if the theory of action gardening influences their choices and a study of how the teacher changes her enactment of the theory of action gardening with more experience in using it. Implications for practitioners include the necessity of planning and having a support system in place before beginning GBL curriculum. Practitioners are encouraged to embrace community diversity through engagement of willing volunteers in all aspects of GBL.

INDEX WORDS: Ethnographic case study, science education, middle school, theory of action gardening, garden based learning, place conscious education, agricultural science; relevancy; active learning; community

AN ETHNOGRAPHIC CASE STUDY OF THE ENACTMENT OF ACTION GARDENING IN AN URBAN MIDDLE SCHOOL AGRICULTURAL SCIENCE CLASS

by

HEATHER ANN RUDOLPH

BS, Eastern Oregon University, 1996

MS, University of Idaho, 2004

A Dissertation Submitted to the Graduate Faculty of The University of Georgia in Partial Fulfillment of the Requirements for the Degree

DOCTOR OF PHILOSOPHY

ATHENS, GEORGIA

2015

AN ETHNOGRAPHIC CASE STUDY OF THE ENACTMENT OF ACTION GARDENING IN AN URBAN MIDDLE SCHOOL AGRICULTURAL SCIENCE CLASS

by

HEATHER ANN RUDOLPH

Major Professor:	Deborah Tippins
Committee:	Kathleen deMarrais
	David F. Jackson
	Cory Buxton

Electronic Version Approved:

Suzanne Barbour
Dean of the Graduate School
The University of Georgia
August 2015

DEDICATION

For my grandparents, Raymond T. and Esther P. Rudolph, who helped lay the foundation that supported me in this journey. As Grama said, “It’s a struggle,” but like Grampa, I always find something to make me laugh and then I take another step.

ACKNOWLEDGEMENTS

Many people helped me persevere in this journey and I wish to thank all of you for the variety of contributions whether it was Etta Roberts taking care of me when I first came and was clueless, Helen Rogers cheerfully filling out forms at the last minute and finding the right people to sign them, or meeting fellow grad students for coffee and mutual support sessions. Thank you for every piece of advice, support, smile, and friendly hello.

To my parents, Tom and Karen Rudolph, and sisters, Katrina and Sara, for never telling me I couldn't do something. Thanks for letting me go on my never-ending adventures and not saying, "I told you so" when things didn't work out which they often don't. I wouldn't be who or where I am without the love and support of my family.

To Todd, a huge part of my support system in Georgia and very good friend, for letting me invade your house countless times to study sleep and eat, taking me on top-down rides to air out my brain, listening to my complaints and rants and then telling me I could do it and that I would be fine. Your patience, lawn care, dinners, advice, and friendship are appreciated more than I can express.

To Dr. deMarrais for pushing me and pushing some more, gently and sometimes not so gently encouraging, for being a wonderful model, and saying, "Of course you can," when I thought I probably shouldn't even be in the program.

To Dr. Tippins for editing so many times she may have parts of this memorized. I appreciate your patience with me when I didn't have any for myself, helping me get to conferences (Hotels are so expensive!), and for taking me on when I know your plate is already overflowing.

To Drs. Jackson and Buxton, thanks for serving on my committee. Thank you for your advice and comments toward making my prospectus and dissertation better.

To my fellow grad students who trudged through the process with me, some finishing before, some later. I am so glad for the time we spent together discussing classes, writing papers, drinking coffee, sharing papers to read, or just giving hugs on a rough day. I'll see you at the conferences and enjoy amazing my students with my "connections" when I tell them, "Oh yeah, I know Dr…."

To Dr. Norm Thomson, who started this program with me but whose body couldn't quite make it to the end. Thank you for your encouragement, support, and reigniting my curiosity and the sheer joy of learning. I'm so glad we had the time together we did. Yes, Dr. Thomson, I'm still playing.

To Dr. Eloise Dielman who encouraged me to first get a Masters and assured me I should go on to get a PhD. You were right. I can do it and I did.

To Paul, who always, always, always responds, "Of course you can!" Thank you.

TABLE OF CONTENTS

Page

APPENDICES

LIST OF TABLES

Page

LIST OF FIGURES

Page

CHAPTER 1

INTRODUCTION

The pocketknife was textured black plastic, with two steel blades, and a small silver decoration that looked like a knight's shield. The blades were not particularly sharp but they suited the purposes of my eight year old activities. Secondhand knife folded and safely stored in the small, front pocket of my faded Lee jeans, I walked intently on the unpaved gravel street that led up the hill to my uncle's garden. I wanted to pick a kohlrabi and the knife made removing the leaves and thick, green skin easier. I squeezed between the wooden poles of the corral fence, stopped to pet our horse, walked across the pasture, crawled under the barbed wire fence, and with a glance toward the house, walked into the garden, put both hands around the leaves, and pulled a kohlrabi from the rich, brown soil. The dirt was soft under my tennis shoes as I quickly left the garden and retraced my path, peeling my treasure and leaving a kohlrabi trail toward my family's house a block away. This was one of my favorite summer experiences, eating a whole raw, crunchy, fresh, delicious kohlrabi by myself.

In the above paragraph, I described a scene from my childhood in a rural eastern Oregon town. My uncle, Bill, grew an organic garden. Stirring in leaves and cow manure in the fall, he worked for years to get the soil I remember. My immediate family raised rabbits, beef, a pig, and Dad hunted deer and elk. Bill gave us his "undesirables," like giant, seedy zucchini, and we ate quite well from what he considered inferior produce.

Despite this background in growing our own food, I did not make a connection between school subjects and home life. School was easy for me because I was good at sitting quietly,

reading, taking notes, and taking tests. I knew I had to get good grades in high school to be awarded scholarships that would pay for college. I worked enough to get A's and B's. I wanted to be a veterinarian so I got a weekend job cleaning kennels and surgical instruments at the vet's office. Mom said I needed more experience seeing what vets really do before I could decide that I really wanted to be one.

In high school I took agricultural science[1] (ag) and joined Future Farmers of America (FFA) so I could learn more about animals. Since I did not grow up on a farm, I felt like an outsider to the other ag kids. They were the country kids who rode school busses in from ranches and farms around the valley. They had grown up together and I was the kid from town who walked funny and refused to tell anyone that I had rheumatoid arthritis. I just wanted to be like them. My parents bought a "small" acreage during the beginning of my sophomore year. Their 120 acres was a "hobby farm" compared to the hundreds or even thousands of acres that my new friends lived and worked on.

Though my days were busy with school, homework, FFA and 4-H activities after school, everything was neatly compartmentalized. School was school. Work was work. I did not see the overlap between my ag class where we learned what healthy soil should look like and Bill's gardening methods, or the time my parents spent out in the fields at our new property, trying to adjust the soil pH so alfalfa would grow. I did not feel curious about the ground squirrels and hawks I saw when I went out to ride horses, despite being in biology class in school. In short, I felt no connection between the place I lived, including the culture of my family and town, and

[1] Agricultural science was referred to as "ag" in my high school and at the school where I did this study therefore I will use the common term "ag" throughout my dissertation. Similarly, the agricultural science teacher will be called the ag teacher. Since this is an ethnographic case study which focused on the culture being studied, I used the language of that culture as much as possible.

the science I was learning at school which was intended to guide me into my expected career in a science field.

Rationale for Study

In considering my education, I have seen a lot of missed opportunities to make connections between my educational experiences within school hours and outside of school, especially connecting science and place. For example, I did not understand why I was supposed to learn what was on the test. I knew I had to do well on tests because good grades were needed to get scholarships and get into college. Much of my formal education, despite the A's I earned, felt superficial because I applied it only to the tests but not to my life. Coming from a blue collar background, I learned the value of practical applications of learning, but until recently had not thought about how informal learning experiences in my grandfather's woodshop or my grandmother's kitchen shaped my life and how they could have been combined with public school education. Combining lessons learned at home with those in school can be used to make learning more meaningful to more people, such as students at the schools and their family members within the community.

I was drawn to this research through a lifelong connection to agricultural science and my desire to share a love of the outdoors with others. For this ethnographic case study, I spent one semester with an eighth grade ag class who participated in garden-based learning (GBL) experiences. While I learned, observed and participated with the students and their teacher, I was able to explore how enactment of a theory of action gardening contributed to their learning. I investigated GBL and how it connected the school, the community, the teacher, and the students through a theoretical framework of place conscious education. In a time of standardized testing and top down management, this case study stepped back to consider Dewey's (1916) promotion

of experiential learning and democratic education as components of action gardening and relied on students' and the teacher's perceptions of what was significant to them.

Overview of Literature Review

American schools kept gardens as early as the 1800's and included them in students' hands-on, experiential lessons. Dewey (1903) promoted garden learning in schools in the early 1900's. "War Gardens," later called "Victory Gardens," were heavily promoted during World War I as a way to promote self-sufficiency by growing food in vacant spaces to replace what was sent to Europe (Miller, 2003). Heavily supported by the Department of Agriculture, World War II brought resurgence in growing Victory Gardens as citizens' patriotic duty, including gardening linked to schools (Blair, 2009; Miller, 2003). The civil rights movements of the 1960's and 70's incorporated another wave of school gardening in America (Mitchell, 2013).

Recently, some garden based learning (GBL) studies have leaned toward tests and curriculum that they felt showed quantifiable positive learning results with the use of gardens (Dirks & Orvis, 2005; Klemmer, Waliczek & Zajicek, 2005b). Several authors of GBL research brought up the friction resulting from what they felt were conflicts between educating students for their futures and demonstrating required proficiency levels on standardized tests (Dirks & Orvis, 2005; Klemmer et al., 2005b; Pigg, Zajicek & Waliczek, 2006). Despite the friction, many studies between 2005 and 2014 focused on obtaining results related to standardized testing and GBL (Dirks & Orvis, 2005; Klemmer, et al., 2005b; Smith & Motsenbocker, 2005). Junior Master Gardening curriculum and tests developed at Texas A & M University were used in several studies between 2005 and 2014 (Cater, Fox & Fletcher, 2012; Dirks & Orvis, 2005; Klemmer, Waliczek, and Zajicek, 2005a; Klemmer, Waliczek, & Zajicek, 2005b; Pigg, Zajicek & Waliczek, 2006). Researchers acknowledged that standardized testing is a driving force in

what is taught and how, but many questioned if it is really what will be most useful to future communities of which currents students will be a part (Eppley, 2011; McInerney, Smyth & Down, 2011; Showalter, 2013).

Several recent studies emphasized the importance of school gardens for elementary children in learning plant life cycles and other ecology concepts (Cutter-Mackenzie, 2009; Eick, 2012; Fleszar & Gwardys-Szczesna, 2009). Some research emphasized environmental learning via garden aspects (Graham, Beall, Lussier, McLaughlin, & Zidenberg-Cherr, 2005; Ruiz-Gallardo, Verde & Valdés, 2013). These studies investigated ways in which school gardens provided students with opportunities for direct contact with nature, developed their talents and interests, and enhanced their ecological observations including plant identification and animal life cycles.

Besides targeting younger students, many studies were conducted in schools with high ethnic diversity and large populations of low socioeconomic status students (Cater, Fox, and Fletcher, 2012; Kelley & Williams, 2013; Smith & Motsenbocker, 2005). For example, 75% of students qualified for free and reduced lunch, 41% were English as second language learners, and 55% of students were minorities in Skinner, Chi, and The Learning-Gardens Educational Assessment, Group 1's (2012) study. Cutter-Mackenzie (2009) used this diversity to the advantage of students' and their community, including grandparents and multicultural gardening aspects in the students' learning time. Researchers found that garden experience facilitated a sense of belonging and involved family members (Cutter-Mackenzie, 2009).

Teacher education research between 2005 and 2014 on GBL included a focus on reflective practices and interactive learning between teachers and students. For example, Tal and

Morag (2009) studied the use of reflective practice in assisting teachers preparing to use gardens or other outdoor learning opportunities.

In conclusion, many educational research findings supported school gardens as beneficial to youth health (Ruiz-Gallardo, Verde & Valdez, 2013), the development of positive attitudes (Dirks & Ovis, 2005), community building (Cutter-Mackenzie, 2009), and academic achievement (Klemmer, 2005a). The emphasis in many studies was on schools of lower socioeconomic status (Kelley & Williams, 2013; Skinner, Chi, & The Learning-Gardens Educational Assessment, Group 1, 2012). Also prominent was a concentration on learning about plant life cycles through gardening (Fleszar & Gwardys-Szczesna, 2009; Graham et al., 2005). Research themes included community involvement, connections to the environment, teacher learning, and motivation of students involved in GBL.

The literature review in chapter two will describe empirical GBL research conducted in the last ten years. Some of the search terms used to find current research included school gardens, garden science, garden based learning, and garden based education. Research was not excluded from any countries unless there was no English translation available. Georgia Library Learning Online (GALILEO) which is the online library portal used by the University System of Georgia was used to search for empirical garden based learning studies. It searches more than ninety databases and the University libraries catalog.

Overview of the Theory of Action Gardening

Of special interest to this study was Debra Mitchell's theory of action gardening (2013) which includes gardens as more than a way of teaching science. The theory of action gardening involves action, love of living things, care, community development and support, prophetic pragmatism, radical democracy, and science education. Mitchell (2013) described action,

prophetic pragmatism and radical democracy as follows. Action is "advocating and acting on the behalf of other species and other human beings" and "developing relationships in authentic situations in which youth themselves live" (Mitchell, 2013, p. 10). An example of this was described by Cater et al. (2012) in which excess produce grown in school gardens was given to citizens of the community. Prophetic pragmatism has to do with acting on change at the grassroots level. Mitchell (2013) summarized

> "when applied to science education West's prophetic pragmatism can be used to analyze socioscientific issues, serving as a catalyst for youth action based in some foundations of knowledge, challenging and empowering youth to become engaged citizens, and promoting skills of problem-solving, decision-making, and critical thinking in an uncertain future" (p. 24).

In her use of prophetic pragmatism, Mitchell advocates for a "bottom up" change for students in which they learn to advocate for themselves and others, including other species, for a healthier environment. Radical democracy is a form of pragmatism in action. Love ethic is "what drives prophetic pragmatism" (Mitchell, 2013, p. 68) and is simply caring for others. Mitchell continued by connecting the three concepts. "The love ethic is required for prophetic pragmatism, and radical democracy describes the action that extends from a prophetic pragmatist perspective, in turn clearing the path for continued prophetic pragmatism" (p. 69). The theory of action gardening promotes care for self and the community through taking action for better living and empowerment of those involved.

There are three main tenets central to Mitchell's (2013) theory of action gardening. The first is that it offers resolution to societal crises through the claim that reciprocal relationships established in the garden can result in action for others. Reciprocal relations are developed as

gardeners provide care for the plants and in turn, the plants are providing a type of care for the gardeners in the form of nutrition, education, and emotional calmness (Blair, 2009;Graham et al., 2005; Klemmer, et al., 2005b). Other reciprocal relationships develop between students and their teacher, the teacher and the garden, the school environment and students, and the students and the garden (Mitchell, 2013). These reciprocal relationships help students learn to care for others as they encounter them in their lives.

Supported by research, another tenet of the theory is that experiences in the garden can provide understandings that guide choices for the future, can teach people to work toward equity, and aid in establishment of bonds of community based in relationships of care and love (Blair, 2009; Bowker & Tearle, 2007; Mitchell, 2013). Benefits of spirituality, support for the sociocultural dimensions of science, and youth action are other components of action gardening. McInerney et al.(2011) and Dopico and Garcia-Vasquez (2011) cite studies, including their own, that demonstrate the importance of establishing an ethic of care for the environment and a connection with authentic community improvement projects in support of school retention and student engagement. For example, McInerney et al. (2011) stated that "students began to see a greater purpose in their schooling" and the projects "helped extend their social networks and enhance employment prospects" (p. 9).

A final principle of action gardening focuses on promotion of youth action, care, and democracy as ways to teach children how to make choices. Mitchell (2013) stated, "Life is happening now; choices affecting the future are made now" (p. 7). This focus was highlighted in Mitchell's extensive exploration of prophetic pragmatism in which philosopher Cornel West calls for action and engaged citizenship. Connected to this is radical democracy which Mitchell (2013) called radical because it is a "democracy of action willing to venture outside the norm for

the greater good" (p. 107). Making choices and enacting those decisions are important to action gardening's ability to change lives.

Statement of the Problem and its Significance

Few recent GBL studies were conducted in the middle school contexts and those that were did not typically include student perspectives or direct interactions with students (Bowker & Tearle, 2007). Although Bowker and Tearle's (2007) and Green's (2012) garden-based studies include student and researcher interaction, they were both at elementary school levels. Other studies, like McInerney et al's (2011), investigated high school level students' learning and perceptions of gardening.

Several recent studies based on gardening and/or place conscious education contained aspects of action gardening, such as care for others and learning to be a conscientious citizen of the community, but none are framed in a theory of action gardening (Green, 2012; McInerney et al, 2011; Ruiz-Gallardo, Verde, & Valdés, 2013). Lack of studies including students' perspectives alongside teachers', especially at the middle school level and none framed in the terms of the theory of action gardening led me to the following research purpose and questions.

Research Purpose and Questions

Using place conscious education, my research purpose is to examine garden based science learning in an eighth grade agricultural science class. This purpose led me to the following three research questions:

1) How does a middle school teacher enact a theory of action gardening in an agriculture science class?

2) How do middle school agricultural science students experience the enacted action gardening curriculum?

3) What supports and constrains the enactment of action gardening in a middle school classroom?

Overview of Theoretical Framework

The theoretical framework used in this study is place conscious education (PCE). Place based learning and place conscious learning are other terms used to describe PCE. I used place conscious education to theoretically frame this study. Van Eijck and Roth (2010) defined PCE as "An approach to education where local setting becomes the integrating element in students' education" (p. 871). Another way of looking at PCE is place-as-difference which includes sociopolitical differences in how place is perceived by different cultures and genders, as described by Karrow and Fazio (2010). Karrow and Fazio (2010) added place-as-being to the PCE framework, contributing an ontological realm to its evolution.

Place conscious education can be a way to prevent what Dewey (1916) called the "waste" or "frustration" of school curriculum not connecting with what is learned at home. Research in rural situations (Showalter, 2013) and urban areas (Lim & Barton, 2010) demonstrated relevance of PCE in a wide variety of places. Eppley (2011) stated a goal of PCE is to prepare citizens to "understand and influence the place in which they live" (p. 90).

Many researchers responded to the criticism that PCE limits learning topics to the local area (Gruenwald & Smith, 2008; Semken & Brandt, 2010; Sobel, 2004). For example, Smith and Sobel (2010) countered this misconception with examples of PCE as varied as Rural School and Community Trust projects from Maine to Louisiana and inner city schools investigating critical issues such as green space as a place of social justice, homelessness, and community revitalization to learn history. Many studies concluded that PCE was beneficial because it taught people a sense of agency by emphasizing the importance of relevant knowledge and experiences

for active and democratic community participation (Buxton, 2010; Eppley, 2011; Lim, 2010; Resor, 2010).

Overview of Methodology

I used ethnographic case study because my research was conducted with a particular teacher as she enacted the theory of action gardening with her agriculture science middle school class. Case study allows in depth empirical inquiry and within real-life context (Yin, 2009). Stake (1995) called a case "an integrated system" (p. 2), comparing a case study to a leaf because they are both complex. He reminded readers that the case study has to be something of interest and complexity. Ethnographic case study focuses on a certain project or program while trying to understand it within its socio-cultural context (Simons, 2009).

Mitchell's (2013) theory of action gardening in combination with educational research findings that support school gardens as beneficial to youth health, attitudes, community building, and academic achievement made case study a good methodology for further investigation of the questions of interest. The principal criterion for this case is to maximize what can be learned about implementation of a theory of action gardening. I conducted a single case study. Primary participants in this case study included Denise Hill (pseudonym), the ag science teacher, and three eighth grade students in one classroom. Secondary participants included four eighth grade students comprising the same middle school class, a VISTA (volunteer in service to America) volunteer, and a graduate student from the local university.

I used three common methods found in case study research to generate data: interviews, participant observations and reflexive journaling (Simons, 2009; Stake, 1995; Yin, 2009). This study was conducted over six months, beginning in July 2014. Fieldnotes based on participant observations assisted in capturing the details of this case and in providing the thick rich

description of an ethnographic case study. Prolonged engagement in the field, persistent observation, triangulation of data, and member checks with the participants ensured quality of this case study. Lincoln and Guba (1986) called these measures parallel to rigor, a term used in "scientific' understandings of research results. Details of the methodology will be expanded on in chapter three.

Overview of the Study

Chapter one has been a summary of where this research began related to my life experiences and included an overview of literature, action gardening, theoretical framework, and methodology. Chapter two includes a literature review of garden-based learning and evolution of the theoretical framework, place conscious education, will be described. Chapter three will include an expanded methodology and the study purpose and research questions. Chapter Three details the ethnographic case study design and methods used in the study. The context of the study, including city, school, classroom, gardening areas, participating teacher and students begins the chapter. The description of methodology will include rationale for selecting a case study approach, case selection criteria, a discussion of how the case was bounded, how data was generated and analyzed, and how quality was built into the case study. Chapter four will represent the context of the action gardening approach being used with this middle school class. This chapter will be written as an ethnographic case study narrative. Chapter five will discuss the themes and interpretation of the data. Chapter six conclude the dissertation with a discussion of tensions related to the research questions, concluding remarks, and implications for future research and practice.

CHAPTER 2

MAKING CONNECTIONS: GARDEN BASED LEARNING AND PLACE CONSCIOUS EDUCATION

This chapter includes a review of empirical studies using school gardens as a context for K-12 science teaching and learning. A review and discussion of current conceptualizations of place conscious education (PCE), its evolution and history, and studies in which it was applied follows the garden based learning (GBL) section. The chapter ends with a discussion of how and why GBL and PCE can be connected and their significance to my study at Magnolia Middle School[2].

Garden Based Learning

Science has been called "mysterious and opaque…a set of objective truths and absolute realities to be approached—abstract, disembodied, and decontextualized" (Avraamidou & Osborne, 2009, p. 1684). In contrast to this description, gardens have been described as excellent sites for interdisciplinary, hands-on, experiential and contextualized science learning. Many books, scholarly articles, and professional organizations support gardening as a method of interdisciplinary science learning for all ages and abilities of learners (Kirby, 2008; Peacock & Pratt, 2011; Rye, Selmer, Pennington, Vanhorn, Fox & Kane, 2012; Skinner, Chi, LEAG, 2012; NSTA, 2015). Human and plant nutrition, plant identification, soil composition, insect life cycles and identification, microorganisms, and even chemistry are all science subjects involved in gardening.

[2] All names of people and places except my uncle and hometown are pseudonyms.

The garden based learning (GBL) section of this chapter was organized by studies with similar themes which were reflected in the literature of the last ten years. Cronin, Ryan and Coughlin (2007) recommended reviews of literature encompass the past five to ten years of research because the goal is to bring the reader up-to-date on "current knowledge and highlighting the significance of new research" (p. 38). Garden based learning is introduced in the next section and continues with a review of recent literature beginning with studies that used a standardized test with a Junior Master Gardener (JMG) curriculum to investigate GBL in 2005. From there, GBL research is highlighted that encompassed cultural influences, community interactions, and sustainability. Studies that link GBL to motivation, empowerment, and community benefit are described in the next section of the chapter. This section ends with challenges to GBL in schools.

What is Garden Based Learning?

Willams and Dixon (2013) stated that garden based learning (GBL) is an instructional strategy that uses a garden as a teaching tool. They argued that the recent support of GBL in schools comes from a convergence of public concerns about obesity, health, food insecurity, and a lack of outdoor learning experiences for children. Programs such as The Edible Schoolyard in Berkley, the JMG programs, and Denver Urban Gardens have sprung up across the United States to increase GBL opportunities in schools. Gardening programs were distinct and varied by their locale. For example, gardens were sometimes potted plants in a classroom or raised beds on asphalt (Graham et al., 2005), habitat and butterfly gardens (Cutter-Mackenzie, 2009), or revitalized wetlands (Green, 2008). School gardens were grown in a variety of places and sizes and were often used to engage students with hands-on, experiential learning as indicated in the

studies just mentioned. In the next section, studies that attempted to measure learning outcomes through GBL in schools are described.

What are Students Learning through Gardening and How Can It Be Measured?

Fleszar and Gwardys-Szczesna's (2009) research in Poland (2009) reported the benefits of gardens in the learning and teaching process. One hundred thirty-eight reports were analyzed over three years. The reports, written by university students about experiences teaching primary students in school garden settings, were analyzed and results were coded into twenty-two categories. The researchers found that school gardens give students opportunities for direct contact with nature, develop their talents and interests, and engage them in conducting phenomenological and ecological observations including plant identification and plant and animal life cycles. Similar to other studies, results emphasized the importance of school gardens for elementary children in learning plant life cycles and ecology concepts (Cutter-Mackenzie, 2009; Eick, 2012).

A large quantitative study conducted by Graham et al. (2005) focused on school gardens in California. Principals were contacted by email and traditional mail to participate in a survey designed to determine the status of school gardens including their uses, perceived barriers to effectiveness, and available resources. Seventy-three percent of respondents were in urban schools and thirteen percent were in middle schools. Principals reported that gardens were used for enhancement of academic instruction, mostly in teaching environmental studies, science and nutrition. Sixty-nine percent of the principals rated gardens as moderate to very effective in teaching science. A common barrier to GBL in this and other studies was that teachers were often held accountable for tending the gardens and many had no previous experience with school gardens (Cater et al., 2012; Eick, 2012; Graham et al., 2005). Survey results suggested

curriculum supportive of garden incorporation in lessons would be helpful. Future research areas suggested by Graham et al. (2005) included time management, resource management, and the need for professional development to assist teachers' use of gardens more effectively. Cutter-Mackenzie (2009), Kelley and Williams (2013), Pascoe and Wyatt-Smith (2013), and others responded to the request for professional development.

Texas A & M University influenced a series of studies published in 2005 and 2006 when researchers developed three tests to measure science learning in the context of school gardening in third, fourth, and fifth grades (Dirks & Ovis, 2005; Klemmer, Waliczek, and Zajicek, 2005a; Pigg, Zajicek, & Waliczek, 2006). The tests, one for each grade level, were based on the Junior Master Gardener (JMG) curriculum and consisted of forty questions, ten from each of four chapters. The final version was then administered to 647 students in third through fifth grades in seven Texas schools. Results are discussed in the next paragraph, written up in Klemmer et al. (2005b).

Klemmer et al. (2005b) used the three tests, one for each grade level as described above, to assess whether scores actually changed when a school gardening curriculum was added to students' regular classroom curriculum. For each test, a control group received a JMG curriculum guide at the end of the school year and the experimental group received it at the beginning of the year and used it throughout. At the end of the school year, all students took the grade appropriate test (described in Klemmer et al., 2005a). For example, all fifth grade students took the test appropriate for their learning level. Students who participated in the hands-on gardening experiments scored significantly higher than students in the control group. Fifth grade students scored significantly higher than third and fourth grade students. In this large sample, findings supported the inclusion of hands-on gardening experiences with classroom learning to

increase science test scores. Older students showed larger learning improvements than the younger students.

Building on Klemmer et al.'s (2005a, 2005b) studies, Dirks and Ovis (2005) conducted research in Indiana with third grade students to investigate if the use of the JMG program increased agricultural awareness and knowledge in a formal classroom setting. Junior Master Gardening programs were designed by Texas A & M University researchers specifically for implementation with youth in school gardens and included curriculum for subjects such as science and environmental education (Dirks & Ovis, 2005). Students participated in activities related to increased science achievement and development of positive attitudes toward science, horticulture and the environment. Eight classes had garden areas or outdoor classrooms and seven did not. Pretests and posttests were administered at variable times during the ten to twelve week program. Participant observations were done during the activities. Participants included 14 teachers and 277 students. Post program qualitative open ended and closed surveys were given to students and teachers. Results of the study showed significant gains in science, particularly agricultural and environmental knowledge covered in the program. Overall positive changes in attitude toward science and agriculture and toward the program were noted. This study was similar to other studies because it analyzed results at the elementary level and centered on the use of the JMG program. It was unique because it included community service projects as part of the program.

Studies that measured outcomes of GBL through standardized tests and programs have been described in this section. Researchers investigated changes in science, environmental, and agricultural content knowledge, attitudes toward the environment and science, and uses of school gardens. Overall positive changes were noted with suggestions of providing professional

development for teachers who choose to use GBL with their classes. The next section includes studies of GBL that incorporated students' culturally diverse backgrounds as relevant learning material.

Garden Based Learning Stimulated by Diversity

Hammond and Brandt (2004) recommended an anthropological approach to science education. This approach was suggested by Hammond and Brandt (2004) not as a panacea but as a "way of transforming science into a tool that can give agency to all people" (p. 42). The researchers argued that science is not a natural activity even for Western children in first world societies because it is a socio-historically situated cultural activity and must be formally learned. They stated that the methods used in an anthropological approach can assist in seeing through insider's eyes, such as those of the teachers, students, and principals. For example, Hammond (2001) used school gardening similarly to Cutter-Mackenzie (2009) in which immigrants forced from their native lands and living in a different culture were able to create some familiarity and a sense of "home." The Iu Mienh were displaced members of a Southeast Asian hill tribe due to war in Vietnam who relocated to California. With no traditional secular written language, their knowledge was considered irrelevant to the urban environment they moved to. A project called the Bilingual Integrated Science Curriculum Project (BICOMP) created relevant science curricula for language minority students. As part of science centered reform at the school level, BICOMP created an environment where grandparents and parents were able to share their knowledge about horticulture through establishment of a heritage garden and Iu Mienh field house at the school. These two places were used to explore science in a familiar context, that of a Southeast Asian garden. Through application of anthropological techniques, this project involved family members as co-researchers in creating community books for school children, teachers and

researchers learned about cultural dialogue needed to integrate Iu Mienh knowledge with California state science standards, and student teachers and teachers became involved with the process of enacting strategies and working through challenges when teaching language minority students through use of culturally appropriate methods centered around the gardens.

Bowker and Tearle's (2007) international study investigated what school gardening experiences meant to school children in India, Kenya, and England who participated in them. Their main research question was: What similar and different features are noted by students on three continents relating to school gardens? As part of a large international program, Gardens for Life (GfL), one class in each of six schools with two schools per country were included in this study. Students' ages ranged from 7 to 14 years old. The study was conducted during the first year of the program and included many students with limited English proficiency. In India and Kenya, English was usually the children's third language. Researchers gained an understanding of perceptions and attitudes toward school gardens via collection and interpretation of the written and spoken word, diagrams, pictures and field notes. They analyzed concept maps, interviews in English, contextual observations and a drawing of the school garden from each child. Key findings indicated schools and children were strongly influenced by their environments and cultures which, in turn, influenced children's perceptions and understandings of the gardens. For example, during a dry spell Kenyan students often referenced lack of water during interviews and contextual observations. In contrast, English students saw gardens as a place to play and Indian students emphasized curricular connections most strongly of the three groups. All groups used affective words to describe their positive feelings toward school gardens. Researchers found explicit global and local environmental connections between gardening and school, although they noted it most with the Indian children. Kenyan and English children seemed mostly to relate

their gardens at the local level. This research is similar to other studies because it looks at agricultural connection between gardens and children's lives (Dirks & Ovis, 2005), local connections (Cutter-Mackenzie, 2009), and analyzes what children are learning through gardening (Cater et al., 2012). The authors noted that a lot of research has been done that concerns children but not much has been done by direct interaction with the children.

An Australian study by Cutter-Mackenzie (2009) proposed to gage children's learning experiences as participants in multicultural school gardens. This study investigated place based science learning in a multicultural environment. The researcher conducted inquiry-based experiential learning with 10 students who were 6 to 12 years old and mostly Afghanistan and Sudanese. One researcher, several teachers, and several grandparents participated in the study. The 10 student researchers kept journals, took pictures, conducted interviews, and then met in focus group interviews with the researcher to discuss their experiences. Results of the study indicated that the garden experience provided a connection to the local environment, enhanced opportunities for students to learn English, and developed a space that facilitated a sense of belonging (Cutter-Mackenzie, 2009). Furthermore, the garden provided a place to transcend language and cultural differences and involved family members. Similar to other studies, environmental learning via garden aspects was emphasized (Graham et al., 2005; Ruiz-Gallardo et al., 2013).

Studies in this section found GBL as a way of developing a sense of belonging and that cultural aspects influenced how the garden was perceived. Researchers included students' perspectives in their investigations by directly engaging with them, a strategy missing in many studies about children. The next section will discuss research that included GBL through community interactions and sustainability.

Garden Based Learning Encourages Community Interactions and Sustainability

Cater et al. (2012) used the JMG curriculum to link curriculum and outdoor classrooms with school gardens and classroom instruction. Curriculum kits were distributed by community programs that included 4-H Seeds of Service, 4-H Youth development, and Master Gardeners to 10 schools with 875 students in high poverty areas of Louisiana. Teachers participated in professional development that included garden basics, educational gardening, and service learning. Twenty-three teachers responded to an email questionnaire which investigated curriculum implementation, reach of the garden program, and use of garden products. Similar to other studies, it focused on low income communities (Smith & Motsenbocker, 2005) and used JMG curriculum (Klemmer et al., 2005b). Ninety-six percent of teachers said it was the first time they had developed a school garden (Cater et al., 2012). Teachers most likely to include garden curriculum had prior gardening experience. Most classrooms tasted the garden produce (87%) with surplus being sent home with students, sold, or donated to needy families. The majority of gardens were vegetable and most JMG lessons taught included plant growth and development. Math (61%) and science (83%) were the most common subjects taught using the JMG curriculum. Social studies was the least likely to be included (8%). Researchers suggested further inquiry in areas like marketing of excess produce and the importance of service learning.

Pascoe and Wyatt-Smith (2013) investigated how school gardens worked as a physical and curricular space to facilitate literacy across several disciplines. Their study focused on elementary students learning about plant cycles and eating what they grew, community interaction at one school, and involved multiple topics of learning like chicken husbandry, soil health and plant growth. Their study reflected underlying ideologies such as more time spent in gardening activities is better for learning, community interaction supports learning, and literacy

is a central component of education. Methods of data collection for this case study included semi-structured interviews, participant observations, and collection of secondary data source material from five interviewees: one fifth grade teacher, one principal, one kitchen garden coordinator, and two fifth graders. Key findings included the importance of meaningful integration for increasing learner engagement, literacy and numeracy improvements in some areas tested which may be related to the garden, and recognition that professional development is important to guiding teachers' implementation of gardens in their curriculum. It was similar to other studies in that it focused on elementary students learning about plant cycles and eating what they grew. This study was unique because it focused on interdisciplinary literacy, sustainability learning seen outside the school community, and provided professional development for teachers which improved their attitudes toward the garden.

Related to school gardening and community involvement, Fusco (2001) examined a community-based science project in which urban youth residing in a low-income housing facility created a practicing culture of science learning in which they transformed an empty lot into a usable community space. Fifteen 12 to 16 year olds participated in the nine month biweekly science project. The project investigated the ways in which relevant science learning was created through a garden experience. The final project proposal included vegetable and flower gardens, a stage for cultural events, a pond, a birdbath, garbage cans, compost bins, picnic table, a wheelchair accessible garden path and game tables on which to play chess. Fusco (2001) concluded that the practicing culture of science learning was relevant because concerns, interests, and experiences of the youth who were involved were what created the project. It was a long-term process of the young people doing the research and then enacting their ideas, by situating the garden within the broader community.

This section highlighted studies that included community interactions with schools and community sustainability. As with much GBL research, elementary level students and plant life cycles were part of the focus. The role of professional development in school gardening was evidenced in many of the studies. In the next section, research will be discussed that centered around motivation, empowerment and community benefits resulting from GBL.

Motivation, Empowerment, and Community Benefits through Garden Based Learning

Ideological perspectives associated with a study in Spain focused on assumptions that skills learned through education benefit the educated individual and the community. Ruiz-Gallardo et al. (2013) argued that hands-on, experiential learning motivates students to learn, working with the land enables people to feel more relaxed, and working with plants reduces aggression. Their research purpose was to determine the influence of a GBL program on disruptive and low performance secondary school students. Research was conducted at a middle class, public high school in suburban Spain in which students averaged 16 hours per week in GBL activities. Thirty activities were designed by teachers and university educators. Sixty-three students and 10 teachers were involved over 6 years, with students usually spending 2 years in the GBL program. Six students in the program dropped out of the school over 6 years. Trends in dropout rates, disruptive behavior episodes, and graduation rates were compared during the 6 years of the study. School failure rates and number of disruptive episodes decreased substantially. Dropout rates went from an initial 30 percent to zero percent in some years. Teachers noted improvement in students' self esteem, confidence and skills. The GBL program was specifically created to reduce dropout rates and school failure rates and was found to be successful. Ruiz-Gallardo et al. (2013) concluded that GBL involves good practices for reaching

disengaged young people. Kelley and Williams (2013) also found beneficial effects of gardening on behavior of "problem" students.

In 2012, Skinner, Chi, and The Learning-Gardens Educational Assessment, Group 1, conducted a study in which motivation was a key issue of interest. Their research purpose was to present a theoretical model of motivation as a possible explanation for GBL focusing on achievement and to construct brief quantitative indicators of student engagement in garden based activities. The researchers used self-determination theory which states that motivation and engagement contribute to active learning and increases achievement in learning. Sixth and seventh graders and their science teachers in one middle school with a 4 acre garden area participated in the study. Participants completed a survey with a five point scale that measured student engagement and disaffection in the garden, garden learning outcomes, student achievement, perceived competence, intrinsic motivation, and autonomy. Positive and significant correlations with learning and achievement, engagement in science and school, and academic self perceptions were found. This study supported Mitchell's (2013) assertion that teenagers need to feel that they can make a difference and that they have a need for autonomy. Skinner et al. (2012) conducted one of the few studies that involved middle school students in the context of a large garden area, like that of Magnolia Middle School. Their study was also unique in that it used more complicated quantitative analyses, (included learning and achievement in core subjects and not just science as a variable) and analyzed factors of motivation instead of science learning material. The importance of motivation will be returned to in the place conscious education section of this chapter.

The research presented in this section discussed studies with schools that had high proportions of low SES status and lower graduation rates. Motivation, self-esteem and

engagement were found to increase with involvement in GBL. This section and those previous have highlighted research supporting GBL but there are also challenges toward implementing and maintaining garden based programs. Studies which highlight challenges associated with GBL are discussed in the following section.

Challenges to Garden Based Learning

Buxton (2010) stated that administrators seem more supportive of teaching methods that increase scores on standardized tests. Several authors of garden based learning research brought up the friction resulting from what they felt were conflicts between educating students for their futures and demonstrating required proficiency levels on standardized tests (Dirks & Orvis, 2005; Klemmer et al.,, 2005b; Pigg et al., 2006). Smith and Motsenbocker (2005) proposed to quantify the effects of a school garden and garden curriculum on science achievement of fifth graders in an inner city Louisiana public school by including JMG curriculum and gardening activities once per week. One hundred nineteen, fifth grade students at three inner-city East Parish, Baton Rouge, Louisiana, elementary schools participated in the study. Students took part in JMG activities once weekly for 2 hours (1.5 hours in JMG, .5 hours in the garden) over 14 weeks. Science achievement tests, developed at Texas A&M University for the JMG program, were used (see Klemmer, et. al., 2005a). Oddly, the pre-test for the control group occurred 8 weeks into the semester and the post test was conducted 1 week after the end of the semester (Smith & Motsenbocker, 2005). Paired t-tests showed a significant difference between pre- and posttest scores of the science achievement tests within the experimental group. No significant difference was found between pre- and posttest scores within the control group or between experimental and control groups. University students with little training in education methods ran the program with help from Master Gardener volunteers. JMG curriculum was not related

back into other weekly activities with students. Test scores were not a part of students' grades so researchers felt that students did not take the tests seriously. In contrast to Smith and Motsenbocker's (2005) results, Klemmer et al. (2005b) and Dirks and Ovis (2005) did find significant differences between the control group and the experimental group.

Garden based learning can be challenging for teachers, as well. Tal and Morag (2009) documented a significant challenge to GBL for teachers: lack of confidence. They studied the use of reflective practice in assisting teachers who were preparing to teach outdoors in a variety of settings. Their research was conducted in an ecological garden rather than the vegetable garden which characterized most of the garden studies, on a university campus and involved five female students: three undergraduates with no teaching experience and two graduates with teaching experience. (To simplify this explanation, the university students will be called "student teachers," and their students "participants.") Action research was used to encourage reflection and help the student teachers become more aware of their own practices and of what their participants were thinking, feeling and learning. Interpretive methodology included student teachers conducting descriptive studies with first, second, third, and eighth grade classes which were videotaped. Researchers conducted in-depth retention interviews with student teachers 6 months after the class ended and analyzed final portfolio materials. Using inductive analysis, emergent themes and repeated patterns were discovered. Member checking was included. Tal and Morag (2009) found high levels of confidence and enjoyment by outdoor experience participants and student teachers. Management and communication issues positively affected student teachers' learning and enjoyment. A supportive environment provided by the researchers contributed to positive learning experiences about successful garden teaching for the student teachers. The reflective component included a lot of moral support for student teachers as they

prepared to teach, while they were teaching, and in the reflective interviews and portfolio reviews later. Tal and Morag's (2009) study supported the idea that teachers' lack of confidence for engaging students in GBL can be overcome with reflexivity, communication, and a supportive environment are included as key elements to the curricula.

In another study on teachers who were unfamiliar with sustainability through gardening, Kelley and Williams (2013) studied professional learning communities as ways to help them become more knowledgeable of sustainable practices in this context. The purpose of their study was to explore whether garden-based experiential learning helped students and teachers develop science conceptual understandings and increase their confidence in level of science knowledge. The researchers believed that a summer program would be a non-judgmental learning space which could create better opportunities for learning. Thirty educators learned alongside kindergarten through eighth grade students from four schools in Portland, Oregon, through hands-on learning opportunities in gardens for teachers during a summer program called Schools Uniting Neighborhoods (SUN). The study occurred in low income communities. It investigated teachers' learning during gardening projects in collaboration with students in a democratic form of learning where they learned together. Methodologies included qualitative narratives produced by the teachers after participating in place based, formative, inquiry activities derived from National Research Council standards. Researchers found hands-on gardening experiences increased confidence and self-efficacy in teaching STEM subjects. Teachers were inspired by the holistic, interconnected nature of learning in gardens and with increased engagement of "problem" students. Kelley and Williams found that opportunities to collaborate and learn with a group of nonjudgmental peers was transformative for the teachers and greatly increased their confidence in including GBL with their classes.

Two main challenges were discussed in this section. First, administrators in the studies reviewed were pressured to show results in the form of increased test scores at their schools and this was communicated to teachers. To address this challenge, Klemmer et al. (2005b) and others demonstrated, through reliable tests, that GBL curriculum was an effective teaching tool. Second, studies indicated that teachers may lack experience in gardening and therefore, confidence in their ability to teach it as part of their curriculum. Professional development and democratic education were shown to increase confidence and self-efficacy for teachers and students.

These studies are representative of research in GBL in the last ten years. Characteristics that emerged included a focus on elementary students, especially grades three and five which is when standardized testing in science often begins; a focus on low SES groups; and a concentration of studies on plant life cycles and eating what was grown. Justification of GBL was promoted by quantitative studies that attempted to "prove" that significant learning took place when GBL was incorporated into the curriculum. Tests were developed to assist in supporting the claims. Research was connected by themes of community involvement and benefit, promotion of community and environmental sustainability, and motivation, engagement and empowerment for students involved in GBL. In the second half of this chapter, I discuss conceptualizations of place conscious education, my theoretical framework, over the last five years.

Place Conscious Education

Research on place conscious education (PCE) has been conducted in a variety of subjects such as social studies (Duffy, 2014), math (Showalter, 2013), science (van Eijck & Roth, 2010), and English (Azano, 2011). This part of the chapter begins with conceptualizations of PCE. Then

the history and evolution of PCE, characteristics and challenges of implementing PCE, and several recent studies that use PCE will be discussed. The chapter concludes by connecting PCE to GBL since this research will be conducted in conjunction with a school garden environment.

What is Place Conscious Education?

Van Eijck and Roth (2010) defined PCE as "An approach to education where local setting becomes the integrating element in students' education" (p. 871). Another influential scholar, Gruenewald (2003), described theory of place as a "multidisciplinary construct for cultural analysis" (p. 619). Sobel (2004) stated "Place based education is the process of using the local community and environment as a starting point to teach… across the curriculum" (p. 185). Resor (2010) noted that as students develop a connection with a place they feel a responsibility toward their relations with it and others who live there. Lim (2010) argued the role of PCE is to find ways for the multiple voices and identities to occupy the place at the same time and learn to interact in meaningful ways. Buxton (2010) summarized the relevancy and importance of PCE when he stated "learning occurs most naturally when focused on people, their environments, and an authentic purpose" (p. 123). According to Gruenewald (2003), the purpose of PCE is to "work against the isolation of schooling's discourses and practices from the living world outside the increasingly placeless institution of schooling" and "to enlist teachers and students in the firsthand experience of local life and in the political process of understanding and shaping what happens there" (p. 620). All of these definitions make connections to local life and schooling as part of their descriptions. Researchers agree that there will be a variety of ways place will be familiar to people who inhabit them at that moment. This variability is one of the biggest factors that makes PCE important in education research and makes it a good framework for use with garden-based learning.

In describing the importance of place based education, Gruenewald (2003) emphasized awareness of place by using an alternate term, "place conscious education." Although he used "place based" and "place conscious" interchangeably, his attention to consciousness of place appealed to me because it "suggests…an orientation that refuses to abstract learning and the purpose of schooling from the places where people actually live" (Gruenewald, 2003, footnote 1, p. 646). Research has suggested that many science learners struggle with a feeling of detachment from science learned in school and from their lived experiences (Dopico & Garcia-Vazquez, 2011; Eick, 2012; Van Eijck & Roth, 2010). Smith (2002) summarized PCE as grounding "learning in local phenomena and students' lived experience" (p. 586). Therefore, the term "place conscious education" is used in this study to emphasize the importance of the immediate environment to education. For example, immediate environment could include the school restrooms or a fishery in the town. In addition to the significance of local knowledge, PCE is about children being drawn to learning tangible phenomena instead of ideas about these tangible things (Dewey, 1943). Smith (2002) added to this, noting that children value knowledge that allows them to engage in activities that they know are valued by people they love and respect. Place conscious education has many definitions but it boils down to learning that involves the local environment to make a connection between formal education and the community schools serve.

Avery and Kassam (2011) summarized major qualities of PCE as follows: It "emerges from a specific place and includes cultural and nature studies from that place" (p. 3), is multidisciplinary and experiential, "includes internships and entrepreneurial opportunities within local places, connects individuals with the community and involves them in aspects such as decision making and real world problem solving, and reflects a much wider-ranging learning

paradigm than simply learning to take a test" (p. 3). In the next section, the history of PCE is described. Qualities of PCE will be returned to in a later portion of the chapter with several recent studies as examples.

History of PCE

Smith and Sobel (2010) stated "In many respects…there is nothing new about place- and community-based education. Those who practice it simply do what adults… have done for millennia: they provide opportunities for the young to engage in the common life of older and more experienced people" (p. 25). They cited the Tlingit residents of Sitka, Alaska, as using an apprenticeship method to encourage children's learning and eventual growth into a particular position in that community, saying it occurred as late as the 1970's.

Dewey (1897) warned in the late 1890's of disconnection between school and home life. He sought to recover the relationship between formal learning and community life in his educational approach by immersing children in community activities such as cooking and carpentry from which contemporary academic disciplines came. Students attending his lab school learned about issues that compelled them at the moment, rather than learning for some future *possible* use. The late eighteenth and early nineteenth centuries began the environmental education movement (Smith & Sobel, 2010). People like Wilbur Jackman (1907), Liberty Hyde Bailey (1895), and Anna Botsford Comstock (1939) encouraged public school teachers to use the local environment in scientific investigations with their classes. They claimed that direct experience was better than simply reading and memorizing from textbooks.

After World War I, William Heard Kilpatrick (1937) proposed that project completion was a more open-ended method to connect formal education to students' lives. He supported social environments for learning and believed that the way students were being educated was

wasteful of their native talents. He, like Dewey (1943), wanted education to prepare people for a democratic life. Counts (1932), through a keynote speech to the Progressive Education Association promoted schools as places to teach social improvement through problem-solving and analysis. Counts (1932) stated Progressive education "must face squarely and courageously every social issue… [and]… establish an organic relation with the community (p.9). Service learning, which involves young people in work to enhance community and social conditions, has been promoted in the United States since the end of the nineteenth century. Current environmental education courses often combine local environmental learning with community service (Smith & Sobel, 2010). In the 1960's, Peace Corps and VISTA (Volunteers in Service to America) were created to nationally recognize and support service to community. During the 1970's and 1980's, United States schools commonly had community service programs. Congress passed the National and Community Service Act which authorized grants to schools to support service learning in 1990. A missing piece from service learning, in comparison to PCE, is that while it connects students to their communities, it does not develop "their understandings of the unique characteristics and dynamics of their homeplaces" (Smith & Sobel, 2010, p. 27).

Foxfire books and journals of the 1970's and 1980's explored cultural details of lives of people in students' Appalachian communities in northern Georgia and centered on collection of oral histories (Wiggington, 1972). The projects also investigated current community issues and included students in local decision making processes. Since the mid-1970's local organizations have been providing training for young people to learn the skills needed to create their own businesses so they will not feel dependent on jobs created by outsiders to their communities (CFED history and highlights, 2014). These organizations emphasize experiential learning and skill set support for neophyte business owners, assisting in their success.

This section of the chapter presented a brief overview of the history of PCE. While not completely new, it continues to be relevant to schooling today. The following section describes the evolution of PCE. This section will conclude with a discussion on how I used PCE in my research.

Evolution of Place Conscious Education as a Theoretical Framework

This section begins with Karrow and Fazio's (2010) categorization of meanings of place into three realms of experience: natural, cultural and ontological. Following an explanation of these realms, place as natural environment, place as community, and place as difference will be described. Then a more recent concept, place-as-being, will be discussed.

Realms of experience: Natural, cultural, and ontological. Karrow and Fazio (2010) argued that place meanings derive from more than the traditionally used natural and cultural realms of experience. Semken and Brandt (2010) described a study that included natural and cultural realms when they investigated Superior, Arizona, as a contested place where the low deserts and rugged mountainous region had been occupied by indigenous people for centuries who were then forcefully removed when the land was seized for mining and military purposes. Now indigenous people have returned to the region only to be again challenged by a new mining opportunity which questions their rights to lands where they have reestablished traditional lifeways. Karrow and Fazio (2010) proposed that ontological experience, which they described as a sense of being, is missing from conceptions of place if we only use the first two categories, natural and cultural realms. "As place-meanings derive from all three, we argue, to become more theoretically and existentially robust PBE must attend to these realms" (p. 196). They proposed that including the ontological realm will help "ease binary distinctions between subject and object, and create room for a theory of knowledge posited on care" (p. 197). The next section

describes these three realms in connection with place as natural environment and place as community, place as difference, and then place as being.

Place as land or natural environment and place as community. Place conscious education where place is a natural or local environment is one of the most commonly thought of definitions in education. It is often combined with education that includes community and school integration. These constructs were often found within the same studies and so are described together in this section. They are grounded in the natural and cultural realms (Karrow & Fazio, 2010) and are often associated with place as nature (Semken & Brandt, 2010), although some studies have included other components of students' immediate environment. For example, middle school students in New England were dismayed with the bathroom conditions at their school, including missing bathroom stall doors and toilets that were not being flushed (Smith & Sobel, 2010). They launched a campaign to get the bathrooms upgraded, better maintained, and get fellow students to help keep them clean. In this case, their school environment included the indoor space but was still place as location. Gruenwald and Smith (2008) and Smith and Sobel (2010) have been identified as leaders in environmental and community PCE, grounding ideas of place in local phenomena and students' lived experiences.

Over time, definitions of PCE have broadened to include social and political components and have moved from a focus on learning to also include teaching. This more expanded perspective is illustrative of place as community. Common elements of place as community included being clearly grounded in local issues and possibilities (McInerney et al., 2011), a willingness of teachers to go beyond pre-made lessons that come with textbooks and design their own instruction (Eijk, 2012), inviting students to become knowledge creators (Cutter-Mackenzie, 2009), providing opportunities for people in the community to become involved in students'

education (Miller, Hougham, & Eitel, 2013), creating partnerships with local agencies to provide students with experiences with adults outside their families and schools (Dopico & Garcia-Vazquez, 2011), and designing learning activities for positive regard toward students' home lives and regions (Green, 2012).

A criticism of place as environment or community was that issues of culture, gender and class, which influence how place was perceived were ignored. Another criticism was that both, place as environment or community, describe place as an ideal to strive for, such as more jobs by revitalizing a fish hatchery as described in Smith and Sobel (2010). Not everyone will agree that a fish hatchery is an ideal use for that particular land. Perhaps the land should become a nature preserve or a place for indigenous people to practice their spiritual beliefs. The third concept of PCE, place as difference which I will describe next, addresses these deficiencies.

Place as difference. Place as difference has been grounded in the cultural realm within a sociopolitical context. Complex social, political, economic, and historical forces have been included in this type of PCE and influence how place is perceived (Karrow & Fazio, 2010). Semken and Brandt (2010) described these conflicting components in their study of Superior, Arizona, mentioned earlier. A rich copper deposit was discovered deep beneath the earth's surface east of Superior. Mining technologies can now remove the copper and supporters proposed that extraction would result in a state economic impact exceeding $46 billion over 66 years. However, the area is also an important camping and gathering site for Apache people and an important food source for Apache and Yavapai people. Apache people opposed the mining project, believing it would interfere with sacred and critical traditions and culture. Climbers and geologists expressed concern about environmental damage to the area. Other residents supported the mine, seeing it as a way to revitalize their economy and therefore their population base which

had been declining since the last mine closed in the 1990's. This study was a good example of place as difference and how PCE can be used to explain stakes each group has to the other groups to try to settle the dispute in land use. It highlighted the dynamics of place as it described how this area went from a culturally significant place for indigenous people to a mining boom town, displacing indigenous people. Then, when mining ran out, it went back to a culturally significant place but for a more diverse group of people and how that changed again with new technology and possibility of another mining opportunity. Promotion of sustainability as a goal of PCE which results in a balanced understanding of and care for both biotic and abiotic components of space were emphasized in this example.

Place as being. The evolution of PCE equating place with land, community, and then difference is not enough, according to Karrow and Fazio (2010). They argued that the ontological realm needed to be included to promote more reflectivity of the "phenomenon that exists between humans, their cultures, and their natural environments" (p. 190). Through a philosophy of hermeneutic phenomenology, they stressed the importance of the ontological dimension through relationship with place. Gruenwald (2003) agreed that more was needed to round out PCE as a theory. "Place-based education, in its diverse incarnations, is currently less a pedagogy per se and more an alternative methodology that lacks a coherent theoretical framework" (p. 3). Karrow and Fazio (2010) criticized a limitation of PCE that categorizes context and education as separate things which are brought together to relate subjects (students) with objects (places). They argued that it "tends to moralize and emphasize dualities" (Karrow & Fazio, 2010, p. 200) by promoting current environmental conditions as a fall from a historical ideal. Even Gruenewald's critical pedagogy of place (2003) was criticized as representing "abstract, context-free thinking and a rationalist approach to change and progress" (Stevenson,

2008, p. 356). Karrow and Fazio's (2010) final argument in describing the deficiencies of these three approaches to PCE is that place is represented by boundaries of regions which limits critical questions from being asked about how they are connected.

A solution to address the lack of connection between place and being can be found in Karrow and Fazio's (2010) use of hermeneutic phenomenology, described as oriented toward the ontological human existence, also called *being*. Place as land, place as community, and place as difference all approach place as an object from the standpoint of a human subject. Karrow and Fazio argued for the need to "delve into the meaning of human existence and its relation with place as we currently experience it" (p. 202). By changing the language to name PCE instead as "educating-within-place" (p. 202), they attempted to convey a "sense of ongoingness, intimacy, imbeddedness, the active, inevitable, evocation of the possible" (p. 202). Educating as a verb was significant because it depicts education as an ongoing, lifelong endeavor. Educating-within-place reflects "the continual, ongoing, intermingling, and complex phenomenon between place, being, and educating. It is not something *acted* upon a place, rather something that occurs *within* place" (italics in original, Karrow & Fazio, 2010, p. 202). It was this fluidity between place and humans that was lacking with the other three conceptions of PCE, according to Karrow and Fazio (2010).

Of the four conceptions of PCE, place as difference was most compelling. Karrow and Fazio(2010) argued that students need opportunities to engage with science in ways beyond strict data collecting activities. Such opportunities may nurture the students' respect for their immediate surroundings, as well as strengthen their relationships with the world in which they function on a daily basis. Participants and the observer brought different thoughts, feelings, and histories with them wherever they interacted with place therefore they experienced it differently.

Participant observations and interviews of the students and teacher under study at Magnolia Middle School provide insight into the development of this realm.

This section of the chapter focused on the evolution of place conscious education as a theoretical framework. Smith, Sobel, and Gruenwald's contributions of place as environment, community, and difference were described. Karrow and Fazio's dissatisfaction and addition to PCE theory with their descriptions of realms and contribution of an ontological realm to expand PCE to include education-within-place were discussed. It concluded with a choice to focus on place as difference. The next part of the chapter discusses characteristics of PCE implementation in order to describe roles students and teachers might undertake.

Characteristics of Place Conscious Education in K-12 Schools

Place-conscious education is specific to the location of the students, by definition, and this intrinsic variability can contribute to it being difficult to describe. Smith (2002) suggested the following five elements of PCE, calling them "critical characteristics" (p. 593). He first argued that with PCE investigation of phenomena in the local environment is foundational and can then be used for further learning about distant places and abstract ideas. Second, place conscious education emphasizes learning experiences where students are knowledge creators instead of consumers of others' knowledge (Eppley, 2011; McInerney et al., 2011; Smith, 2002). Third, students' questions and concerns play a central role in determining what is studied which results in ownership and engagement in learning (Smith, 2002). Fourth, teachers act as "experienced guides, co-learners, and brokers of community resources and learning possibilities" (Smith, 2002, p. 593) and, by doing so, help students learn to not need them as they work to acquire skills to become lifelong learners (Mitchell, 2013; Smith, 2002). Finally, barriers

between schools and the community are frequently crossed by students and community members joining the school to the community.

The next section of this chapter presents many recent studies that have achieved positive results through PCE and is followed by challenges to its use. Studies illustrating community and student interactions, students learning with technology, students in rural and urban areas, and teachers learning to implement PCE will now be described. They are arranged by themes of cultural studies, environmental connections, real world problem solving, internship and entrepreneurial opportunities, and induction into community processes (Smith, 2002). Most of the studies reviewed included more than one theme.

Cultural studies, environmental connections and real world problem solving. Eppley (2011) investigated how rural, elementary pre-service teachers learned to incorporate PCE through an exploration of their own place based identities and how these selves would impact their future students. A second purpose of her study was to investigate how pre-service teachers experienced students' representations of their place based identities and literacies. Despite the rural research location, Eppley (2011) proposed “orientation to the global world extends from the local rather than being limited by the local (p. 89) and explored the importance of how and why children learn, citing Dewey and Vygotsky in support of the need for "a rich and varied environment with ample social interactions... for deep and meaningful learning" (p. 93). Eppley (2011) argued that place based pedagogy can only be effective when teachers are taught explicitly “within larger conversations…” about issues like “equity, democracy, and the role of the teacher” (p. 90). This was indicated during her study of incidents where PCE "failed" with the pre-service teachers. Eppley (2011) concluded that more scaffolding was needed to push the pre-service teachers to transition toward more equitable teaching and learning.

Azano (2011) observed PCE in a rural English classroom and noted that the teacher's strong sense of place and active use of it within the subject of poetry helped students relate school material to their lives and understand the curriculum better. Citing the theory of self-determination, she stated that students who were engaged and completed high school were those that found the curriculum more relevant to their lives than those that dropped out. Self-determination theory was also used by Skinner et al. (2012) in their study of motivation and engagement as active ingredients in GBL.

Middle school students are at an age where they are actively seeking and expanding their place based experiences (Mitchell, 2013; Skinner et al., 2012). Many studies documented what sense of place means for children and how it matters in an educational context (Karrow & Fazio, 2010; Semken & Brandt, 2010). Lim (2010) regarded time as an important component of place. In an effort to promote decolonization, she asked readers to consider whose history is included in PCE. Her paper (Lim, 2010) highlighted key findings from her study of New York City (NYC) youth (Lim & Barton, 2010) and also reported on a study by van Eijck and Roth (2010) which discussed inclusion of First Nation history and immigrant children's perspectives on PCE. Van Eijck and Roth's (2010) purpose was to understand place as chronotope, "a lived entity" that evolves from transactions between "a community and its material environment" (p. 871). Like Lim (2010), they questioned whose account of place was being promoted by place based literature in education, proposing that if only the science voice was promoted, how the PCE actually took place and who learned from it was limited (van Eijck & Roth, 2010). Lim (2010), Root (2010) and Piersol (2011) all emphasized physical connection with the local environment.

Van Eijck and Roth (2010) promoted multicultural PCE as a dialogue which can result in a different place, both materially and socially, and in which all community voices are heard, as

proposed by Karrow and Fazio and named place-as-being (2010). Like Buxton (2010) and Lim and Barton (2010), Van Eijck and Roth (2010) emphasized the importance of students' pride and motivation in presenting their PCE projects and using them to teach to the community. They discussed an environmental study in which the Indigenous view was presented as parallel to the White view of a place that was significant to both groups of people for different reasons, but emphasized working toward a similar result of a cleaner environment.

Some research articles discussed rural situations (Eppley, 2011) but PCE also applies to urban living. People in cities tend to live within particular neighborhoods where they influence and are influenced by community intradependence as well (Lim & Barton, 2010). Lim and Barton (2010) investigated urban children's sense of insideness, which means belonging to a particular group. Their purpose was to explore urban children's relationship with their environment. Using phenomenology and ethnography, they learned that children's sense of place develops in many ways, routes, and dimensions. Insideness was defined by Lim and Barton (2010) as interactions between environmental understandings, environmental competence, and diverse affective relationships with a place. According to Lim and Barton (2010), children actively and purposefully explored their environments and nurtured their sense of place which was developed through the use of boundaries and where they wanted to go (affordances). Through their lived experiences, children constructed their own understandings of their place which Lim and Barton (2010) called "emplaced learning."

Exploration of place, through the use of technology, was described by Isogai et al. (2012) and Tzu-Chien, Peng, Wen-Hsuan, and Ming-Sheng (2009). Tzu-Chien et al. (2009) engaged students by using technology and PCE. Students were basically able to take the school pond home with them because pictures of it were incorporated into lessons which students were able

to access online from home and in other areas of the school. This use of technology was a way to bring the pond to students' homes, making it a more accessible learning environment. The purpose of their study was to design natural science activities using mobile technology, examine how these activities affected students' learning about aquatic plants, and to investigate students' perceptions toward the activities. Forty-six fourth grade students participated in the after school program in which the study was conducted. Case study was used as the methodology. Students learned through seven activities that incorporated the 5E learning cycle. Data was collected from a pre- and post- knowledge test (open ended response) about aquatic plants, pre- and post- multiple choice understanding tests, a learning activity survey, observations of students as they worked on the activities, student interviews after each meeting, and students' reflective journals. Data sets were coded by attributes and dates of collection. Knowledge and understanding test scores were significantly higher after students participated in the learning activities. Survey results showed that most students' perceptions of mobile learning activities were positive. Factors identified as prominent in positively affecting student perceptions of the activities were mobile technology support during their observations and students' engagement in mobile technology manipulation during scientific inquiry. Tzu-Chien et al. (2009) concluded that their study has useful implications for teachers in the potential of mobile technology in school settings.

Buxton's (2010) study of middle school aged students involved cultural studies, environmental connections and real world problem solving. Buxton (2010) stated, "Participants challenged dominant cultural paradigms and considered how to live more harmoniously with their surroundings" (p. 121) He argued that students who are engaged in social problem solving can still learn the science they need to pass standardized tests. In his study, students learned

about global and local environmental issues at an urban seaside nature center program. The study relied heavily on critical pedagogy of place, an attempt to connect place based pedagogy and critical pedagogy (Buxton, 2010). Students discussed how ideologies and environmental inequities are often related to race, ethnicity and class. They made posters as public service announcements to educate family and community members during a one week curriculum. Buxton assessed how much learning tasks designed to transform students' understanding of their place in the world indirectly affected their science knowledge and found an increase in the science content knowledge as well as increased environmental awareness. The latter was demonstrated by comments tied to decolonization and reinhabitation of their local environment. Buxton's research used transformative experiences as a conceptual framework, i.e. experiences that "change people's views of the world and empower them to take action to improve their surroundings and their place within" (p.123). Like McInerney et al. (2011) and Lim and Barton (2010), transformative experiences induced by PCE in this study, challenged learners to question social inequities and power dynamics. By doing this, it reconfigured the teacher/student relationships (also discussed in Showalter, 2013).

Dopico and Garcia-Vazquez (2011) studied the teaching of environmental science to adult education students through immersion in rural cultural life. The student researchers were learning skills that could be applied to jobs in environmental services, community development, and rural tourism. Dopico and Garcia-Vazquez (2011) felt that teaching environmental science through PCE emphasizing positive interactions between humans and the environment would be more effective than teaching through a crisis approach. The study was a unique form of hands-on learning because student researchers learned about environmental practices used on traditional farms in their area by participating in activities alongside their interviewees. Student-researchers

learned to do research and they learned farming practices. This method of learning by doing was similar to Kelley and Williams' (2013) study in which teachers learned how to include garden based learning with the students by actually participating in gardening in a summer program.

Related to learning to do research by experiencing it firsthand, Showalter (2013) argued that professional development is needed to effectively use PCE. He investigated the sustainability of place based math education. Showalter (2013) interviewed fifteen doctoral graduates of a rural mathematics education program about their attempts to integrate place based math education in their classes. He used grounded theory to form thirty-one codes from which three themes emerged. These themes were: (1) PCE is easier to teach about than to do, (2) several factors contribute to depth and authenticity of participants in place based math learning, and (3) teaching place based statistics was fundamentally different from teaching place based math. According to Showalter (2013), there is a need for more place based exemplars that inspire teachers in math specifically. The author found that the teachers had an average of twenty years of education and three years of theory training yet had trouble incorporating PCE. Showalter surmised that the twenty years they spent being educated lacked the preparation, the "hands on" learning, needed to incorporate the concept of PCE in math. Showalter argued that teachers must have strong familiarity with place to use PCE well and at times the students can teach the teacher. Showalter encouraged readers to keep the purpose of education in mind when teaching anything. Finally, Showalter (2013) made an example of three teachers who made an extra effort to learn about the unfamiliar place they were teaching in order to help students achieve PCE goals.

Steele et al. (2013) proposed to increase researchers' knowledge about their pre-service teachers' experiences of math and science both in and out of school. Researchers wanted to

determine the nature of the relationships between pre-service teacher's (PT's) attitudes toward and teaching of science and math, and their majors and genders. They also wanted to develop an understanding of the effectiveness of some of the pedagogical practices, including PCE, used in their teaching, reflect on, and improve the researchers' practices as educators. The authors used many theoretical perspectives and methods with their classes including ecofeminism, progressivism, social constructivism and PCE. The study began with a fieldtrip to provide PT's with an out of school science and math learning experience. Following the field trip, PT's filled out open ended surveys which were analyzed using mixed methods. Significant differences were found between the PT's attitudes, prior experiences, and confidence in engaging their students in science and math. The process of collaboration between researchers provided a rich learning experience as far as improving their practices but also in working through differences in preferred pedagogies and becoming more aware of how their individual philosophical stances sometimes hindered use of certain strategies. For example, one researcher took time after the study to take her PT class into the school forest the second week of the semester. The activity took time away from other planned experiences but it was something the students commented on throughout the semester.

Internships, entrepreneurial opportunities, and induction into community processes. Closely connected to leadership qualities and care for the community is promoting the idea of a sense of empowerment through place conscious education. Smith and Sobel (2010) argued that drawing students into the decision making processes of the community turns them into intellectual resources for government agencies and others who can address community needs. For example, Oregon elementary students were asked to participate in a study in which they assessed community parks and playgrounds and then make recommendations for how these

areas could be better equipped with play equipment (Smith, 2002). In this instance, even students at the elementary level were learning how to be involved in caring for their community and that their input was relevant to changes in the local environment.

The significance of relevancy to what is being learned was demonstrated by McInerney et al. (2011) who described place as a lens through which people begin developing their view of the world, of themselves and learn about a sense of community. Using their research conducted between 2005 and 2007 in which participant observation and teacher/student interviews were conducted, they described three cases of place based pedagogy that emerged. In one case, students revitalized a deteriorating boardwalk by designing murals and markers with information such as environmental themes and historic events. After careful research, students presented their findings to city counselors. McInerney et al. (2011) argued that by creating spaces for the students to learn about important historical events from their own neighborhoods, they were encouraged to view themselves as information producers rather than just passing on others' knowledge. The second case described students as community volunteers at a school for severely disabled children, an assisted living facility for the elderly, or day care centers. The purpose of the program was to increase students' awareness and understanding of a variety of social structures, programs and primary care facilities. The third case described a horticultural experience based program in which students designated as at-risk of dropping out of school developed and ran a plant business and a café which was open twice a week. In all three cases, McInerney et al. (2011) emphasized the importance of innovative and caring teachers who saw opportunity to involve students' communities in their learning and by doing so increased the relevancy of the curriculum to the students. These researchers argued that teachers need to be trained in PCE so they are better prepared to teach their students in this way, a task made more

difficult when coming from a background of traditions and hierarchy that this approach criticized.

According to McInerney et al. (2011), place is where social networks are formed and where people learn to live with others. Another outcome of place conscious education, the development of leadership qualities and care for the local community was exemplified by McInerney's (2011) research. With these skills, students learn confidence in themselves and have initiative to stay in the community and be of service. McInerney et al. (2011) and Smith (2002) in their respective studies, found that place conscious education promoted involvement in the community for students as participants and not just as consumers and helped ground learning in particular places, contributing to it being a highly democratic process.

PCE contributing to cultural, environmental, and community interactions. In Canada, Isogai et al. (2012) investigated engaging indigenous youth in local environmental mapping through technology. Isogai et al. (2012) described how elders believed that youth need to learn to use the tools for collecting information about their native lands because the generation doing it now will not be able to do it forever. The older generation noticed that the shift toward a wage based economy was moving their youth away from the culture of familiarity with the land. Proposing that youth can be engaged in learning through the use of technology, Isogai et al. (2012) asked: Can place based education be used to engage Aboriginal youth in Fort Albany, First Nation, Canada, by using collaborative-geomatics informatics, an internet-based mapping tool which allows communication and collaboration with others who are using similar devices. Like van Eijck and Roth (2010), this study investigated ways of incorporating Western science with Indigenous knowledge to benefit all students. Culturally relevant methods such as informal PCE, collaborative learning, group work, and experiential learning were used to teach the

students. Results indicated that students enjoyed learning about their community and environment as demonstrated through their interest and enthusiasm. Students noted their enjoyment of learning how to use the geomatics tools to take pictures and read a map and compass. Students' comments describing ease of use of the geomatics tool will be used for their further development so other community members can use them more easily.

The five organizers described in the studies above included cultural studies, environmental studies, real-world problem solving, internships and entrepreneurial opportunities, and induction into community processes. They were described by Smith and Sobel (2010) as antecedents to PCE. Smith (2002), in an earlier article, described them as thematic patterns that can be adapted to different settings and thereby, used to implement and support PCE. Gruenwald (2003) introduced them as educational traditions, combining the last three into one category: action research. As shown by the variety of studies in this section, researchers suggested that PCE can be a successful framework to provide relevancy and motivation for learning for learners of many different situations, interests, ages, and abilities.

Challenges of Place Conscious Education in Schools

While PCE has a lot of research to support it, it also comes with many challenges to successful implementation in schools. Smith (2002) noted the following four challenges in his seminal article. First, teachers' roles changed when implementing PCE instead of traditional pedagogies. These roles included facilitating the process, linking the problem to the required curriculum, finding resources, and acting as trouble shooters. Smith (2002) argued that teachers have to become curriculum creators in order to have the needed resources to teach local phenomena. Second, Smith described more involved student roles in learning through PCE which included identifying a problem, selecting one for the whole class to work on together,

studying its variables, development of potential solutions, and finally organizing and participating in efforts to solve the problem. Third, links between the commonly unpredictable activities of PCE and the standards set by the district or state have to be made by teachers making their jobs more challenging, especially in a time of high stakes testing. Educators and community members have to set aside the belief that learning only occurs in a classroom. Parents have to be accepting of more ambiguous projects for learning and integration of school subjects. Finally, Smith (2002) argued that community agencies and organizations have to see themselves as partners in educating children, accept interns, and provide multiple learning opportunities for students. Adults need to see kids as participating citizens of the community, make room for their contributions and devote time to prepare them for that role.

Despite a long history, PCE has many challenges to its successful implementation in schools. Many of these potential barriers place more responsibility on community members and organizations than has been common in the last century of public education (Gruenwald & Smith, 2008; Sobel, 1996). Overcoming these challenges could lead to positive local and global outcomes including improved economic and environmental conditions, more fully prepared young citizens who have experienced success in leadership roles while still in school, and motivation for lifelong learning (Isogai et al., 2012; McInerney et al., 2011; Smith & Sobel, 2010).

Support of Place Conscious Education

Scholars have documented many reasons to support PCE. For example, according to Smith (2002), PCE validated the culture and experiences of students' families, "acknowledging them as worthy of inquiry" rather than using the more generic national curriculum which may be unrelated to their locale or their experiences (p. 588). Smith (2002) noted that topics in national

textbooks tend to be related to urban middle class experience which can lead to a feeling of "cultural imposition and domination" (p. 589). He explained how national textbooks often focus on definitions and general principals instead of questions from students' immediate experiences and this can result in learning that is "detached from the world rather than part of it" (p. 589). Smith (2002), Dewey (1897), and Eppley (2011) argued that focus on local culture as curriculum demonstrates students' ability to analyze and synthesize directly from their own experiences. Azano (2011) explained that this does not mean ignoring regional, national, or international topics. Rather, according to Smith (2002), the local was used as a foundation from which to build information about faraway places or abstract ideas and was a way of taking advantage of students' natural curiosity about their surroundings. According to Smith (2002), there is no set of rules to follow when implementing place conscious education because it is, by definition, variable to the place in which is it used.

The studies described above provided examples of why PCE is important, emphasizing the local environment in connection with education and lifelong learning. As Sobel (2005) stated in regards to the significance of PCE, "Something's happening here" (p. 1). The significance of PCE to GBL will be discussed next.

How Can Garden Based Learning and Place Conscious Education Connect at Magnolia Middle School?

Engagement and relevancy were brought up as motivators in many studies in both PCE and GBL research (Azano, 2011; Bowker & Tearle, 2007; Cutter-Mackenzie, 2009). Both were cited as necessary for encouraging students to want to stay in school and to want to learn. Relevancy relates to motivation which seems to increase engagement in learning and retention in school, resulting in higher graduation rates (Ruiz-Gallardo, et al., 2013). For example, Buxton

(2010) mentioned that in his study with middle school students, science oriented PCE was used to help students learn to answer the questions "Why here?" and "So what?" to find out why science matters to them. McInerney et al. (2011) argued when material was found relevant by students, they were more likely to stay in school.

The purpose of education is another connection that can be made between PCE and GBL. Researchers in many studies acknowledged that standardized testing is a driving force in what is taught and how, but many questioned if it was really what will be most useful to future communities of which currents students will be a part (Eppley, 2011; McInerney et al., 2011; Showalter, 2013). McInerney et al. (2011) stated that PCE has many benefits beyond high school graduation including helping people develop a sense of agency, giving them the status of knowledge producers and not just knowledge receivers, and providing relevant knowledge and experience for active and democratic community participation. Eppley (2011) argued for schools to support democracy, by more deliberately preparing students. In Spain and Australia, researchers investigated ways of engaging older students through GBL and PCE who had not learned the value of learning (McInerney et al., 2011; Ruiz-Gallardo et al., 2013). Their studies focused on students who were “falling through the cracks.” Both groups of students found engagement in their education though these methods and demonstrated increased success rates. In addition, both groups cited relevancy to their futures in the programs using PCE and GBL.

Many PCE studies (Azano, 2011; Buxton, 2010; Eppley, 2011; Resor, 2010; Root, 2010; van Eijck & Roth, 2010) noted that critical thinking promoted by some PCE projects might interfere with acceptance of standardized testing and learning practices currently being implemented. McInerney et al. (2011) for example, described critical pedagogy as a way to make curriculum’s relevancy part of a move toward a democratic education for all. Lim (2010) said

students should be critical of universal and globalized environmental education, and that place should be framed within a larger sociopolitical context where "insideness, outsideness, multiple histories and diverse narratives can co-exist dynamically" (p. 906).

A final important connection between PCE and GBL found in the research was the importance of professional learning for teachers. Several studies in both areas mentioned a need for professional development experiences related to PCE and/or GBL (Graham et al. 2005; Showalter, 2013). A few investigated the impact of professional development experiences and found them beneficial (McInerney et al., 2011; Showalter, 2013).

In this section I have summarized significant connections between PCE and GBL found in the current literature. PCE and GBL have been shown to be useful ways to teach democratically so students recognize a purpose in education (Eppley, 2011; Kelley & Williams, 2013; McInerney et al., 2011; Showalter, 2013). Perceived relevancy of curriculum to their present and future lives has been demonstrated as a motivator for students to stay in school and develop skills that advance them toward fruitful citizenship within their communities. Research suggests (Kelley & Williams, 2013; Tal & Morag, 2009) that professional development experience for teachers assists them in obtaining confidence in their abilities so their students will benefit from GBL and PCE.

Chapter Conclusion

The purpose of this chapter was to examine the recent literature of GBL and PCE. The chapter introduced some common definitions of GBL, its history in the United States, and examined relevant research studies of the last ten years. It continued with definitions of PCE, its evolution and history, and described several studies that included it. The chapter concluded with a description of the overlap between findings of many studies that used GBL and/or PCE.

Specifically, this chapter provided a foundation for designing the research study by analyzing perspectives and findings of recent studies. The next chapter describes the research design and methods used to explore enactment of the theory of action gardening at an urban middle school.

CHAPTER 3

RESEARCH DESIGN AND METHODS

I used ethnographic case study to focus on a single case of the enactment of action gardening at a middle school in the southeastern United States. Case study is a way of doing social research that allows empirical inquiry in depth and within real-life context (Yin, 2009) and ethnographic case study adds a component of understanding related to theory or theories of culture. It focuses on a certain project or program while trying to "understand the case in its socio-cultural context and with concepts of culture in mind" (Simons, 2009, p. 23). This chapter begins with research context, participant selection, description of the research methodology, and data analysis. Finally, the chapter ends with my role as a researcher and subjectivities I hold that might influence the study.

Profile of the School and City

In 2014, the city in which Magnolia Middle School was located reported demographics of 62% white, 26% African American, 4% Asian, 10% Hispanic, 2% two or more races[3]. The local university, a major presence in the city, reported approximately 26,000 undergraduates at the local university, of which 7% were African American, 74% were white, 9% were Asian, 5% were Hispanic and 3% were one or more race. In contrast to the city and university demographics, Magnolia Middle School's (MMS) student population was reported as 48% African American, 32% white, 3% Asian, 5% multiracial and 12% Hispanic in 2014. All MMS students were in the ag science class at least one semester during their three years of attendance.

[3] Numbers were rounded to the nearest whole number. Citations are not provided in order to preserve anonymity.

Table 3.1 Demographics of city, local university undergraduates, and MMS students

Setting	White	African American	Asian	Hispanic	One or More Race
City	62	26	4	10	2
University	74	7	9	5	3
MMS	32	48	3	12	5

.

Setting

Location of the school, classroom, and gardens, curriculum, and policies at the school were included in this case. Magnolia Middle School was located in a city in the southeastern United States in which a university is a major presence. The university affected the middle school because part of the gardening program was supported by it. Magnolia Middle School was located within one block of many restaurants and clothing stores, a hospital, the city library, a movie theater, and a grocery store. Residential property of varying values was located within a few blocks with a definitive contrast between socioeconomic categories of housing in the area north of the school compared to that of the south. The school was connected to the city library and the university by sidewalks and a greenway. Just behind the middle school, on the other side of the fence from an agility course, was a historical African American cemetery.

The ag science classroom was located near the front, left side of the school building. The classroom was rectangular with the entrance door from the hallway directly across from the exit door to the garden area. To the right of this door lineup was a large space with U-shaped cubicles in two lines down the middle and lining the sides of the area. At the back of that area was a bulletin board covered with bright yellow paper and a clock on the wall that did not work. The

bulletin board had very few posts on it and looked like it was poised, waiting to do its job. Cubicles held sets of science or agriculture textbooks, colorful cloth covered boxes with students' journals, or clear plastic containers with craft project supplies like scissors and newspapers. An empty glass fish tank rested in one cubicle.

To the left of the entry door, where I usually sat during my indoor observations, were the desks and large rectangular faux wood tables and where most students sat for class time when they were inside the building. Three tiered levels held individual student desks, arranged as though it used to be a band room. Four tables with four to six chairs at each table resided in a flat area at the bottom of the tiers. The desks faced a wall with a whiteboard on it where Denise Hill's (the ag teacher) slides are projected and where students and she wrote notes. Another rectangular table usually overflowing with papers, clipboards full of student work, and the classroom laptop computer was located along the left front part of the wall. Denise's office was on the other side of the wall from the whiteboard, also full of papers, file cabinets, book on shelves, her desk, and materials for upcoming projects. The wall to my left, as I faced the whiteboard, had a light blue paper background covering the bulletin board area and was full of information compared to the yellow one in back. On the blue paper were several signs proclaiming characteristics of leaders, the Unit Question, Significant Concepts, the state education standard focused on in this unit, profile of a leader, area of interaction, approaches to learning, standards, rules, and ag words. The white, blank section for ag words was filled in by students throughout the semester. Denise had someone write a new word up: horticulture.

Beyond Denise's office was the wall where the outside door was located. To the left of the door were cabinets and a work bench. Microscopes and an egg incubator were usually out on the work bench. There was an amazing amount of space in this classroom!

The garden and greenhouse were easily accessible from Denise's classroom. In fact, walking through the outside door took a person directly to a greenhouse that had running water furnished by a cistern. Turning to the left and walking across the sidewalk, one arrived at a large chicken pen in which a coop was located with many hens and a few roosters. Continuing toward the greenhouse, a tool shed was to the left which held many hand tools such as rakes and shovels when not in use. Raised beds with strawberries were directly in front of the greenhouse door and on the fence between the greenhouse and the outer school grounds were blue felt-like material where living herb plants grew. Just beyond the imposing chain link gate was the main garden which was divided into four sections so crops could be rotated and the land could rest throughout the long southeastern growing season. A rusted aluminum sided tool shed held "in-process" building projects, such as wooden herb drying racks, and stall-like wooden compost bins were located outside the fence. To supplement the gardens and give all MMS students hands-on composting education, fruit and vegetable leftovers were collected in the cafeteria every day after lunch and taken to the outdoor bins by a class of eighth grade students. The process was overseen by the VISTA worker who spent about forty hours per week working on garden related school projects.

There were three garden areas at the middle school, one of which was cared for by a local Master Gardener group (personal communication, January 20, 2014). Turning left as one leaves the classroom and reaches the sidewalk outside, took one through a hallway and outside to a courtyard between classroom. Here, visitors found an outdoor classroom and a fish pond to their right. To their left were "T" posts set in the ground and connected with wire from which struggling grapevines hung, a casualty of overzealous mowing (personal communication, January 20, 2014). The Master Gardener garden area was through the next set of doors and in the

courtyard on the left. A variety of garden based learning experiences are literally just outside the classroom door.

School Schedule and Class Structure

The school operated on an "A/B schedule," meaning half of the classes met one day and half of the classes met the next day. During a two week block, each class should have met five times. The school schedule changed at times due to testing and other school events. Normally, class periods were fifty minutes long. Students were in ag science class for one semester and then changed classes. Many ag science students then go to the food and consumer science (FCS) class which nicely complements what they did in the previous semester. Denise established objectives for the semester that included gaining an understanding of the importance of agriculture in people's everyday lives, learning where food comes from, and understanding how it was grown or produced though work with the natural environment. Introduction of the concept that healthy ecological environments grow healthy food that can help develop healthy bodies and minds, and promote healthy communities was another objective woven throughout the semester's lessons.

Curriculum for the ag science classes was influenced by the state Department of Education. Many facets of southeastern and American agriculture, including ecological, historical, and cultural, were explored. The content areas for the class were based on the state Performance Standards for Middle School. MMS incorporated the International Baccalaureate (IB) philosophy: "to develop inquiring, knowledgeable and caring young people who help to

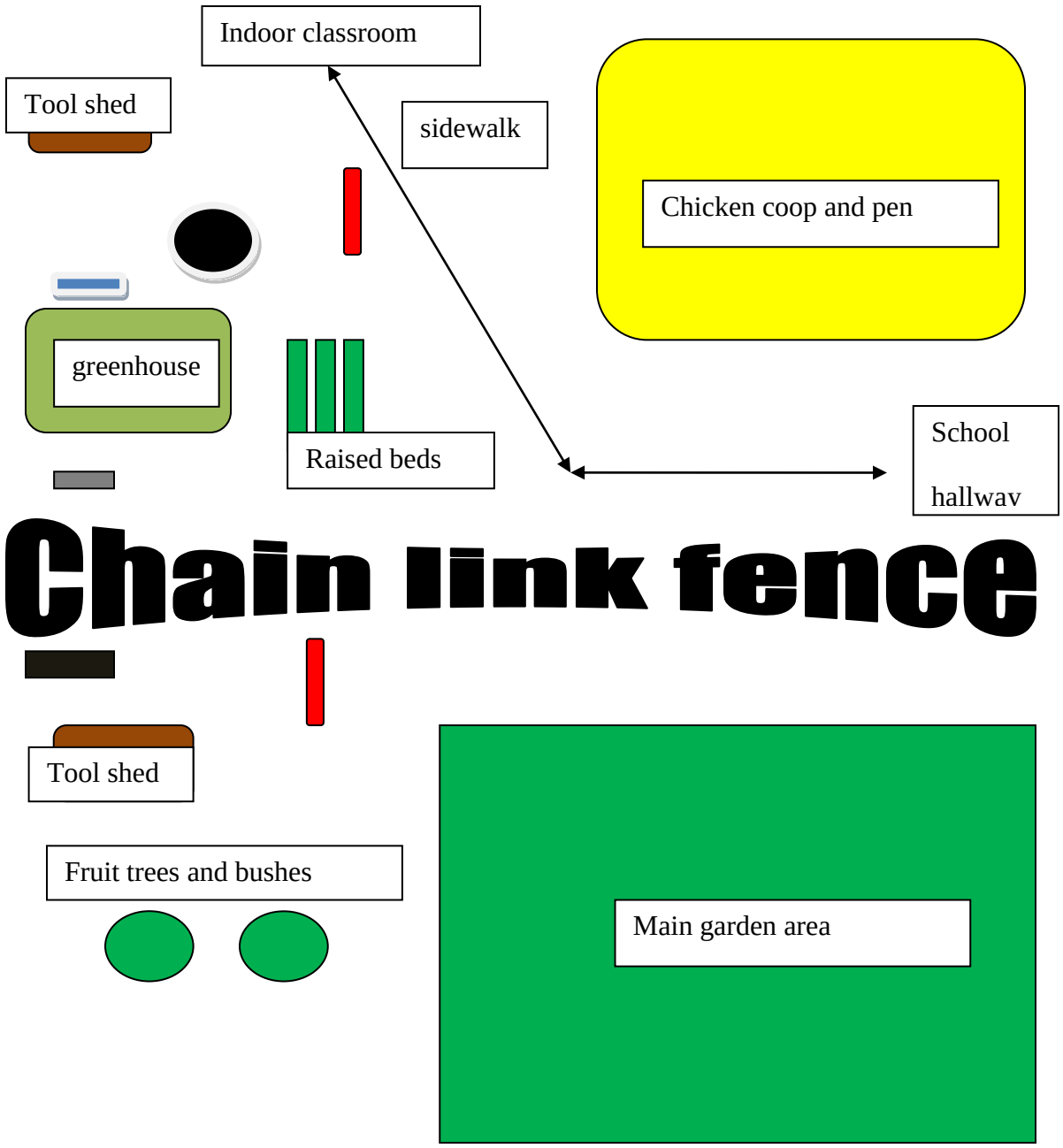

Figure 3.1 Outdoor Learning Area Map. Key: Black oval - cistern. Red rectangles -picnic tables. Blue rectangle - sink stand. Dark brown rectangle- compost area. Gray rectangle - herb drying rack.

create a better and more peaceful world through intercultural understanding and respect." There were no national standardized tests for ag science classes at the time of this study but students

did participate in a district standardized pre- and post-test.An integral aspect of agriculture education in this state is FFA (Future Farmers of America) and their mission to promote: premier leadership, personal growth, and career success. Magnolia Middle School FFA was an active chapter that welcomed new members. All ag students, FFA members or not, participated in a supervised ag experience (SAE) of at least eight hours during the semester. The SAE involved supervised work, related to agriculture, outside of class during the semester and students keeping record of it. If students continued in the ag science program into high school, scholarships based on SAE experience were available to help pay for college degrees.

Field trips were part of the structure of the class. Parents granted permission for these walking field trips in which students walked to the cemetery (adjacent to school property) and/or Sweet Gum Elementary (next door to MMS). Parents were notified beforehand when these activities were planned. Family member volunteers, especially with knowledge in areas of gardening, cooking, crafts, walking field trips, and woodworking were actively sought and joyfully received.

Grading procedures included summative assignments (major performance tasks, projects), formative assignments (in class, farm and greenhouse activities), and homework (SAE). Class expectations and rules included cleaning up after activities indoors and outdoors, using polite words, and acting with consideration for others. Students were expected to practice respect at all times – including respect for other people, animals, plants, structures, materials, and self.

Curriculum included the use of hand tools for gardening and/or woodworking. Students were instructed in the safe use of each tool he or she was allowed to use and supervised by the teacher or other adult while operating the equipment. Notified at the beginning of the semester,

parents signed a permission slip allowing their children to participate in class activities involving hand tools. Misuse of tools resulted in loss of privileges.

A large amount of instructional class time was spent outside because agriculture is based in outdoor environments. Denise considered outdoor work to be fun and wanted to expose students to many enjoyable opportunities. Students were reminded that outdoor time in ag science class was not the same as incentive time, a type of "reward day" for students who display appropriate work habits and leadership characteristics. Students were disciplined for disrupting class or endangering others through horseplay.

Participants

The ag science teacher in this case study was Denise Hill who was in her second year as the ag science teacher. It was her third year at MMS because she served as the Volunteer in Service to America (VISTA) worker for 1 year prior to being hired to teach. She was a white woman who moved to this city 21 years ago and felt that she was still considered an outsider though she did grow up in the southeast.

The current VISTA worker, Wren, was a 35 year old white male with a family background in farming and a degree in environmental science. He grew up in a county about a two hours drive away and had worked in many areas of the United States in an environmental educator capacity. His role as a VISTA worker divided his time of 40 hours per week between many areas of the school and the city. Wren worked in the ag science garden assisting Denise's classes and spent time with other classes such as the FCS class, for example, doing hands-on learning projects involving produce from the garden such as how to can pickles. Part of his time, as a government worker, was spent doing the paperwork that explained his duties and how he spent his hours during the week. He reached out to community organizations and organized how garden produce

was used within the school and if enough was left after that distribution, supervised students selling it during the Friday afternoon sales period outside the school.

Hanna, a graduate student from the local university was an African American woman in her twenties who enjoyed service learning classes and decided to volunteer so she could continue to have more experiences in that capacity. I am a 41 year old white woman who grew up in a rural area of the Pacific Northwest but has lived in this area of the southeast for 3 years. When the study was conducted I had lived in the southeast for a total of 6 years. Though not considered a participant, interpretations of my observations were influenced by my status as a white female Northwesterner (See Rudolph, 2014, for more description).

Seven of the eighth grade students from one of Denise's classes were participants. They were Scott, Kassandra, Nino, and Summer, all African American. Maria was the only Hispanic student. Janice was the only white student. Sierra was African American/Puerto Rican. Janice loved animals and belonged to Future Farmers of America (FFA). Kassandra was a quiet, smiling girl with braces. She was a cheerleader. Scott was a cheerful student who liked to make other students laugh. Sierra was a quiet girl whose family moved to the community from Florida. She wants to be an FBI agent but her father told her they do not get paid well enough so she thinks she will be an attorney. Janice, Scott, Sierra, and Kassandra often worked together. Summer was one of the "loud group" who often disrupted the class. She wanted to be a writer and though she does not like school, knew it is something she has to do. Maria, the only Latina in the class and part of Summer's group of friends, left before the end of the semester. Nino was a quiet boy, sometimes part of Summer's group, who grew up a few blocks from the middle school and had known Summer all his life. If he gets to be a professional basketball player, he wants to earn enough money to go to culinary school because he loves basketball and cooking.

Participants of this study brought a variety of interests to the class. The two African American boys, for example, had different personalities with Scott often in front of the class making jokes and Nino quietly sitting in a back corner, listening to music through his earphones. Talking one on one with Nino brought his interests to light, including his love of being outdoors. Similarly, Kassandra and Summer had very different personalities within the group but when interacted with individually, had definite opinions on why they were at school and had different interests in GBL projects associated with the class. Hanna, the university student knew very little about gardening but was interested in learning new things through her experiences, such as when she decided to take some cilantro home to add to her guacamole. Each participant, whether adult or eighth grade student, brought variety to the research which is described in the narrative case study that makes up chapter four and the analysis of themes discussed in chapter five. Student participants were recruited when I attended class and asked for their involvement after explaining the study. Adult participants were recruited through verbal discussions when we met at MMS.

Primary participants in this case study included Denise, Nino, Summer, and Maria. Maria left the class before interviews were conducted. Secondary participants included Kassandra, Sierra, Janice, Scott, Wren, and Hanna. Subunits in this study were the secondary participants. Yin (2009) stated "The same single-case study may *involve more than one unit of analysis*. This occurs when, within a single case, attention is also given to a subunit or subunits" (emphasis in original, p. 50). Subunits added opportunities for analysis and thereby enhanced insights into the case (Yin, 2009). Care was taken not to focus completely on the subunits but to refocus back to the larger, holistic aspects of the case. Primary participants participated in formal interviews while secondary participants did not. Other than the difference in interview formats, they

participated equally in the study. Eighth grade students were asked to participate because they have had the possibility of engaging in action gardening in their previous year or two and with their additional knowledge from previous years of experience spent more time engaged in gardening activities than students in other grades. Amount of garden experience was important given the significance of gardening as a central component in the theory of action gardening (Mitchell, 2013).

Table 3.2 Participant Summary

Primary Participants			
Name	**Role at MMS**	**Demographic**	**Gender**
Denise	Ag teacher	White	Female
Nino	Student	African American	Male
Summer	Student	African American	Female
Maria	Student	Hispanic	Female
Secondary Participants			
Wren	VISTA worker	White	Male
Hanna	Graduate student	African American	Female
Scott	Student	African American	Male
Kassandra	Student	African American	Female
Sierra	Student	African American/Puerto Rican	Female
Janice	Student	White	Female

In the next section of the chapter, the methodological literature on case study will be reviewed and ethnographic case study will be explained. Research purpose and questions, rationale for selecting a case study approach, case selection criteria, how the case was bounded, and how data was generated and analyzed follow. The section concludes with how quality was built into the case study.

Case Study

Case studies have been described in many ways by researchers. For example, Yin (2009) defined it as "an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident" (p. 18). Stake (1995) stated, "case study is the study of the particularity and complexity of a single case, coming to understand its activity within important circumstances" (p. xi). Stake (1995) and Simons (2009) noted that case studies are not always qualitative. Schwandt (2007) stated that case study research is a strategy for doing social inquiry and compared Yin and Stake's strategies for use of case study. Hancock and Algozzine (2006) defined case study as "a detailed analysis of a person or a group, especially as a model of medical, psychiatric, psychological or social phenomena" (p. 85). Simons' definition was used for the purpose of this study:

> "…in-depth exploration from multiple perspectives of the complexity and uniqueness of a particular project…in a 'real life' context. It is research-based, inclusive of different methods, and is evidence-led. The primary purpose is to generate in-depth understanding of a specific topic…to generate knowledge and/or inform policy development, professional practice and civil or community action." (p. 21)

Simons' definition was the most compatible with my interests for this study though all definitions referred in some way to in-depth examinations of a particular project or phenomena.

There are many types of case studies. Stake (1995) argued categorization is useful in that methods differ based on the type of case study. He reviewed three broad categories of case study: intrinsic, instrumental, and collective. Intrinsic case studies are those in which the researcher wants to learn about that case in particular. Instrumental case studies are those in which studying a particular instance helps researchers understand something else that is beyond that case. Collective case studies are conducted when several teachers or schools, for example, are considered together to help researchers learn about a particular condition or phenomenon.

Yin (2005) described another type of categorization of case study research: explanatory, descriptive, and exploratory. Explanatory case studies link program implementation in real-life interventions with its effects when it is too complex to explore using surveys or experimental methods. Descriptive case studies describe an intervention and its context. Exploratory case study is used when the intervention has no clear set of outcomes. Simons (2009) described theory-led case study as exploring a case from its beginning to determine what the program is trying to achieve and focusing on that. Theory-generated case generates data from the case using interpretivism. Evaluation case study relates to political aspects and works to determine the value of a program. Simons (2009) discussed ethnographic case study which is described next and was used in this research.

Ethnographic Case Study

Ethnographic case studies' origins are in anthropology and sociology. This type of case study uses methods of participant observations, interviews and document analysis to "gain close-up descriptions of the context and [are] concerned to understand the case in relation to a theory

or theories of culture" (Simons, 2009, p. 22). It differs from ethnography by being conducted in different timescales, familiar or unfamiliar cultures, and by use of a wider range of methods than classic ethnography. I used ethnographic case study because my research was conducted with a particular teacher as she enacted the theory of action gardening with her eighth grade agriculture science middle school class.

Case Study Evolution and Rationale

Case study evolved in the late 1960s and 1970s in the United Kingdom and United States. The most common models for research, particularly in education, were inadequate to provide evidence for development of needed programs and to explain success or failure of the programs being implemented in a changing socio-political climate (Simons, 2009). Predominant designs of objective models and systems analysis did not include participant perspectives, were not responsive to the needs of their audience, and were not conscientious of processes and dynamics of implementation or interpretation of sociopolitical contexts (Rudolph, 2002). Simons (2009) referred to a "quiet methodological revolution" (p. 13) as the broad movement of qualitative study, including case study, evolved over 40 years.

Simons (2009) discussed the history of case study to remind readers to consider what problems it was designed for in the first place before deciding whether to use it or not. Her description of school research in the 1960s and 1970s as "primarily experimental, quasi-experimental and survey, utilizing quantitative outcome measures of programme effectiveness" (p. 14) reminded me of the education research being done today in American school systems where high stakes testing is considered normal. Simons argued, "Developers, stakeholders and other audiences need to know how results were achieved, why some succeeded where others did not, and what key factors were in the particular setting that led to the precise outcomes." (p. 15).

She continued that this type of research was not adequate for the "specific and innovative" (p. 14) programs in place and new programs in development.

Stake (1967) argued for case study as a way to tell the program story. In order for case studies to tell the story, Stake stated that the role of evaluation needed to be rethought and evaluators needed to widen their databases. MacDonald (1971) worked to develop a rationale for case study design that took variability and different influences on human action into account, relationships between acts and consequences, and different perceptions of those who designed the program with those who implemented it. The Nuffield Foundation sponsored conferences in which United States and United Kingdom researchers contributed to alternative forms of evaluation and over thirty years promoted a range of qualitative research practices, including case study (Simons, 2009). These approaches all had a focus on "documenting complexity, interpreting in context, observing in natural social conditions and communicating in the natural language of the participants" (Simons, 2009, p. 16). Context and participants are key components in case study research.

Rationale for Selecting a Case Study Approach

Case study may be used when "the intervention being evaluated has no clear, single set of outcomes" (Yin, 2009, p. 20). Simons (2009) called case study a "study of the singular, the particular, the unique" (p. 3). She continued, "the essential task is to understand the distinctiveness of the individual case" (p. 3). Similarly, Stake (1995) emphasized case study as a method of researching a unique situation. "We take a particular case and come to know it well, not primarily as to how it is different from others but what it is, what it does" (p. 8). This point applied to my research which included action gardening as part of the context of the class I studied because it was being done by one teacher, in one school. It was a very specific situation.

Qualitative case study "values multiple perspectives of stakeholders and participants, observation in naturally occurring circumstances, and interpretation in context" (Simons, 2009, p. 4). It is an alternative to positivistic research conducted in the past which assumed a constant and objective reality that could be measured accordingly and applied to new education programs being put into practice (Rudolph, 2002). Yin (2009) argued that case study applies when the researcher seeks answers for "how" or "why" questions. Stake emphasized case studies for pursuit of understanding for "issues intrinsic to the case itself" (p. 28.) The research questions for this study were "how" and "why" questions, indicating applicability to use of case study. Why the teacher implemented the theory in a particular way was as an aspect of the third research question.

Simons (2009) described a single case study as an in-depth way of "using qualitative methods within a naturalistic paradigm" (p. 5) and recommended it for education because of its educative process. Case study is also useful for "an integration of inferences and interpretations of events organized to tell a story of the whole" (p. 6). To share the story of the educative process for Denise and her class, a single case study was conducted at Magnolia Middle School where the enactment of a theory of action gardening occurred.

A major purpose of research is "to inform and promote public decision-making" (p. 17) because it is linked to the politics of who gets the limited resources (Simons, 2009). While the alternative evaluation tradition was developing, there was a growing awareness of need to shift power in research relationships and to acknowledge perspectives of participants, as well as judgments of those who make decisions in practices (Freire, 2000). Simons (2009) related this to the "purpose and role of evaluation in a democratic society" (p. 17) which is particularly relevant to the democratic leanings of action gardening and place conscious education.

Case study critique and support. Case study has been critiqued for its "lack of control and high probability of bias" (p. 16), masses of data so large they are hard to process, reports too large and detailed for stakeholders to read, its uncontrolled intervention in the lives of participants, and personal involvement of researchers (Simons, 2009). Flyvberg (2006) listed and argued against five misunderstandings used to critique case studies: (1) Case studies produce context-dependent knowledge which is less valuable than context-independent knowledge. (2) It is not possible to generalize based on a single case so case studies cannot contribute to scientific development. (3) Case studies are most useful for generating hypothesis in the first stage of research but other methods are much better for hypothesis testing and theory building. (4) Case studies contain a bias toward confirming the researcher's preconceived notions. (5) It is difficult to summarize and develop general theories through specific case studies. These misunderstandings suggest that theory, reliability, and validity are problems and therefore case study cannot be used as a scientific method. Flyvbjerg (2006) disagreed and dismantled the criticisms arguing the following points: (1) Case study produces the type of context dependent learning necessary to develop from rule bound novices to experts. (2) "Formal generalization is overvalued" and "the force of example is overestimated" (p. 228). (3) Case studies contain "no greater bias toward verification of the researcher's preconceived notions than other methods of inquiry" (p. 227). Instead, they contain greater bias toward falsification of preconceived notions. (4) Summarizing case studies is difficult because of the properties studied and it is not often desirable to generalize them. Each should each be read as a whole narrative instead. (5) Predictive theory does not exist in social science so context dependent information is the only kind available and therefore is valuable.

Case study critiques have been acknowledged and countered by other qualitative researchers, as well. For example, Lincoln and Guba (1986) stated, "The interactive nature of the relationship is prized, since it is only because of this feature that inquirers and respondents may fruitfully learn together" (p. 75). Simons (2009) justified how subjectivity of the researcher is inevitable but does not have to be a problem when appropriately monitored. It can actually be essential to understanding the case. Radley and Chamberlain (2012) reasoned that qualitative and quantitative research have variables that cannot be controlled. As far as case studies being a distorted representation because they capture a frozen moment in time, Simons (2009) argued that highlighting "the timing of the study, the partial nature of interpretations and the conditions of their construction" (p. 24) can help readers determine relevance and significance for themselves. There are many ways to make inferences from one or more cases that apply to other contexts (Flyvberg, 2006). Simons (2009) concluded with a reminder of the purpose of case study which is "to present a rich portrayal of a single setting to inform practice, establish the value of the case and/or add to knowledge of a specific topic" (p. 24). This is how case study was used in my research.

Case Selection Criteria

Stake (1995) stated "Our first obligation is to understand this one case" (p. 4). The principal criterion for this case was to maximize what can be learned about enactment of a theory of action gardening. Denise's enactment of action gardening with her middle school students is important to research because garden based learning has been demonstrated to be effective in teaching science but has been studied far more at the elementary school level (Bowket & Tearle, 2007; Cutter-Mackenzie, 2009; Klemmer, 2005b) and for its value in teaching about good nutrition (Blair, 2009). Ag science classes include much more than one science subject and more

than content knowledge. They combine science subjects of biology, chemistry, and physics and encourage students to work toward development of leadership skills, characteristics, and responsibilities through their supervised ag experiences programs (Georgia Standards Agriculture, 2008).

Generation of Data

Interviews, observations, a reflective journal between researcher and teacher, a researcher journal and document analysis were used to generate data (Simons, 2009; Stake, 1995; Yin, 2009). Informal interviews were conducted as the opportunity arose with all participants. Data generation began in July 2014, though the first site visit was January 20, 2014, when I met Denise and was asked if I was interested in attending a weekend workday.

Simons (2009) listed five reasons for observations and interviews being used together in case studies. The first was to gain a comprehensive description of the setting which cannot be obtained by simply interviewing. Secondly, observed incidents provide a base for rich description for further analysis and interpretation. Third, observations assist the researcher in discovery of norms and values of the culture or subcultures. Fourth, since interviews are verbal interactions, those being interviewed who are less articulate are at a disadvantage. However, one must be aware of misinterpretations that can occur when considering observations alone and outside of cultural contexts. “Finally, observations provide a cross-check on data obtained from interviews” (p. 55) which can strengthen validity of the account (Simons, 2009). Emerson, Fretz and Shaw (2011) recommend focusing on initial impressions, a personal sense of what is important, and impressions of what those in the setting reacted to when conducting observations during field research.

Participant observations. Participant observations were recorded as jottings which have been defined as "a brief written record of events and impressions captured in key words and phrases" (Emerson et al., 2011, p. 29). These jottings were used later to write up more complete field notes. The researcher was a participant and an observer during this study. My role as a researcher was similar to that of a volunteer parent but possibly with more science knowledge. I did not take the place of the teacher but worked with her as requested and was allowed to integrate into the culture of the classroom and become familiar with the students. I explained my role to students as clearly as possible in order to assist in their understanding of what it entailed.

Researcher thoughts and actions of events during field visits were recorded and included as data. Emerson et al., (2011) stated "It…becomes critical for the ethnographer to document her own activities, circumstances, and emotional responses as these factors shape the process of observing and recording others' lives" (p. 15). Field notes were written up with emphasis on "social and interactional processes that make up people's everyday lives and activities" (Emerson et al., 2011, p. 15). Social interaction "consists of people taking each other into account and, in the process, influencing each others feelings, thoughts, and action" (Coakley, 2009, p. 5). Social structure consists "of the established patterns of relationships and social arrangements that take shape as people live, work, and play with each other" (Coakley, 2009, p.5). It is useful to observe social structure and arrangements because they play a key role in the theory of action gardening as indicated by emphasis on establishment of community based relationships, democratic education, and support of sociocultural dimensions of youth (Mitchell, 2013).

Interviews and journals. Formal and informal interviews were conducted to generate data. Hands-on experiential learning was encouraged by the teacher which resulted in frequent

opportunities for research interaction with study participants. Bowker and Tearle (2007) related the importance of what they termed "contextual observations" which provided ways for researchers to "experience the context and the ethos of the school through 'looking,' 'watching,' 'listening,' and 'initiating discussion' with children whilst they showed the researcher around the school garden" (p. 91). Informal interviews were conducted with the students similarly to Bowker and Tearle's (2007) study. This was similar to ethnographic interviews conducted in a recent study with which I was involved. Researchers use ethnographic interviews to establish rapport with participants which may be confirmation of something observed through informal chats (Emerson et al., 2011). Informal interviews are flexible which allows the interviewer to change directions "to pursue emergent issues, to probe a topic or deepen a response, and to engage in dialogue with participants" (p. 43). Informal interviews contributed to a sense of belonging which helped establish rapport with study participants.

Establishing rapport was essential for in-depth or semi-structured interviews (Roulston, 2010; Simons, 2009). This rapport was evident between the amount of time students were willing to participate in the first formal interview (15 minutes) and the second (over 30 minutes), having spent more time together and becoming more familiar with me by the final one. I interviewed both students together during both semi-formal interviews because there were only two of them. I thought interviewing them together would put them more at ease because they had not known me very long at the time of the first interview. The third primary participant did not participate in the semi-formal interviews because she moved before they were conducted. Simons (2009) argued that semi-structured interviews "document the interviewee's perspective on the topic" (p. 43) and promote "active engagement and learning…for the interviewer and interviewee in identifying and analyzing issues" (p. 43). Interviews have a potential "for uncovering and

representing unobserved feeling and events that cannot be observed" (p. 43) which provided additional insight for the interviewer and interviewee (Simons, 2009).

Two semi-structured interviews were conducted with Nino and Summer (primary participants) during class. A garden drawing was collected from most students. It was used as an interview elicitation device with Summer during the first student interview. Nino did not contribute a drawing. Instead, he described what he would have drawn and why. Bowker and Tearle (2007) cited several studies in support of the use of children's drawings to elicit their understandings. Prior to the second interview, Nino and Summer were provided with digital cameras to allow them to take pictures that were of particular significance to them during a tree walk (a tree mapping and identification exercise outside on school grounds and in the cemetery). These pictures were used as data and as interview elicitation devices for the second interview with the students. Pictures were downloaded from the digital camera to the researcher's computer. The cameras malfunctioned after Nino took a few pictures and Summer's camera batteries ran out despite being new. Both students were still able to describe the thoughts represented by their pictures despite the camera limitations that occurred.

Three semi-structured interviews and several informal interviews were conducted with Denise. Our first interview was in July at the beginning of the study to provide an initial reference point regarding the end of her first year and beginning of the second year of experience of enacting a theory of action gardening with students. The second interview was in September 2014 to discuss the fall semester to that point. The third interview took place near the end of the fall semester in December to discuss the affordances and constraints to enacting a theory of action gardening. Semi-structured interview questions for the students and Denise are located in Appendix A.

Another source of data was reflective journaling and email between the teacher and researcher throughout the study. A google document, only accessible to Denise and I was established and we wrote reflections about the class on the shared document. The shared reflective online document was a source of reflexivity and written analysis that assisted in creating a chain of evidence as suggested in Yin (2009). A separate researcher's journal was kept which was not shared. It was used to record more personal experiences, ideas, mistakes, dilemmas, epiphanies, reactions, questions, and thoughts.

Table 3.3 Summary of Data Generation Methods

Data Generation Method	**Number of Instances**	**Length of Each (Time or Pages)**
Participant observations & ethnographic interviews	40	50-120 minutes
Teacher interviews	3	60-75 minutes
Student interviews	2	15-30 minutes
Reflective journaling	23	1-3 pages

Study timeline. This study was conducted over seven months, from July to December 2014. The first semi-structured interview was conducted with Denise in July 2014. Participant observations began in August 2014. Informed consent was obtained from all participants before observation of them as participants began.

The first student interviews were conducted in October 2014 after their garden drawing was completed. Gardening photos were taken during November. The second student semi-structured interviews and the third teacher semi-structured interviews were completed in December 2014. Primary analysis was completed in May 2015.

Data Analysis

Simons (2009) wrote that analysis and interpretation may be two aspects of case study research that are the least written about. She proposed three reasons for this: case studies depend heavily on interpretive skills of the researcher, guidelines that apply to all situations for replicable results are difficult to establish, and case study data needs analytical tools specifically for it not just those borrowed and tacked on from other kinds of inquiry. The purpose of analysis is to organize and make sense of data. It is often a "formal inductive process of breaking down data into segments or data sets which can then be categorized, ordered and examined for connections, patterns and propositions that seek to explain the data" (Simons, 2009, p. 117).

Table 3.4 Timeline for Data Generation during the 2014 Fall Semester

July	**August**	**September**	**October**	**November**	**December**
1st teacher interview			2nd teacher interview		3rd teacher interview
			1st student interview		2nd student interview
Participant observations, informal interviews, reflective journaling→ongoing					

Data analysis is often a "formal inductive process of breaking down data into segments or data sets which can then be categorized, ordered and examined for connections, patterns and propositions that seek to explain the data" (Simons, 2009, p. 117). The purpose of analysis is to

organize and make sense of data. For me, this began during data collection by writing fieldnotes. For example, I wrote:

> Nino came back from lunch saying he only ate a little because he doesn't like school food. I asked if they go outside at all during lunch because it's short. Nope. They eat and go to class. Denise told me the school day goes from 8:25-3:45. So these rapidly growing, highly energetic, highly intelligent people are supposed to quietly soak up information all day? I'm going to look up exercise recommendations for 13 year olds. (Researcher's journal, November 13)

In this quote, I made a connection between Nino and his classmates for their classroom squirminess because I felt that they needed more time to exercise their bodies amid the exercise their brains were getting through hours of class work. As I wrote up fieldnotes, I added comments in margins including questions that arose for me, wrote memos about details I wanted to look into more, and pondered day to day things that were on my mind in my researcher's journal.

Charmaz (2014) recommended a progression of line by line and then focused coding but acknowledged that it is not a linear process. "In practice, grounded theory research is not as linear as the organization of chapters in this book might suggest. A pivotal insight or realization…can happen any time during the research process" (Charmaz, 2014, p. 18). My analysis proceeded in a convoluted and often frustrating process full of fits and starts and doubts of my ability. I read my fieldnotes, coded and wrote memos, interrupting both processes to write notes on sheets of a large white scratchpad which I later organized and manipulated physically into categories and eventually, themes.

Line-by-line coding was recommended as a way to detect patterns in everyday life and to help dissect and analyze compelling events in more detail (Charmaz, 2014). I began coding through close reading of my fieldnotes using line-by-line analysis but was soon "chunking it" instead. Since I was looking through hundreds of pages of documents about several participants' experiences of the enactment of action gardening, looking for paragraphs or lines that together made a code or a "chunk", worked more efficiently for my analysis. I switched from fieldnotes to student interviews to provide a sense of direction toward what they considered important which helped me hone in on "looking for threads that can be woven together to tell a story" (Emerson et al., p. 171) that is comprehensible to readers "not directly acquainted with the social world at issue" (p. 171). I read every word and listened to every interview more than once, organizing codes into chunks of impressions of what seemed important to participants to begin "close, intense reflection and analysis" (Emerson et al., 2011, p. 172).

Charmaz (2014) argued "Memo writing frees you to explore your ideas about your categories. [It is] part of the discovery phase of writing in which you write to learn" (p. 181). I wrote memos concurrently as I wrote fieldnotes, after interviews, and as I coded fieldnotes and transcriptions. For example, in a summative memo after listening to the first student interview I listed ideas and then explained my thoughts more fully:

Cultural influences: Grandparents

Driving forces: Food-cooking, eating; money-Nino; socializing-Summer; future plans-know you have to go to school now to do something else later

School is something you "have to do."

Things they like about school: math, writing, eating, socializing

> Not positive about this class except for Nino loving to be outside every day and getting to eat donuts.
>
> This interview hinted at a few things that came up stronger in the next interview. One thing is grandparent involvement in their lives. Food is definitely an important factor in what interests them and their grandmothers are the people they learned to cook from and who they admire for her good cooking. Interruptions during this interview made it hard for them to stay focused but they did pretty well until the last couple of minutes when the other students opened the door and started yelling" (Memo #1, January 30, 2015).

In the above excerpt, I was just beginning my analysis process and was unsure where and how to start. I wanted to know what things came up in the interview that seemed important to the students as a way to think about how students made meaning of the teacher's enacted theory of action gardening. I identified these things as codes in the margins of the fieldnotes document and wrote the memo.

Emerson et al., (2011) insisted that in-process memos are necessary to step back from actively writing fieldnotes and begin "identifying, formulating, and elaborating the theoretical import" (p. 123) of events. A memo written within my fieldnotes contained information to try to help me make sense of the place where the school is located.

> It has also surprised me to see how many students ride buses. Is it because of the amount of traffic they would have to deal with if they walked home? Assuming the map providing by the school is to scale, I would estimate that the farthest point of the area from the school that is covered by this middle school is less than two miles away. Based

on the number of streets, this seems to be the most crowded part of town of all the areas where middle schools are located. What does that mean?

Oak trees are growing in front of my truck. Their leaves are red. They are small trees and I wonder when they were planted. Maybe in the last five years? That is another thing for me to look up. I wonder because the pine trees which are closer to the road are much bigger around and taller, clearly much older than the oak trees. What brought on the planting of the oak trees after the pine trees? According to the school fact sheet, it opened in 1959 and a major remodeling occurred in 2005. I don't know how to find out but I wonder how it was decided where the middle schools should be placed."

(Fieldnotes, November 4, 2014, p. 116-117)

In this memo, I asked questions about what I had observed to help me focus on development of a rich description of the place where the school is located within the city and background information on when it was built, what was happening at that time that influenced a middle school being built in this location and who lives in these neighborhoods. Trying to understand what I had observed seemed to bring up more questions than answers in this memo but it guided me to think more deeply about this place and community the students and their families inhabited. Memos provided insight and guidance and were not intended to produce final analysis. They were used to help direct the fieldwork process and explore connections of what was being noted (Charmaz, 2014). As I re-read and coded my data, I continued writing memos.

Besides writing marginal notes and memos, I wrote "big ideas" on another notepad that I felt might be themes. The notepad pages were about the size of a half sheet of notebook paper. I wrote one heading on each page. It helped me to have a lot of space to work in and to physically move ideas. I had to see things and touch them to really understand where they fit, moving them

and sometimes moving them back to their original place. Each white paper had one "big idea" written at the top, something that I thought might be a major theme of my study. I added subheadings under whichever main headings they fit. For example, on one of these sheets I wrote: "TASKS (students' type of experiential learning)." Under the word TASKS, I wrote, "Lack of care for tools and garden structures" because students ran inside for lunch one day and left everything outside, forgetting to put it away. A bigger subtheme on that page was, "Sense of autonomy (fieldnotes, p. 77, look for other examples, connect to McInerney and Spanish paper)" to remind me that I felt an increasing sense of autonomy among students as the semester progressed related to tools they were allowed to use in building garden structures. As my analysis continued, I felt that other themes would support or build onto the one about autonomy.

Simons (2009) and Whiting and Sines (2012) recommended a form of visual organization called concept maps or mind maps. Whiting and Sines (2012) argued that mind maps, as they referred to them, are a way to graphically represent "ideas, concepts and sub-concepts, classifying and organizing a large number of items around a central concept; they also build and visually link relationships within and between concepts" (p. 22). I wrote more codes and ideas on 2 inch x 2 inch squares of colored notepaper which I arranged on a bed (Figure 3.2) and then transferred to a flow chart (Figure 3.3). It was a mess and much too complicated but I included it as an example of the data process analysis process. I used concept maps several times to organize my thoughts and visualize the large amounts of information I was required to analyze but have only included two as examples. I find them much easier to write out and manipulate by hand than on a computer.

As I began to dig deeper into the analysis process, I read new material and reviewed old material to learn and be reminded of what coding and categories were, where themes come in,

and how case studies are organized. I asked a lot of questions of the data as I read it. Emerson et al. (2011) summed it up as "A grounded, open-ended approach to ethnographic analysis, an approach keyed to the close, systematic consideration of fieldnote data aimed at genera many ideas, issues, topics, and themes as possible" (p. 197). Charmaz (2014) encouraged me when I read "Keep coding simple. If you have the makings of a solid analysis with a small number of focused codes, then proceed with the analysis…" (p. 147). Continual reading, review, and occasional advice from more experienced researchers like this, "At this stage of your analysis, writing is your friend as it forces you to connect what you are seeing in ways that can be shared with others" encouraged me to continuing writing as a process of thinking through the analysis. Early in my analytic process, I tried not to worry about terminology and instead, just wrote things as they occurred to me. When I started to "just write" while re-reading my fieldnotes, ideas started to emerge from my subconscious and I wrote them either as comments in the margins, as memos on separate documents, and as lists of connected concepts and diagrams. In the initial stages, I specifically coded for student-student interactions, student-researcher interactions, teacher-student interactions, tasks, student groups in places of the class (i.e. classroom, garden, greenhouse), cultural environment, and environmental descriptions. By environmental descriptions, I meant surroundings such as neighborhoods around the school, retail opportunities, and physical description of the school. Maxwell (1996) stated that "the main categorizing strategy in qualitative research is coding" (p. 107) and the goal of which is to break the data into smaller pieces and rearrange them into categories that facilitate comparisons and aid in development of theoretical concepts. As I coded, I thought about how I would write up my results. I organized it in my mind and wrote ideas in my researcher's journal each morning before I started the day's work. For example,

> I can organize the data like I did for our ethnography article; write a composite narrative of "a day in the life of 8th grade ag science at Magnolia MS." It'll be from my point of view and include interactions with each participant in multiple places. Each interaction will contribute support toward a theme…" (Researcher's journal, February 28, 2015)

In the above quote, I felt like I had a good idea for how to organize the information and wrote it down so I would remember it later and to free my mind to continue considering what the data meant. I continued doing this almost every day on whichever component of my research I was trying to understand. Through this intense reflection and analysis using memos and visual analysis, I began to make connections between fieldnotes and interviews. For example, a comment written after I had reviewed students' interview transcripts read:

> Explicit message about creating a community within the class. What neither of us knew is that they already are a community but we were not accepted because we didn't know how to work with their cultural rules. See interview 2 with students. (Fieldnotes, August 22)

I referred to a section of a student interview in which Nino and Summer explicitly described their cultural norms of using the terminology, "Yes ma'am" or "Yes, sir," when addressing their elders as a form of respect. Yet, Denise specified that she would rather not be called ma'am which was in conflict with the manners enforced at students' homes. I had noticed students already were part of an established community due to my interview and yet it was not acknowledged in the classroom at this point in my observations. A later interview with Denise provided information that her awareness of their community had changed. Community became a focal point in my results.

Figure 3.2 Manual Organization of Emerging Ideas

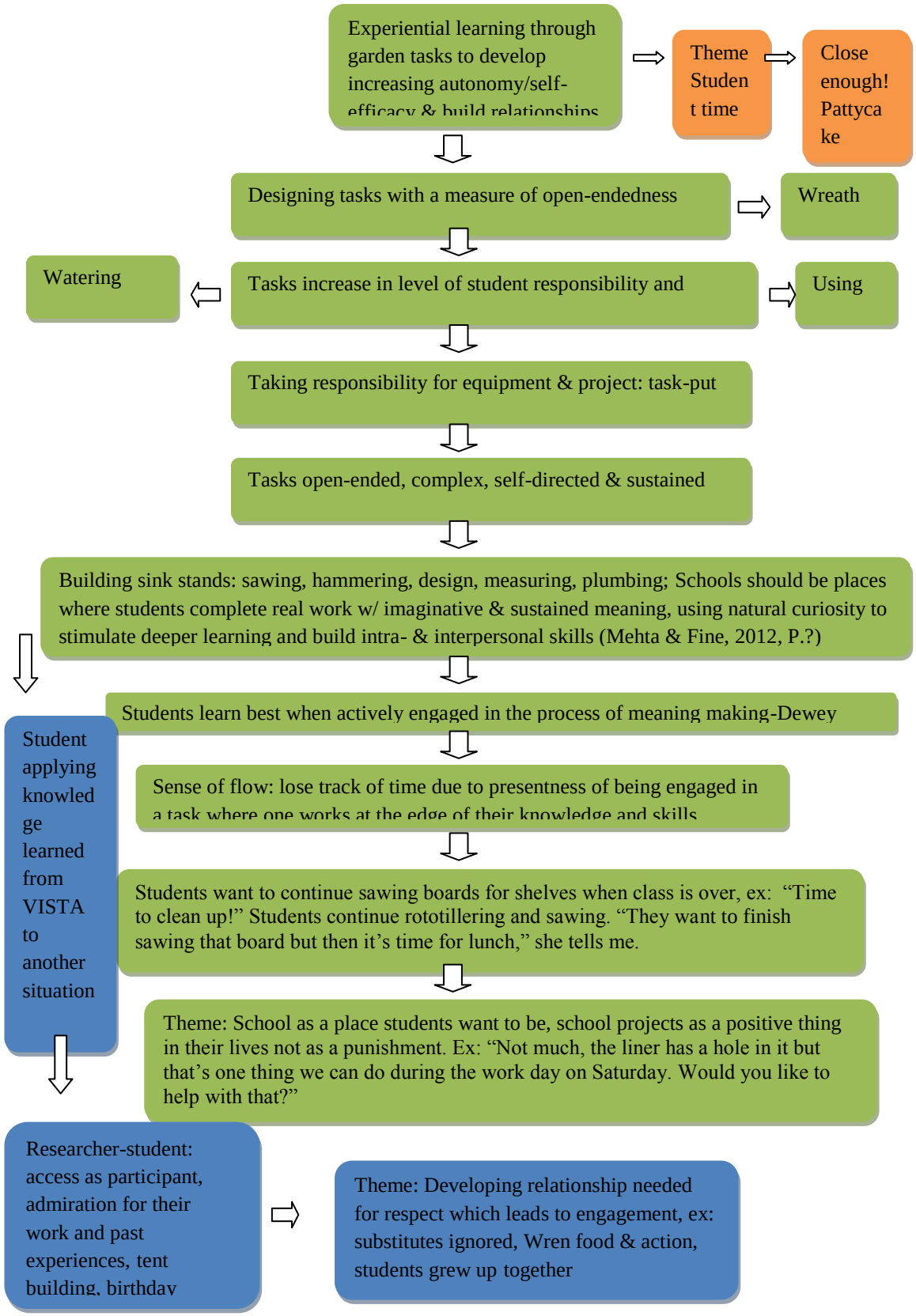

Figure 3.3 A Visual Map of Ideas in Progress

Maxwell (1996) advised beginning data categorization by what seems meaningful to the researcher. These visual maps were a beginning way of categorization of data for me. Patterns and key events in the data began to emerge to my mind as I coded as noted in the following memo about time:

> There is a near-idea in my head about concepts of time as I read about my struggle to get the six students outside where I can talk to them and where they won't have the rest of the class to entertain, making it easier to ignore me. I'm thinking about the structure of their days at this time in their lives and how time is changing for them because they are approaching high school where they will be expected to be nearly grownups. First, their days now are scheduled minute by minute throughout the school day which starts about 8 and ends about 3:30. It must be a relief to go to a class like Denise's that is loosely structured where they have the opportunity to talk to their friends. My thoughts when I was trying to get them out the door were about the limited time I had with them away from their friends and how I needed to use it efficiently. By doing that, I was doing what all the grownups in their lives probably seem to do to them, structure their time. Denise mentioned it in her interview, a feeling of slowing down in her class, and how it seems important to her to provide that to them… I feel like use of time or structure of time will be a theme somehow so I will keep looking and thinking as I read further. (memo #5 while reviewing September 8 fieldnotes).

As I described in this memo, I felt like there were different ways of feeling the concept of time. During the second student interview when Summer and Nino talked about growing up together, I noted, "Shared history, time in this place, families go back a long time with each other." I had started thinking about how long it felt like it took me to start to be accepted into their classroom

community and that I was very new to this place where they and their families have lived for generations. In another part of the interview, Summer mentioned that even their grandmothers knew each other. Both thoughts about time and place contributed to my thinking about the significance of community with the class.

I described three initial themes as my analysis progressed. One theme I developed was something I called "student time" in which things get done more slowly and with more enjoyment of the process than our adult society promotes. Adding to the first theme, a second theme was use of time and place contributes to relationship building which increases student engagement. Having grown up together seemed to be a key ingredient in their establishment of relationships. The third theme was experiential learning through garden tasks helped develop student autonomy and builds relationships. I mentioned these themes-in-progess as part of my data analysis section because their conception was a part of my process of understanding how to develop themes from data analysis. It took several readings and codings to create categories corresponding to key events, cultural groups within the class, and patterned regularities related to the enactment of a theory of action gardening. Stake (1995) stated "We seek to portray the case comprehensively, using ample but non-technical description and narrative. The report may read something like a story" (p. 134). I struggled with how to write up results in a way that supported the themes, was interesting, and was scholarly to read.

My process of selection of data included quotes from participant interviews, memos, journals, and fieldnotes from throughout the experience to present a feeling of change throughout the semester as my research question asked about perceptions of enactment of action gardening. Themes emerged in my writing related to temporality, sociality, and place. Lapum, Angus, Peter, and Watt-Watson (2010) described narrative form noting, "We attended to facets of temporality,

contextuality, plot, scene and characters in order to understand processes and activities involved in narrative emplotment" (p. 756). For example, I wrote:

> I wanted to include examples of all of the students, Denise, Wren, Hanna, and show all of the components of the school and nearby area that affect the answers to my questions. That means I could start with a text the night before from Denise who was concerned about a student, demonstrating care for students extending beyond classtime and development of relationships between teacher and student and teacher and researcher… (Researcher's journal, March 8, 2015).

This quote begins the composite narrative that will describe a visit to Magnolia Middle School written from fieldnotes, interviews, memos, and journal entries.

Case Quality

Construct validity, external validity, and reliability were three tests Yin (2009) recommended for judging quality of this kind of case study. Lincoln and Guba called these measures parallel to rigor, a term used in "scientific' understandings of research results (Schwandt, Lincoln & Guba, 2007). Freeman, deMarrais, Preissle, Rouston, and St. Pierre (2007) criticized use of terms borrowed from conventional practice:

> "Our premise is that it is neither desirable nor possible to reach consensus about describing standards of evidence in this diverse field. Such prescriptions, we believe, amount to disciplinary action (Foucault, 1975/1979) that constrain generation of knowledge rather than improve it." (p. 25)

They proposed that the civil and intense discussions of quality in qualitative research are due to the heterogeneity in qualitative design and the "absence of hegemonic presence" (Freeman et al., 2007, p. 25). Their recommendation was for descriptive documentation of

methodologies. Lincoln and Guba called this a new language of authenticity criteria (Schwandt et al., 2007). To achieve trustworthiness, they recommend researchers focus on credibility, dependability, transferability, and confirmability. Many things can be done to ensure credibility, such as prolonged engagement in the field, persistent observation, triangulation of data, and member checks. Lincoln and Guba argued that this is necessary to provide "narrative about the context so judgments about the degree of fit or similarity may be made by others who wish to apply…findings elsewhere" (Schwandt et al., 2007, p. 19).

Prolonged engagement in the field, persistent observation, triangulation of data, and member checks with the teacher and students strengthened the quality of this case study and were accomplished by spending one full semester at Magnolia Middle School doing participant observations. As an example of member checking, one day I took a transcript of the students' first semi-structured interview for them to read and discuss with me during class to ensure an accurate portrayal. Member checks were also conducted by continual, informal solicitations of reactions by the participants to my reconstructions of happenings, written as fieldnotes, with which they were involved. I included these "check points" to provide the authenticity which was described by Schwandt et al. (2007) as tending toward empowerment by providing everyone with something at stake in the evaluation to control it as well.

Subjectivity Statement

I write almost every morning in a spiral notebook while I sit in my recliner and drink my first cup of coffee. This is when I let whatever is on my thought run freely onto the page. Academic writing, in contrast, feels dry and constrained to my mind in contrast to the morning writing I do. Simons (2009) described interpretation as understanding and insight derived from a "more holistic, intuitive grasp of the data and the insights they reveal" (p. 117) and as a highly

intuitive process "open to different senses of understanding, such as dancing with the data" (p. 117). Throughout the above mentioned morning free writing, coding and memos, my interpretation of the events will be evident in the results, findings and case study narrative. Creative and personal skills are required to make sense of data because it does not stand alone. "Data that do not 'speak' to the person who gathered and reported them are not likely to strike up a conversation with subsequent readers either" (Wolcott, 1994, pp. 13-14). Although my case study research is about how Denise's experience and actions of the enactment of action gardening and how students experience it, it is important to recognize that I interpreted participants' experiences and actions, as well as my own. Therefore, who I am and what is important to me will impact this case study (Simons, 2009).

Researchers need to be aware of the dynamic that exists between the interactions with our values, emotions, ways of thinking, ways of being, and how all these things affect how we live and act (Simons, 2009). Self has been split into "'situational selves' and the 'substantial self," the former being positions we can take in different situations, the latter being that part of us which is difficult to change, rooted as it is in the conscious and unconscious past and the relationships which helped shape it (Simons, 2009, p. 83). For example, my situational self changes whether I am having dinner with a friend or am teaching a class. My substantial self becomes distressed upon hearing about child abuse on the news or about environmental damage due to careless, ignorant humans. My actions and thoughts are influenced by my past and present and I have to note this as I conduct research.

"Seeking out your subjectivity is more than a rational process. It is sensing when your emotions and feelings are engaged" (Simons, 2009, p. 84). Some values that influenced my choice of topic and theoretical framework for this study is the importance I place on pragmatism,

my love of science and being outdoors, a feeling that action is more important than words, and my caring and compassionate nature toward living things. Education, both formal and informal, is valued in my family as indicated in the opening vignette in chapter one where I was encouraged to do well in school and continue on to college. Informal education is much more prevalent, despite or perhaps leading to, the value placed on formal education. For example, I grew up heavily influenced by the physical strength and work ethic of my father and both grandfathers who were all carpenters. My grandmothers did domestic work for other people and one began waitressing when her children grew up and left home. Only one of my grandparents finished high school. Although my family could not pay for college, it was understood that my two sisters and I would earn college degrees and would find ways to pay our own expenses. We did. Hard work, determination, and practically are all traits I was brought up to value.

The following vignette[4] describes my attachment to place, returning to the "home" I opened Chapter One with, which I include now to show the significance to me of using place consciousness in education in my study.

> "What do people do there?" "Why would anyone want to live there? In the middle of nowhere?" These are questions people ask when I describe the town of 10,000 where I grew up, left, returned and recently left again.
>
> Baker City, Oregon, once the "Queen City of the Mines" boasted fine dining, famous accommodations, modern transportation and gold fever. That was about 100 years ago. It is now a quiet town where farmers, ranchers, miners, loggers and environmentalists are learning to accept each other for the sake of the next generation.

[4] This is part of a slightly different version of a previously published essay. See Rudolph, 2009.

Baker, as locals know it, is located in a large open, nearly treeless valley about forty miles long and forty miles wide. The Elkhorn Mountains with peaks stretching nearly 10,000 feet in elevation make up the western boundary of Baker Valley. Sunsets over the Elkhorns light up our sky with an array of pink, gold, blue, red and orange hues. They are highly photographed and, I think, one of the most beautiful sights in the world.

The Eagle Cap Mountains border us to the northeast. Sunrises over those 10,000 foot peaks turn the snowy trees a powdery pink for almost nine months of the year. The Blue Mountains form the northern edge of the valley and to the south; we have hills that Easterners often mistake for mountains. The sagebrush hills, forested mountains, golden wheat fields, green alfalfa hayfields and pastures dotted with grazing cattle are only part of this place that I have grown to love.

I left Baker three years ago to begin a doctoral program in the Deep South. I cried for an hour, the day that I left. Then, I focused on the adventure of living somewhere completely different in climate and culture as I drove almost 3,000 miles away from home. I knew I would miss the mountains so I brought pictures and hung them in my new house. My new friends and neighbors would stare at the mountains and snowy fields and ask, “Where is that?” Many of them had never experienced snow or rugged mountains like ours. They would say, “You should go to in north Georgia. We have mountains and snow there.” Then they would pause and look at the pictures hanging on my wall and say, “but not like that.”

When someone asks me where I am from I say, “eastern Oregon.” Far from the lush greenery and large population of Portland, Oregon, located 300 miles west, I am from “the dry side,” Baker City. I show pictures of the place: rugged, snow capped mountains, my family’s horses,

my dog, the fields at my parents' farm, and sometimes a house. Sense of place, for me, is about the experiences I have had within an environment and the people who have formed communities there.

Far from eastern Oregon, in my new community, one of my neighbors recently introduced himself and told me he grew up near the town where we live. "In the 60's, everyone farmed and everybody had a garden," he said when I asked him about eating the poke weed found in my yard. "Fifteen kids in one family next door, ten in mine and everybody grew a garden. We ate poke salad every night. You add salt pork while it simmers in the frying pan after you boil and drain it three times." Poke weed is poisonous, he told me, and it has a laxative effect, at least. He told me how to tell the quality of a person, "Don't eat with nobody who won't eat poke salad. That's good eatin'. You just lock them out; they won't eat no poke salad. You don't need no one like that around you" (Rudolph, 2014). Place conscious education takes place for me every day.

Garrison (1991) wrote, "A story is a series of adaptations. The setting yields the characters that help, scene by scene, reveal the setting; the characters, for their part, adapt to the setting that yields them" (p. 19). In the following case study narrative and analysis in chapter five, the characters and settings interact to act out their story through my interpretation of their enactment of action gardening.

Chapter Conclusion

I have described the methodological framework in this chapter. The first section described my conceptualization of place in this study which included context of the study, a brief description of the classroom, gardens areas, surrounding neighborhoods, and a discussion of primary and secondary participants in the study. From there, I explained the research design as

an ethnographic case study. This part of the chapter included a description of case study and ethnographic case study. I continued by explaining my rationale for selecting case study, case selection criteria, how the case was bounded, how data was generated and analyzed, and how quality was built into this ethnographic case study. I ended this chapter with a subjectivity statement which describes my connection to place conscious education and gardening. Chapter four will present a narrative case study with implicit thematic representation of my data.

CHAPTER 4

ETHNOGRAPHIC CASE STUDY NARRATIVE

Denise sent me a text. I smile at the picture of one of the students wearing her university sticker on her cheek and the text saying she really liked the sticker I gave her. The next text tells me the student is being transferred to a reading class because she needs to improve her reading scores. I can see the student in my mind. She is a tall, black girl with long, lean legs and long braided black hair. Her mouth is downturned and her eyes look serious. She, like the rest of the class, can go from serious to joking in an instant. I don't know what to say. It seems odd that she will be switched to a new class mid-semester. "I'm glad she liked the sticker. Thanks for the picture." I reply. "See you tomorrow." We will see each other in the morning when I go to her class to do my daily observation. It's 7 pm and Denise is still thinking about her students.

The paragraph I used to introduce this chapter is representative of the care the ag science teacher, Denise Hill, exhibited with the eighth grade class I observed for this study. Even at 7 p.m., she was reflecting on events of the day and thinking about tomorrow's interactions. I included it here as an entry into the case study narrative that makes up this chapter. I wrote this chapter as a composite narrative that blended fieldnotes, interviews, and journals entries from the whole semester in which the research was conducted. In Chapter Five, the findings will be discussed in terms of themes that are reflected in the narrative that makes up chapter four.

Halilovich (2014) stated, "Anthropology has long been regarded as the science of the 'other' where the researcher is one of 'us' and the researched are 'them'" (p. 87). In this narrative ethnographic case study, I identified with the research community as 'us' and, by doing

so, risked othering the non-researchers by entering to observe and report their actions. Geertz (1973) argued that by learning about this "foreign" culture, researchers have to become engaged at a very close and personal level. Indeed, I developed a sense of belonging to the "other" group as I participated and observed alongside them. Although my observations are not expected to produce any information that may be harmful in any way to those observed I acted as ethically as I currently know how to protect them by camouflaging people, places and events I described.

Each section of the chapter describes a significant task or activity students were involved in during the semester. They are arranged here to present a story, pieces of which will be dismantled and rearranged in discussion of the themes in Chapter Five. Names of places and people, except for the researcher, have been changed.

Welcome to the experience of enactment of the theory of action gardening with Denise and our eighth grade ag science class at Magnolia Middle School.

Arriving at Magnolia Middle School: Centrally Located

I drive into the half circle parking lot, park and turn the music down, listening to try to get a feel for this place where the students come every day. It is noisy with the sound of traffic. Though I am half a block from the three lane street that runs in front of the school, traffic, mostly passenger cars, flows at a constant rate. One bus stops while I watch. One person gets on and no one gets off. A few work trucks roar down the street. To my left a small group of women stand in the parking lot, conversing animatedly. I sit quietly for a few minutes and try to absorb the sights, sounds, smells, and lay out of this part of town.

There is a grassy area between the parking lot and the street where tall pine trees grow next to the wide, well maintained sidewalk. Wispy, red leaved oak trees grow in front of my truck in the middle of the lot where I am parked. The parking lot is unidirectional and has a row

of extra large spaces to accommodate some of the buses. Another area to the right of the entrance also has a bus parking lot. I snap my magnetic ID tag on, pick up my notebook, and leave my truck, walking quickly across the black asphalt to the entry doors of Magnolia Middle School (MMS).

As I enter the building, a white woman with white hair pulled up in a thick tidy bun, smiles and waves me in from her glassed in booth, after she pushes the "magic" button that unlocks the entry door to the hallways. I smile in return and walk through the halls that are mostly empty of students. A gray haired black woman wearing the light blue custodial uniform sits on a bench; near her is a mop and bucket of floor cleaner. We smile and greet each other with a customary, "Hi, how are you?" "Fine and you?" I walk past a group of students I think must be sixth graders because I hear the teacher saying, "I should not hear one voice while we are out in the hall." By eighth grade, the teachers seem to have lost that battle and the students are noisy as they jostle each other down the hall one, two or three across. No straight single file lines in the eighth grade hall, not often anyway. I turn left at the hallway and follow it almost to the end, stopping for a drink of water. A bulletin board at the beginning of the hall instructs students on good study habits. Near the end outside the food and consumer science classroom (FCS), I admire student artwork about how food grows from seeds and ends up on the table. A couple of posters illustrate blueberries from seeds to muffins and one has a recipe. One describes kale and another, radishes. I see composting as a step on several posters demonstrating to me that some of them are aware of where food comes from and that leftovers can be composted. Nice!

Inside the Classroom: Cubicles and Spicy Snacks!

Denise's classroom is located near the front, left side of the building. Fiery hot Cheetos is the distraction of the day. I think I see two bags of them being shared. I LOVE spicy Cheetos and ask if Summer will share with me. "YOU like dese?!" she blurts, with a disbelieving look.

I don't know why that is such a shocking thing. "Sure!"

"She like these!" She announces. Some students stare at me.

"You eat these? You like spicy hot Cheetos?!" I'm asked.

"Oh yeah! I buy them whenever they're on sale. I love them." Summer starts to pour them into my hand but my hand won't cooperate that way so I reach into the bag and take a few. "Thanks! You are my favorite person today!" She smiles shyly and put them in her bag. I wonder if students aren't supposed to have them. The bags of Cheetos are quickly decimated. I stop to ask Summer if she wants me to grab a paper towel for her when I get one in the bathroom for my hands. I get three paper towels in case someone else needs one. When I hand one to Summer, she smiles. I feel like I have finally made progress with her and her group of friends. They are the noisy ones, those who are very good at disrupting the rest of the class. She gives me a few more Cheetos and I thank her. I find an empty chair on the left side of the room, next to the wall, and sit down.

Denise starts class, "Today's starter is right here." She points to the whiteboard where the PowerPoint slide is displayed, "List five tools or technologies used in agriculture and their purposes."I look around the classroom at students. Several seem to be writing in their journals or at least pretending.

"Ok, let's see what kind of tools and technology you remember," Denise says, signaling the beginning of talking about the starter which will lead into the mini-lesson.

"Reaper! For harvesting!" A student shouts.

"Right," Denise mimicking cutting grass with a scythe. "We use it to cut grass sometimes when it gets really high and they used to use it to cut wheat. Good! What else?"

"Shovel!"

"What's it used for?"

"Digging holes!"

"Right!" She mimics digging a hole. "What else?!" Students respond to her enthusiasm by yelling out more answers.

"Tractor! Wheelbarrow!" Denise responds to each student's answer, smiling, and encouraging interaction. Some students are involved. They are smiling and seem to be thinking about the lesson. Other students are playing computer games or chatting with their friends. My mind wanders as I remember introducing myself to the class…

Students have been peeking at me out of the corners of their eyes as I stand to the side of the room, wondering what I should be doing. Denise introduces me to the class. "This is Miss Rudolph. She is from the university and has come to observe your class. Miss Rudolph, would you like to tell us a little about yourself?"

I like pictures and stories so I prepared a PowerPoint to show some pictures of where I'm from and tell them about my background. "Hi," I begin, "I am Heather Rudolph and am a student in a science education program at the university. I used to be in FFA when I was in high school. I raised pigs and ended up with a big scholarship for college because of it." I started with a picture of my sisters and me when I was about the students' age. I was diagnosed at three years old with rheumatoid arthritis and at the time of the picture, it was visibly affecting my posture. Over twenty years later, it has continued to change my joints, especially in my hands

and feet. People see me now and wonder what is "wrong" with me but have been taught not to ask or stare. Some people do anyway. I have found the best way to deal with it, especially with my students, is to bring it up first thing and then just keep talking about what actually matters, in this case, being in FFA, raising animals and eventually, going to college. "This is when I was about 12 and was on a camping trip in the mountains in Oregon with my sisters. Can anyone guess which one is me?"

They raise their hands and guess correctly. I am the one in the glasses. Although my hands are much less affected at the time of the picture, it is obvious something is different. "Has anyone been to Oregon? This is a picture when I was camping with my grandparents and sisters. You can see that my hands are kind of different and they are even more now. That is because I have arthritis and have had it since I was little. They didn't have good medicine to control it then so it went through my body and messed it up, kind of like how a hurricane goes through with lots of wind and leaves knocked down houses behind. That's what happened to me. Now they have medicine to keep that from happening. You might have seen ads for it on tv?" Nope. Forgot who I was talking to! They watch cartoons not old people shows! "Well, that's what happened and I feel much better now but have to take medicine to keep it under control." I continue talking through the next few pictures and asking questions. I try to be quick because Denise doesn't have much time with them. No one has been to Oregon but a few have been to California to Disneyland. The next picture is from when I was a senior in high school and I was with the FFA group. After a few tries, they find me in that picture, next to my friend, the FFA president who is wearing a cowboy hat. The next picture is of a family reunion a few years ago. I know family is important to them and I thought they might be curious about mine. The next slide has pictures of me riding a horse in Oregon, and my pets. I thought they would be interested to know that I like

animals, ride horse, and have pets. The next picture was my cats snuggling each other so they could see the grown version of my kitten, and then I included a picture of the mountains with lots of snow because I wanted to show them what winter looks like there and to see if any of them had been to a place like that. One said he had been and rode a snowmobile. Denise thanks me when I end and I find a place to the side to sit down and watch the rest of the lesson.

"We're Trying to Create a Community": Planting the Seed or Watering the Plant?

Denise has finished the mini lesson while I was thinking about introducing myself to the class and continues the lesson…"You are a class that works together. We're trying to create a community," she tells them. I look around the room. One of the black male students sits like a mop with his thousand braids over his eyes. A petite black girl flirts with him. Two other black girls sit at the back of the room making noises and stirring up others, not that it takes much. One of the pair is not always one of the noisemakers. I wonder why she is being unruly today. They can be polite when they want to be but seem to follow their friend's lead often which gets them into trouble. Aha, I see why they are noisy today. The girl with the hairbrush is back from her absence and seems to be the leader of the chaos. A petite athletic black boy runs in from the cubicle area and jumps between and on people while he squeals. A small mixed group of black and white boys and girls sits quietly in the corner. They are usually quiet and quick to smile but also know how to be quiet enough not to be noticed so they can play video games during class. "You will have a pre- and post- test this year for 8th grade ag," Denise continues, growing louder and trying to compensate for the increasing student noise, trying to forge ahead, "so you need to learn these words as I introduce them every day." She repeats 'propagate' and its meaning several times and has the students repeat it and its meaning.

Summer walks over to Denise and quietly interrupts because she wants to go to the bathroom. “Did you fill out your agenda?” Denise questions.

Summer turns to me and politely asks, “Can I borrow your pen?”

“Sure,” I answer in surprise at her quiet, mature tone of voice, and polite way of asking. She returns my pen and hands her agenda to Denise who then borrows my pen to sign it. That makes me smile as I hand it to her as well.

Now that Denise has explained propagation, we’re going to go outside to propagate strawberries. I want to learn how so I can do it at my house. I follow students outside. Denise has said she wants everyone to do it. She shows the group of us clustered around the raised strawberry beds what to do. “See here where there is a cluster of leaves? This is where you pull it up and we’ll replant it in this tray of potting soil over here and water it. Ok, see how this works?” She pulls a little strawberry plant out of the dirt, uses scissors to cut it off of the red stem that is growing from the next little strawberry plant, and digs a little hole in the potting soil in the black plastic rectangular tray on the sidewalk. Then she buries the roots of the new strawberry plant in the potting soil. “Think you can do that?” she asks Janice, a quiet white girl with a short brown ponytail.

Janice nods her head and Denise leaves me in charge while she goes off to supervise another group. Janice pulls a plant and stuffs it into the soil. This looks like something I can do. “Do you mind if I try?” I ask. There are a lot of plants to propagate.

“Sure,” she hands me the scissors. I pull a plant up gently, snip it off, and hand it to Janice to stick into the potting soil because the tray is on the ground where I can’t reach it. Other students drift by and ask what we’re doing. Janice explains and they snip and plant their own

strawberries. Some don't want to get their hands in the potting soil so they hand it to someone else to do and some are ok with doing it.

I ask Janice about her gardening background. "Is there a garden at your house?"

"Yes."

"What do you grow?"

"We have tomatoes, lots of different peppers, and cucumbers."

"Does your whole family like to help with it?"

"No, mostly me and my mom."

"So the stuff you do here is nothing new?"

"Not really."

"What is your favorite part?"

"I like all of it but mostly the animals." Janice explains that she is involved in FFA and goes to livestock judging events. Last year she went to a wildlife judging where they looked at habitat to see if it was time to "harvest" the deer. I ask if she means kill them. "Yes, last weekend I helped butcher a deer including grinding pork and deer meat together for the right fat content and slicing some tenderloin."

"That's my favorite! Tenderloin, I mean." She smiles. Like me, she is a fan of eating deer. When I ask about horses, she smiles again. Denise told me that Janice loves horses. She tells me about a relative who has 500 miniature horses but Janice has only ridden horses a few times, not the miniatures of course.

"It looks like you have a grass stain on your knee. Is that from today?"

"No, it's from another day when we were painting. I couldn't get it out."

We continue talking about family life and she tells me that her grandparents live with her family because her grandpa had cancer and that's when he and her grandmother came to live with Janice and her family. I tell her that my grandpa lived with my family for a while too because he fell off the side of the hospital from the second floor where he was working and broke his ankles. She quietly keeps working.

Denise reappears and directs students in a variety of jobs. They like carrying watering cans to water the plants. Soon three of them lug water cans, full and sloshing, to the strawberry beds, the elephant ears along the sidewalk and out to the garden where the fall crops have just been planted. The tray of strawberry plants gets watered and taken into the greenhouse.

Finished propagating strawberries, Scott helps Janice "clear the beds," which means pulling the tomato plants because I think Denise intends to plant potatoes there next and it is nearly the end of tomato season. I reluctantly watch them pull the plants and throw them into the waiting wheelbarrow. Students wander in and out of assigned tasks. A few others stop by and pull some tomatoes. When the wheelbarrow is full, Denise asks John to empty it for Janice. "Thanks John," Janice says as he pushes it away.

Meet the Family: "She Old School"

A few of the girls are planting tomato seeds in a large black plastic rectangular tray on a barely painted red picnic table. Always curious, I ask Denise, "Will they grow in the winter? In the greenhouse? I thought it had to do with day length."

"We have lights we can use." Oh, I forgot about that. "So here's what you're gonna do," she tells the students. "Fill these little sections with potting soil and put one tomato seed in each square." Each section is about 1 ½ inches square and 2 inches deep. Kassandra, a quiet and efficient black girl, is quick to start filling them with potting soil using her hands.

"Can I use one of those, ah, things?" Summer says, pointing to a hand trowel. One of the boys wants to help and goes to the greenhouse to get another trowel. They soon have the trays filled with potting soil. The picnic table they are using as a bench has piles of potting soil on it where it didn't quite go into the squares like it was intended. One of the girls carefully puts one seed per section as instructed. Another scatters several seeds and then says she doesn't give a fuck. That is a popular word with them. When she leaves for the chicken pen, Summer takes over the seed planting task. I tell them that I think I didn't explain my study to them very well and tell them that it is anonymous. "What you mean by what you say?" Summer asks me. I start to explain when anonymous means. "I know what dat is. I mean what you say you do?"

"Basically I want to have conversations with you like we're doing now so I can learn to teach better and help other people be better teachers and researchers. Do you get to do anything like this at home?"

"No."

"I remember that this is the place you drew as your favorite part of the garden. Why is that?"

"I like chilling, just sitting."

"Because it's relaxing?"

"Yeah. And then you get to do stuff out there on the table and stuff, like we planted tomatoes on the table."

"What is your favorite thing you did in this class that has to do with the garden? So far, I mean."

"Going out there with the chickens. I'm scared of them though but we was out there giving them feed and giving them water and stuff. And one of them went crazy and came chasing after us. I was so sarcastic and so dramatic and I just had to get out of there."

"Well that's something that's scary then, chickens, what's something good about what you've done in the garden? Like what is your favorite thing?" I try redirecting her.

"My favorite thing, um, watering the plants because it's just fun. It brings joy." She wanders off and I wonder if I have made any sense to her.

Nino, a quiet black boy, stands near the picnic table, smiling. "Nino, do you get to do anything like this at home?" I ask, wanting to include him. Summer tends to talk over him.

"Yeah, I don't really garden. I don't really plant but I eat it."

"What about the watering? Have you done anything like that before? At home or with your grandparents?"

Nino answered that he hadn't gardened with his grandparents but had used a handsaw like he used when he worked on the sink stand with some other students. Surprised that he had that experience, I ask, "Had you used a hand saw before you started that project?"

"Yeah. Yeah with my grandpa. He fix cars and everything. He build stuff like that."

"Oh neat. Do you get to spend much time with your grandpa?"

"On weekends."

"Ok." Trying to think of a way to connect our conversation to the garden, I ask, "What…do you guys cook at home?" I don't know if eighth grade students are considered too young to cook for themselves.

"Yeah," Nino answers as Summer joins in.

"I be cooking my own food."

Nino volunteers, “If I make it to the NBA, I’m going to be a chef, going to take culinary arts in college.”

“That would be great, I will look you guys up and you can cook for me because I am not very good at it,” I say, glad they seem interested in the topic.

Summer is curious, “So you eat out food?”

“No, I just cook bad food.”

She asks, “What you cooking?”

“Um, sometimes, I cook just regular stuff like meat and potatoes and vegetables.”

Nino says, “I love potatoes.”

Thinking about what they grow in the school garden, I ask, “But you know how to make greens? Like collard greens?”

Nino explains, “Yeah, my grandma taught me.”

Summer agrees, “Yeah. I be watching my grama and my grandma be… I be watching her.”

I feel like they are giving me a lesson in learning as Nino continues, “Basically, the way things…you learning watching Grandma.”

Summer exclaims, “Exactly, my grandma can throw down!”

Then I tell them about my experience cooking greens, “Yeah! See, my grandma could too but I didn’t learn from her so for my first time I cooked kohlrabi greens which they told me are like collard greens…but I read about it on the internet instead of having somebody show me and they were like awful. I mean really, you might as well be chewing on a rope.” Nino and Summer laugh hysterically at my lack of knowledge. I notice that their grandparents seem important in showing them how to do things so I ask, “It sounds like your grama for both of you is really

important to you? Other than she feeds you, what makes her so important? I mean she has good food.

Nino answers, “Like, she know, she old so she know everything. The old folk do better than the young folk.”

Summer interrupts, “She go to work every single day. On the spot. They got a different…”

“Mentality, way of thinking…” Nino finishes her thought for her. They alternate, completing each other’s sentences.

“Yeah. Than your mama, like your mama like she the type of people like you know, you get in trouble in school…”

Nino finishes, “She’ll cuss you out.”

Summer says, “Yeah and that’ll be about it but your grama she’ll go farther out than that…”

Nino gives an example, changing his voice when he imitates his grandmother, “Grama …my grama going to take up for me. She going to be like, ‘Ok, Nino not like that. You know Nino not going to do it again.’ Like, it’s a reason I do stuff because I don’t get in trouble that much so like when I get in trouble…”

They continue talking, giving me an idea of their families’ interconnectedness, not just their own connections with their grandparents. “Yeah our mamas know each other and I know him since I was little and stuff. Like we used to play together and stuff,” Summer explains.

Trying to make a connection in my mind between what sounds like respect to me of their grandparents and their actions at home compared to Summer’s school actions that sometimes get

her in trouble, I ask, “What is the difference between…what does your grama do that makes you want to do what she wants?”

Summer answers, “She goes like, more out, like she would try and take my phone and stuff, little stuff like that, and my grama don’t like it when I get in trouble because she just don’t like that. She’s like an older woman and she’s …like I can’t really explain it. Like she old school.” Summer picks up the watering can. She waters the tray that is on the picnic table which means the picnic table is a muddy mess. Nino wanders away to the chicken coop. Summer’s friends run past shrieking and she runs with them.

The Sink Stand: “I Told You Good Enough was Good Enough!”

Since tomato seed planting is over, I walk away from the picnic table area, down the sidewalk, through the open black chain link gate, and out to the group of students near the sink stand. Wren, the VISTA worker, is not here they tell me but they started work on it anyway. I watch four of them hammering and sawing. Scott and Taki work together to nail a board down while Janice and Luke work together to saw the next board. Taki sits on one end while Scott nails the other. Janice stands on top of the picnic table that is colored by various shades of spray paint from a “testing day” when were told they could test the cans of paint that were donated which resulted in a gold finger, a gold phone cover, a gold hammer head, and patches of gold on the table. They had a great time! Today, I am impressed by their initiative.

One thing that strikes me immediately is the change in behavior between being in the classroom and being outside. Students are smiling, engaged, and happy. Scott uses a deep authoritative voice when he manages to saw all the way through the board. They almost seem like different students from those I was just observing inside the school building. It fascinates me to see this change within just a few feet of where they previously were.

Denise comes along and helps us think about how the stand can be adjusted to fit the sink because we have realized there is an overhang that wasn't accounted for in the building plan. The other sink is a newer kind that sits right down into a hole. This one is made to overlap the hole. We decide to cut some small pieces of wood to slide under the edges of the sink to hold it level and make it fit the stand. Luke is drafted to help cut the board. He tries to convince Janice to trade him mints for the nails. John B. tries the tactic of, "C'mon, we've known each other since second grade." She laughs and eventually hands out some mints. Students continue nailing and sawing.

Denise stops by and checks on us. She reminds me of a sheepdog, the way she constantly circles and checks on her "flock." "Now you're going to build a shelf for this side. See? That way we can have the sink in the middle here," she motions with her hands a square that will be about the size of the sink, "and on this side," she points to the left, "you'll have the produce that you've picked from the garden. You'll take it from here, rinse it in the sink, and then set it on the shelf or rack that you've made on this side." She points and motions as she talks, moving her hands like she's rinsing and moving produce.

We are soon back to work, measuring, sawing, and hammering but also hit a snag. How close do our measurements have to be? "That's close enough!" Taki insists.

"But your table will wobble!" I protest.

Wren appears in our midst to solve the dilemma. "Close enough is close enough," he says.

"But it'll wobble," I protest.

"My brother is a furniture builder," he tells me.

"Ok, so he would not say 'close enough is ok'."

"No, he definitely would not," Wren confirms, "but for this job, and I will never be a master furniture builder, 'close enough is close enough.'"

"Ok," I concede, "but that is hard with my science background and having a dad as a carpenter."

Wren leaves and Taki points out, "I told you good enough was good enough!"

"Yes, Taki, you were right."

Then John comes back and says, "But they aren't the same length!" I laugh, understanding his protest and explain that we just went through the same thing but Wren says it's ok. Luke who has been our master sawyer is busy with John B. doing what looks like pattycake to me which makes Janice laugh. When I ask, Luke says he wants to hammer and is tired of sawing. John W. takes over sawing one board. Janice works on another. When we have one ready, John W. starts nailing it together but gets frustrated because he is having such a hard time getting the nail in and drifts away to shovel the dirt. I have been looking for this opportunity, probably because it reminds me of time spent with Dad during my childhood when he gave me scraps of lumber from his jobs and let me build boxes. I start pounding the abandoned nail. It feels good even if I am making very slow progress. Success! The tip of the nail has made it through the board. I finish attaching it to the other board while John B., the self-designated supervisor observes me. "Want to do the next one?" I ask him. He nods and takes a nail from the box. "I feel like part of the problem comes from not holding on to the nail long enough, as we try to hammer it in," I say as his nail starts to bend. He doesn't say anything but straightens it and tries again, holding the nail with one hand and hammering with the other.

"Watch out for the yellow jackets!" Janice tells us, pointing at the ground near the picnic table where they are sawing. "I think they found something to eat that someone spilled. I don't

like yellow jackets! I'm not sure we should be this close." I finally see two of them in the wood bark underfoot. I watch but they aren't swarming so I am not worried. I hold the board for Scott and Taki while they hammer.

Luke finishes sawing the board and Taki finds a 2 x 4 that Luke can saw to go across the other side of the sink rack. I watch Taki hold the 2x4 up to the other one that is already nailed down because I suggested he could use it as a model to figure out how long to make the board for the other side. I watch as he marks the side closest to him, not the side closest to the board he is using as a model and which would have been a more accurate way of copying its size. He also marks the top of the 2x4 with his pencil. Now there are four marks on the board because it was already marked by someone else. Instead of erasing the old marks, he points out the right ones and Janice and Luke begin sawing it.

Scott and Taki point out that they need a diagonal 2x4 to go under the 1x6's that will make up the shelf they are working on. Taki tries to hold a short 2x4 up to the diagonal already in place but it is too long to use it to measure the length they need to cut. "We need a measuring tape. Do you guys know where they are?" I ask. Scott disappears into the shed and comes back without one. I go into the shed with Taki to look for something that will work as a substitute. I find a string wound around a yellow plastic handle using for marking out lines. This will work I think. I hold one end to the board and Taki holds the other end so we have a length. Taki takes the string to the board that needs to be cut and makes a mark. We do it again and then realize the problem. The board needs to be cut at an angle but we're not sure how to measure the angle without a protractor.

While we think about our problem, Luke finishes cutting the 1st 2 x 4 and asks what we need to cut next. I think that if we use the boards we have to make a shelf on the picnic table, it

will work as a model for us to measure where to put the marks on the 2 x 4. Janice patiently shows me what I am doing wrong. She points to the one already made and then walks me over to the boards arranged on the picnic table. “This one is a long one. We have two long ones and three short ones. See? Like this.” She points them out. “And we have the long ones cut but not she short ones so we can’t use them that way” (the way I was holding them).

“Oh! Ok! Sorry, I see now!” I think I may be slowing them down and am frustrated with myself because I feel like it is not a hard problem to solve but it is taking us a lot of time. Taki and Janice decide where the marks should go on the board and Luke and Janice work together again to saw the board.

Scott, meanwhile, has realized that we used the wrong nails to fasten the other 2x4 to the frame because it easily pulls off. Then we have another problem. The longer nails he finds to use don’t have a very big head so they bend as they’re being nailed in. He has a very hard time pulling them out to restart. Taki remembers that Wren used a bigger board to pull against to remove nails so I hand him a 2x4 and he uses it to pull the shorter nails out. I showed him one useful thing, how to start the nails while holding the board in an easier place to access and then pound them in the rest of the way while holding the board where it actually goes. I admire the way that they continue to focus on the problems with curiosity and tenacity as they arise. Despite feeling like I should be more helpful to them, I am really enjoying myself. I have set down my notebook, stickers, and pen a while ago and am participating in a tangible product. I like it! It is a beautiful day to be outside and they are so interesting to work with and so engaged. “Five minutes! Five minutes until lunch!” someone announces. I hear a scream and know that the leader of the loud bunch has joined us outside. I didn’t see her earlier and thought she was absent today. The students return their tools to the shed, fasten the padlock on the door and I turn the

combination. I'm not sure it's very secure but it's what we were told to do. I think most of Denise's 250 students know the combination by now.

Off to Lunch: "A Herd of Stampeding Wildebeests"

I return to the walkway just in time to see the principal come out of the building in his suit and tie, with a concerned look on his white bearded face. I become concerned when I realize a security guard and a woman with an ID sticker are with him. "Where is Mrs. Hill?"

"She right there!" A noisemaker volunteers as Denise walks up looking tired but with a smile.

"We're just about to go back in to get ready for lunch." The principal disappears into the building but remains as a silhouette against the window of the door. Precious and Eli run at the wall and jump up enough to run on it and down. It would be more impressive if they hadn't done it when the principal had just come out to frown at Denise.

Students crowd around Denise, "Is you in trouble?" "Are you going to get in trouble with the principal?" "I told him you went to get a paper and would be right back," one volunteers.

"Thank you for trying to cover for me," Denise says, "but yes, I am in trouble, again. I'll probably be called in to talk to him, again." She seems resigned and unconcerned.

"Ok, time to line up for lunch!" On the way out the door to lunch Janice says, "Bye Miss Rudolph." I tell her good bye and that I'll see her during the next class. I follow the group to the doorway and stand to the side, slightly. We squeeze into the hallway traffic. I keep to the middle of the hall where students aren't supposed to be and where other teachers are reminding students to keep the noise level down in the hallway.

"Noise level zero in the main hall," I hear one bearded teacher instruct. Later I see him having what sounds like a caring conversation with two students who are clearly being respectful

to him as they wait for him to finish the note he is writing for them in a kneeling position in front of one of them. Another teacher walks up and teases him, asking if he is proposing. They all laugh.

I follow students down the hall. I want to know what the lunch room routine is like. Denise sees me in the hall at the end of the line, having escorted the students to lunch, and asks if I'd like to see the composting set up in the cafeteria. Yes!

The lunchroom is a large open room with several high windows along one wall, letting in light. It is noisy with students visiting as they crowd around tables to eat. Students waiting for food have split into two lines, one on each side of the room. The lines lead to the front of the room where the servers hand out lunch. Students move through the lines toward the middle of the room where they meet again and find tables to sit at with friends. I see a student I know checking his cell phone at a table, no tray of food in front of him. *That will make his afternoon even more challenging*, I think. The blue half sized (half of 55 gallons) containers for compost are lined up in the center aisle of the room which we block when she stops to tell me about how the process works. A student in a wheelchair gets stuck behind Denise. I move out of the way just as a lunchroom assistant comes frowning at us and helps the student by carrying her tray to a table.

"So, we put the containers out during third period," Denise says, "and fifth period picks them up. The original plan was to weigh the garbage before we started doing this and weigh it after we started to find out how much less garbage the school is producing. For some reason… well, there's something about them never weighing it so that didn't work out. We can't do a comparison of weight before and after our composting effort, if there isn't a "before" to compare the "after" weight to."

"Could you keep track of the number of bags of garbage maybe?"

"Oh! That's a good idea! Maybe the students could do that!" I look into the containers and see fruit and plastic containers.

"They sort it as they finish their lunches, recyclables here, compost, fruit here, and then we pick it up and add it to the compost piles." A student stops to give Denise a big hug which Denise returns smiling. On the way here, I saw another teacher hug a student. I am glad they do. The lunchroom is a bustling, noisy place and I feel relief that it is more social than Nino made it sound when he described it.

Denise points out the garden bar and asks if I want to go see what they have today. "Yes! Thanks. I'll see you back in the classroom." I wade into the lunchroom crowd. Wren is in the middle of the room holding a blue plastic bowl with a few bruised bananas. I walk over to the garden bar. It is on the right side of the room, near the other food choices of the day. There is green cabbage, sliced cucumbers, sliced red onions, green onions, lettuce, tomatoes, celery, carrot sticks, sliced white onions, salad dressing in small packets that make me think of ketchup. I feel like I shouldn't touch anything so I don't pick them up to see what kind they are. It looks like the spinach container is empty. No students come for salad while I survey it. This is quite impressive to me that it all comes from the school garden. I leave the area so I am not in the way of kids trying to eat. I look at what students are eating and look for familiar faces as I walk through the crowd again. I see a lot of baked chicken, muffins, and fresh grapes.

Wren says hi as I approach him and I stop to talk. "So my wife is going to start doing what you're doing next year. I should give her your email except I don't have it." I give him my email address but I can't stay to ask questions now. "I have to go, too," Wren excuses himself.

"They're about to bolt like a herd of stampeding wildebeests for the compost bins and I need to direct them."

Walking the Halls: "They're Not Bad Kids."

I leave the lunchroom and return to the classroom where Denise has a partial loaf of bread, a chunk of unsliced cheese and a knife for her lunch. She eats like I do! Today I have an apple for the midday snack. I give her a brownie to go with her cheese and bread.

We end up talking about how kids end up where they do when they go to school here. She says before the new superintendent came, parents sent their kids on buses to whichever was the best. "It used to be Sherwood Elementary and then Brook. There was a lottery system where a certain number got to go to a different school than where they lived. The only really bad area is Melody." I just heard of that yesterday. A professor was talking about her son cautioning her that it was an unsafe place to go. "Some of the teachers say those students know much more than kids their age should about certain things." The new superintendent stopped sending buses to schools out of the area as a way of saving money when the economy went bad and things have slowly been changing though parents with the money send their kids to Ace Academy. I know of Ace Academy and thought I might do my dissertation study there at one time. It is an amazing place with the biology teacher's room looking right out on a pond. It felt like teaching utopia. "Do you want a tour of the other hallways?"

Denise talks as we walk all the way to the end of the hallway. Usually when I come in I turn left at the first hall and follow it to her classroom at the opposite end of the building from the core 8th grade classrooms. It is convenient to be so close to the garden and greenhouse but is it further structural evidence of distancing the ag kids from the "real" classes? Denise explains what "incentive days" means as we walk. It is a time out from class work for students who

follow the rules and demonstrate positive leadership and learning characteristics. Students who don't follow the rules get demerits and aren't allowed to participate in incentive activities. Students who do follow the rules get merits and do incentives. Incentives are things like going outside and watching entertaining movies. Sixth grade has incentive together. Seventh grade is together and eighth grade goes together at different times during the day. A few classrooms are used for students with demerits who don't get to do incentive. We pass a classroom where students seem to be watching a documentary and she says that is one of them. We walk down 8th, 7th, and a quiet 6th grade hallway.

We continue back to her classroom where she wants to show me a behavior chart as an example of how records of students' misbehaviors are kept. Teachers comment weekly on students with 'case managers' and include good and bad remarks. Denise says what worries her is students get trapped into being expected to behave poorly by teachers reading the comments. I understand that. That is why I don't like it when I hear teachers say things like, "Oh you're going to have trouble with that one!" as they scan each others' student lists. It sets up expectations in teachers' minds and consciously or not, they act on those expectations and students respond to the actions they perceive. Denise says something and then corrects herself. I didn't catch her first comment but then she said, "They're not bad kids." I agree with her. I really don't think they are bad kids. They're just kids. "I don't want to spend any more time on behavior in our reflective journal," she says, surprising me with her tone of voice. I feel worried because that was something she mentioned before, feeling judged by our comments after class and I apologized and had been trying not to do it since then. I wondered if I had written about it yesterday with my comments but couldn't remember. "I liked your question about success," she smiled, "but I don't want to spend any more time writing about behavior issues."

"Is it ok to comment on really great things that happen?" I am thinking of one student wanting to show his plant to another. I consider that a success.

"Yes, that's good, that's fine. I just feel like I don't want to change the students and they know that and when I do give demerits, it's just 'You gave me a demerit!' Yes, I did.' And that's all there is to it. I want to work with them. I don't want to punish them. I have to follow those rules on the wall for how I do things. If they come to observe me and I'm not doing things in the right order, I could get fired."

Mentoring and Community Involvement: A Visit to Sweetgum Elementary School

Denise takes a minute to race to the bathroom before the class returns from lunch. Students begin returning from lunch. Kassandra comes close to me and is looking at something behind me on the bulletin board.

"Am I in your way?" I ask.

"I was just looking at the basketball schedule," she says and I notice a paper fastened to the bulletin board behind me.

"Oh do you play basketball?"

"No, I'm a cheerleader."

She's so quiet. There is another of my biases exposed. I expected cheerleaders to be more outgoing but maybe I just haven't seen her in that environment.

Denise returns. Hanna, three students, and I start out the door for our trip to the elementary school. It is right next door to MMS, forming a "green corridor" which Denise is making use of through cross-grade gardening projects like the one we are doing today. At the gate, we pick up a plastic crate with several trowels and three black plastic trays of potted plants, including beets, collards, romaine lettuce, and onions. We continue toward the elementary school

slowly, waiting for Scott. We wait for several minutes on the far side of the school, nearest the elementary school where some buses come to pick up students. Finally, we send one student back to find him. His long legs remind me of a track runner when he runs. He returns without Scott.

"Where'd he go?"

"To get his coat." I follow him to the elementary school, leaving the other three to wait for Scott. I know the kids have a limited time, both the middle schoolers and the little kids. We can't wait too long. Eventually the other three catch up with us, no-Scott, just as one group of first graders lines up to wait for us to show them how to plant.

I find that Hanna isn't clear on what to do, doesn't really know how to plant, and doesn't know that first graders have extremely short attention spans. Just as we decide to go ahead and read the short book about growing a carrot to this group, another class and then another arrives. We only have about five trowels and probably 50-60 students. One teacher suggests she dig the holes while we steer students to plant their seedlings. Meanwhile Sierra reads to the first class. Reading the book takes about two minutes and then that group is standing there wiggling. I feel bad for them because we are unorganized and their teacher is a little sharp with them for squirming. We get our planting assembly line going though and I get Hanna, Janice, and the 4th student digging holes and directing students in putting their plants into the holes and covering them up. It is not a perfect system but the kids all get to do something and then they are off to recess, I think. I see a lot of small kids in colorful coats playing when we walk past. "Do we need to water the plants now?" I ask Hanna. "That dirt is powder dry."

"Oh, I don't know. Ms. Hill didn't say anything about watering. I can ask when we get back to the room." I am confused. I thought she was an ag science leadership major. She should

know that plants need to be watered but I am not the boss or the teacher so I agree. We gather our material and walk back to MMS.

Sierra walks alongside us quietly. I start asking her questions about the garden, school, and her family. I know Denise has mentioned one of her relatives several times, that she is going to come to class. “Is it your grandma or aunt Mrs. Hill said might come to class?”

“My mom.”

“Oops, I must not be a very good listener. Do you have a garden at home?”

“Yes.”

“What kinds of things do you grow in it?”

“Mom likes to grow herbs, like lavender. She grows lots of them, everything we need to flavor our food but we also grow tomatoes and red peppers.”

“Do you like to help with that?”

“She spends a lot of time at the farmer’s market and I get tired of that but sometimes I help.”

“Are you learning to cook?” I hope this isn’t insulting but I don’t know how much cooking an eighth grader is allowed to do.

“Yeah, I like to cook.”

“What kinds of things do you cook?”

“Well, breakfast and dinner sometimes.”

“What kinds of things do you cook for breakfast?”

“Oh whatever we have. We might have some eggs and some sausage so I’ll cook that. I just cook whatever.” She smiles as she tells me about cooking and I think this is the most I have heard her talk in the whole semester. She has a lot to say when she gets primed. “Like I didn’t

have grits to go with breakfast but we had rice so I used it and it was good. I don't like to cook meat though. I don't like to touch it so my sister does that."

"I had a system like that with my sister when we went fishing because I didn't like to touch the fish." There is a pause. There is so much I don't know despite coming to almost every class. What does this place mean to the students? It seems to mean different things to them. "What is your favorite class?"

"My favorite class in the whole school?" She seems confused by my change of topic.

"Yeah, what classes do you take and what is your favorite?"

She lists several classes, band, science, math, English, Spanish and then says Spanish is her favorite. That surprises me but then she tells me why, "My dad is black and my mom is Puerto Rican."

"Oh, you're so lucky! So you speak Spanish and English?! That's great. You've already got an advantage when you look for jobs! My cousin married a woman from Chile and they're raising their kids to speak Spanish and English."

"What do you think you want to do when you grow up? I mean what job do you think you want to do?" I ask her.

"A lawyer."

"Good for you!" I respond enthusiastically, glad she is thinking of something that will challenge her, not because I think we need more lawyers. "What kind of lawyer?"

"One that helps kids…but I don't know. I want to work for the FBI but my dad… he says the FBI doesn't pay enough."

"That may be true but I think it's important to do work that matters to you. Like being a teacher, we don't get paid much but it's important work." She smiles.

Bringing the Garden into the Classroom: "Why it Got Those Seeds in it?"

We have returned to the greenhouse area where we leave our material behind and enter the classroom where the other students are putting the finishing touches on concrete stepping stones, examining their handmade soap, and painting dried brown okra pods for Christmas ornaments. Seemingly random conversations are taking place. I listen, watch, and when invited, participate.

Denise hands a bag to Sierra saying, "Here are the soaps. I forgot to get more glycerin but we'll make more next week. Want to take them out and show everybody? Let them sniff it?"

"Why it got those seeds in it?" Summer asks. She sounds demanding but I think it just came out that way. She is curious.

"That is lavender. We put it in the soap. It smells nice." Students crowd around the green, purple, and orange piles of soaps.

"They smell real good! This one smell like gum!" Summer says, holding a green one scented with peppermint. Denise hands another student a bag of Hershey kisses and announces that he is giving out kisses. He smiles at her joke and after a couple of rounds of the class there is some fussing of, "He gave Nino two!" and other complaints of unfairness, nothing serious, just good natured joking punctuated by winks from Summer to Nino after she complained.

"Hey, what about me?" I ask when he passes by and puts some extras in his pocket. He smiles and carefully sets two on the desk for me. He had thrown them to some of his friends so I appreciate that he set them on the desk for me instead. He is one who generally doesn't interact with me and refused to be part of the study but he and another student have finally, in the last two weeks, started to acknowledge my presence with smiles or a few words. I feel an increased level of acceptance after all this time, finally!

Kassandra touches the soap and quizzes Sierra on how she made it during the last class. "You sound like you don't know what you did!" I hear her asking step by step questions which Sierra answers slowly. I think it is important that Kassandra is so curious and that Sierra gets a chance to remember and explain what she did to make it.

"I only said one thing!" Janice protests with a smile. They are teasing Kassandra about someone. She is smiling and looks very cheery in her blue jacket. Usually she looks serious and doesn't smile much during class.

"What did you say?" I ask Janice.

"I don't remember!"

"This reminds me of the game called 'Telephone.' Have you ever played that?" I ask Kassandra.

"That's exactly what it is!"

I hear Summer mention the science fair and I ask her when it is. She showed me her poster when we went to the library to do her interview. "Did you finish your project?"

"Judging was at 9. They all done."

"Great, I'll go by the library after class and look around." I have moved to the cubicle side of the room, away from the crowded area where students are milling around.

Summer sees me writing notes and asks, "Why you always writing things down in that?"

"Well, it goes along with when I record your interviews and then I type up everything you say. I can't remember everything so I write down some of it to help me remember and then every day I go home and write a story about what happened that day. I haven't finished typing up your interview but when I do, do you want me to bring it so you can read it like I did last time?"

"Um huh."

"Ok, I'll bring it when I come next week and you can read it." She surprises me by giving me a big round white and blue sticker that says, "Love your neighborhood school." "Thanks! Where should I put it?"

"You can put it on your notebook there."

"Do you want to work with the group painting the okra ornaments?" Denise asks. She's in perpetual motion! She smiles brightly.

"Sure," I wonder what I just got myself into. I imagine spray paint in the classroom because I have only seen the spray paint outside in the shed.

"These were our beehives," she says, holding three coffee cans with dried okra pods bursting out of them. "Were. That didn't work so well." "Do you want to work here or at the back table?" she asks some nearby students. They indicate the cubicle she stands by. She spreads newspaper and pours the okra pods onto the newspaper. "Listen," she says to me holding up a pod. "The fun thing about the okra is it rattles when you dry it." She shakes it and smiles. Fun! I have never seen dried okra pods. They are about six inches long and one inch in diameter at the top, tapering to a point at the bottom. They are slightly split in several places down the length so you can see the seeds inside that make the rattle. They are light brown and look dark brown between the light brown areas but that is only because the cracked areas are in shadows. Denise has tempera paints and glitter. A few painters appear from the crowd and become absorbed into the craft project. When I see there is plenty of okra to decorate, I pick one up and begin to paint it sunshiny yellow, one of my favorite colors.

I feel peaceful as I start to paint maybe because I haven't taken the time to do any craft projects for the fun of it like this for years. While I paint, I remember a time earlier in the semester when I came to school at the wrong time and ended up alone in the garden where I saw

okra growing for the first time and didn't know what it was. There were no students, no Denise, just quiet, for a little bit of time. I see it in my mind... *I am struck by the silence and the beauty of the day. I am usually here later and surrounded by physically, mentally, emotionally active eighth graders who distract me from the peacefulness I feel right now. I am also usually in a hurry to get wherever I am going and don't take time to feel the place where I am. That's the best way I can describe what I am doing right now, feeling the place. The air smells cool and fresh due to cooling October temperatures. The sky is clear and blue. Grass covers the ground near me but as I walk past the compost bins, my feet sink into deep, soft, dark brown bark much that I think is here to keep weeds down and provide a work area for our building projects. It smells good to me, a damp dirt and decomposing wood smell that reminds me of camping in the mountains at home and walking to the river in the early cool morning air. I feel happy just having the opportunity to be here observing this morning.*

I walk to the center of the garden and look around me. Behind me and to my right are the green tomato plants reaching toward the sky on wires that stretch them up above my head, purple, red and yellow flowers, small round green striped watermelons on the vines, and tall green stemmed, purple flowering okra plants. Behind me and to my left is the resting brown soil. In front of me and to my right are more watermelon, flowers, okra, a variety of colorful peppers, and deep purple eggplants. In front of me and to my left is green bushy stuff that seems like it was just planted but which is bursting out of the ground. It is at least 1 foot tall. I have come for a closer look to see what it is. It is Romaine lettuce, mixed salad greens (I bought some from the produce stand one day. This is where they came from!), collard greens, radishes, and kohlrabies. Did the students plant them? Is this what would happen at my house if I continue to improve the soil until it too is rich, brown and soft like this? Is this all done organically? How do they control

the bugs? I walk over to the flowers to look closely at the butterflies that I saw from a distance. They are small and sort of rust colored with black flecks. When I get closer, they leave. My shadow seems to bother them. I don't want them to be scared away by my shadow so I walk away and leave them to their jobs.

I bring my mind back to the classroom and pick up a pink painted, sparkling glittery okra pod. Fancy! "Why you holding my okra?" Summer asks.

"I thought it was pretty. I wanted to take one home but mine is still wet. I didn't mean to take one of yours, though."

"It all right. You can have it."

"Are you sure? I didn't mean to take yours. Maybe you want to hang it up at your house?"

"No, it all right. You take it."

"Thanks! Now I have a Christmas decoration! And later I can plant the seeds in my garden." Summer smiles at me and sometimes I wonder if she is just humoring the crazy white researcher lady. Maybe.

"Do we need to clean this mess up?" I ask Denise and point to the cup of colored water and paint brushes.

"No, it's fine," she answers, giving the five minute warning. I put the lids on tightly and leave the paintbrushes.

For some reason there is a chair with wheels in the room today and John W. has claimed it. Scott is wearing a blue striped clip on tie that Eli keeps stealing from him and clipping to his t-shirt as he runs and pulls up his fashionably sagging shorts. John W. offers to give Scott a ride who, of course, sits and then squeals when John starts to push it. John immediately consoles him

and slows down which surprises me. Near this chaos, Summer's friend holds up a magazine picture of the ferry at an island they all visited in 6th grade. She asks if anyone remembers it. I am surprised when Janice answers, "I do!" She doesn't usually interact with the noisy group or maybe they don't interact with her. They keep to themselves. Janice remembers it fondly and then says she went to an island twice in ten days this summer, once with her family and once for 4-H camp.

As students line up at the door, I look at the papers I collected earlier and identify who turned them in. I hand each student a small university mascot sticker and say, "Thank you for doing a drawing for me." Most of them seem happily surprised. Luke immediately put the sticker on his shirt and John B. stuffed it into his pocket. Another young man smiles and takes the sticker. He put it in his pocket. Soon they are on their way down the hall

Denise stands by the door, watching students in the hall. I ask if she drinks coffee because I had been thinking of bringing her some but didn't know if she was more of a tea person. She responds with enthusiasm that she does drink coffee and would have a pot in her classroom but she'd probably forget to turn it off and would burn the school down. I ask if she likes it black or with milk and sugar. "Milk and sugar." I tell her I'll bring her some next time. She sounds thrilled at the idea and I am glad to be able to do something for her to show my appreciation. A student comes in for her next class.

She continues monitoring the hallway, greeting students, sending a student to her office for a band aid. Her care for her students is obvious in her greetings and theirs. Students who aren't in her class pause to say hi to her and other students or walk in and walk out. It is a friendly, low stress environment between her and the students. I wave to her and leave, done observing for the day…or not.

Local Support: "How Much Would You Pay for a Candy Bar Out the Machine? A Dolla'!"

"See you later," I wave as I check out at the front of the school. The older, white lady waves to me as I leave. After I check out, I see Wren at the produce stand in front of the school. I stop to see what they have. It is $1 for a bag of tomatoes, baby salad greens, kale, or romaine lettuce. All of it is organic and freshly picked from the school garden. A black woman and man are buying some. The student volunteer has quite a pitch for selling. He lists several common snacks people get from vending machines, "Coke, crackers, and a candy bar," and asks the woman how much she would pay for each. "A dolla'!" he answers. It is a good comparison and since I know that kind of lettuce is much more expensive at the store, I decide to buy some. A white woman steps out of the minivan she parked by the curb and approaches the stand. I wait for Wren and the student to take care of the customers and when they leave, ask if he has time for me to ask him some questions. He says yes and I stay a little longer to take advantage of this opportunity.

I ask about his background in ag and he says, "I grew up on a farm near here where my family grew "conventional" soybeans and cows."

I don't know what that means and ask, "Does that mean organic?"

"No, they were part of the 'green revolution' when additional petroleum based fertilizer and pesticides were being used as the way of growing more food, bigger and better. My grandfather was the secretary of agriculture in the state. I ended up in California working at environmental education centers in several areas of the state."

Hanna walks up to check out, making sure Wren knows she is leaving and asking about what produce he has left. He offers her something "for today's service." She takes a bundle of

cilantro, not knowing what she might use it for or if she even likes it. I ask what her background is because I am still wondering about her not realizing that plants need water.

"I'm a business major. I'm in a leadership class. I took a different one and really liked it so I signed up for this one." Oh! That makes a lot more sense now!

Wren questions her, "How do you plan to use the cilantro?"

She answers, "I thought I'd just look up recipes for cilantro." He asks if she likes tacos and suggests adding it to them but then finds out she likes guacamole and says it would be really good in that. "My friend from Honduras adds boiled egg to guacamole. I think I'll try that."

Hanna leaves and Wren comments on how he has noticed a color line in what produce different groups of people want. He explains, "Black people want collards and turnip greens. White people buy salad. Hispanics buy radishes and cilantro. They buy what they are familiar with though some cross the color line like a person from Argentina who bought some of everything because it was all familiar. And one student's grandmother bought 15 bundles of collards! For $15, I threw in a few extras for her."

"How did you end up as a VISTA volunteer, working on the garden here?"

"My degree is in ecology and it's not a big step from ecology to gardening."

"It seems like such a good thing to be able to buy this fresh organic produce for $1! Not that not that long ago everyone had a garden and grew their own. I have a garden at my house and with the long growing season and lots of rain, I don't understand why more people don't grow them." He suggests jobs, the internet and video games interfere.

Realizing that I am talking too much, I ask, "What are your responsibilities here?"

"Well, I am responsible for making sure the compost gets collected. Fruit that hasn't been damaged gets washed and used for cooking projects in the FCS [food and consumer science]

classes. I help make stuff at FCS like apple pies from those uneaten apples in the cafeteria which I took to the cooks and made them happy," he says smiling. He helped make hot sauce. He's in charge of planting, tilling, organizing university volunteers so Denise has help, ordering plants, organizing special university events like when the kids went to the University Garden. Sixth grade soil science did a unit out in the garden about healthy soil. "I keep track of where the vegetables from the garden will go so that they have enough for the FCS projects, and Denise's class and save some to sell and some for the garden bar. Originally I was only supposed to stay for a year which would end in March but I get to stay another year." I think that will help with consistency of the program by not having a new person start and have to learn everything again from scratch. "The idea is to make the garden program able to sustain itself and keep Denise from doing everything herself because she can't. She is responsible for the greenhouse," he says.

"That reminds me, does all that fresh produce in the garden bar comes from here?"

"Oh no, we don't supply all of the food at the salad bar. I think we had peppers for a while, squash maybe, collard greens but that didn't go over very well because they're so chewy when they're raw. The kids are like me in that respect. They don't like to have to chew so much. If it was up to me, I'd put cheese and butter on the vegetables, all of them. That's how I like them. That's how I'd get them to eat vegetables. That's the point. We want them to eat the vegetables."

"What do you think the point of all this is? Do you think being exposed plants that seed of thought about healthier eating so later they eat better?"

"No, I don't think so. I'm much more pessimistic. You might want to rethink your hypothesis or whatever. I think to them it's just a salad bar. That's all it is and they don't care about eating healthy. They eat what tastes good and I'm the same way. If I had a choice, I'd do

exactly what they do, eat the fatty delicious stuff first and then eat vegetables. I don't reach for them first.

"Evolutionarily that makes sense," I say. "We didn't have all these food choices so if we had the choice between high fiber, low calorie vegetables and high fat food, it'd make more sense to take the fatty ones in order to get the most energy possible and we still do."

"I think it's partly the age though. With the sixth grade there's still some order and they let the classes in one at a time. Seventh grade is a little less controlled but by the time they hit eighth grade, they're not controlled, getting more independent, getting ready for high school, I suppose. No, I think of myself and them as monkeys. I'm trying to learn to understand their language and behavior."

We end up talking about how we think students are influenced by school. He says school kind of is a prison. I say I hope we are helping them prepare for life outside of school. "We are for some but they come with different tools. Some have the tools to be an auto mechanic, others to be an airplane pilot, and others don't have many tools at all."

"Do you mean intelligence or ability?" I don't understand what he means by tools.

"No, I don't look at them that way; at least I don't think I do. I mean what they know."

"I think I know what you mean because some parents in my neighborhood seem to think the kids don't have to learn anything until they get to school and then they get here and they don't even know the alphabet."

"Yes, exactly! And those kids are at a huge disadvantage compared to students whose parents took the time to teach them, to give them the tools they need." He interrupts to head off a student with a peeled banana and directs him to add it to the compost bucket. "One thing eighth graders are good at is bringing their unused fruit and composting. They remember to do that.

Everything else, putting brown napkins in the compost, they're not making that connection but they get the composting of the fruit or giving it to me."

"So it sounds like even if they aren't making healthy eating choices, maybe they are starting to make changes in their environmental habits?"

"Yes, I would say they're starting to make that connection. Well, Heather, I have to go to the next part of my day." I thank him for his time and he sends home a bundle of wilted lettuce, a few stunted beets, and a split radish that probably wouldn't sell. It has been a successful day at the produce stand. That is all that is left! Smiling, I carry my reward for the work I did today. I feel fortunate to be a researcher who is allowed to work with this group of people.

Summary of the Narrative

I wrote the above narrative as a composite from researcher journal notes, our cooperative journal between me and the teacher, fieldnotes, and both formal and informal interviews throughout the semester. In doing so, I provided thick rich description that shows involvement in activities by a group of eighth grade students, their teacher, the Volunteer in Service to America (VISTA) worker, a graduate student from a nearby university and me. I chose to write about a day when the students' class was split due to testing. Students attended class for about twenty-five minutes, left for a thirty minute lunch period, and then returned to the same class for about twenty-five more minutes. Writing about a split day allowed me to include more information about whole school and community involvement in the gardening activities. The narrative implicitly illustrated themes that will be discussed fully in Chapter Five.

CHAPTER 5

FINDINGS

The purpose of this study was to examine garden based science learning in an eighth grade ag science class. The research questions were (1) How does a middle school teacher enact a Theory of Action Gardening in an agriculture science class? (2) How do middle school science students experience the enacted action gardening curriculum? and (3) What supports and constrains the enactment of action gardening in a middle school classroom? The theory of action gardening emphasizes establishment of community based relationships, democratic education, and support of sociocultural dimensions of youth, such as their personal and social need to interact with others (Mitchell, 2013).

Participants in this single case study included seven eighth grade students and three adults. The research was conducted at Magnolia Middle School (MMS) in the southeastern United States. Data collection began in July 2014 and ended in January 2015. Data for the study included formal and ethnographic interviews, a reflective online journal with the teacher and researcher, participant observations, artifact analysis, a researcher journal and fieldnotes. Data reflected the views of participants and of the researcher. Analysis included writing in-process memos, written as fieldnotes were typed, during and after interviews, and as coding fieldnotes and transcriptions proceeded. Through data analysis a set of themes were generated and a concept map was created to represent these. Through this intense reflection and analysis, the following themes were formulated: (1) Students live in a strong stable community where family and peer relationships contribute to shared common values, (2) The community supports garden

based learning by participating in a network that contributes to the perception of school as a place of learning rather than a work place, (3) Curriculum structured around relevancy, prior knowledge, cultural values and physical activity encourages students' active involvement in the learning process, (4) Garden-based learning engages students in learning which promotes problem solving and critical thinking, leading to learners becoming teachers and displays of autonomy and (5) There are supports and constraints in use of garden-based learning.

The themes derived from analysis of artifacts related to the research questions are described and discussed in the section that follows. Figure 5.1 represents how the cycle builds on itself as students continue to expand on their GBL experiences and illustrates the potential to spread tenets of action gardening into the community with the result of a more democratic society.

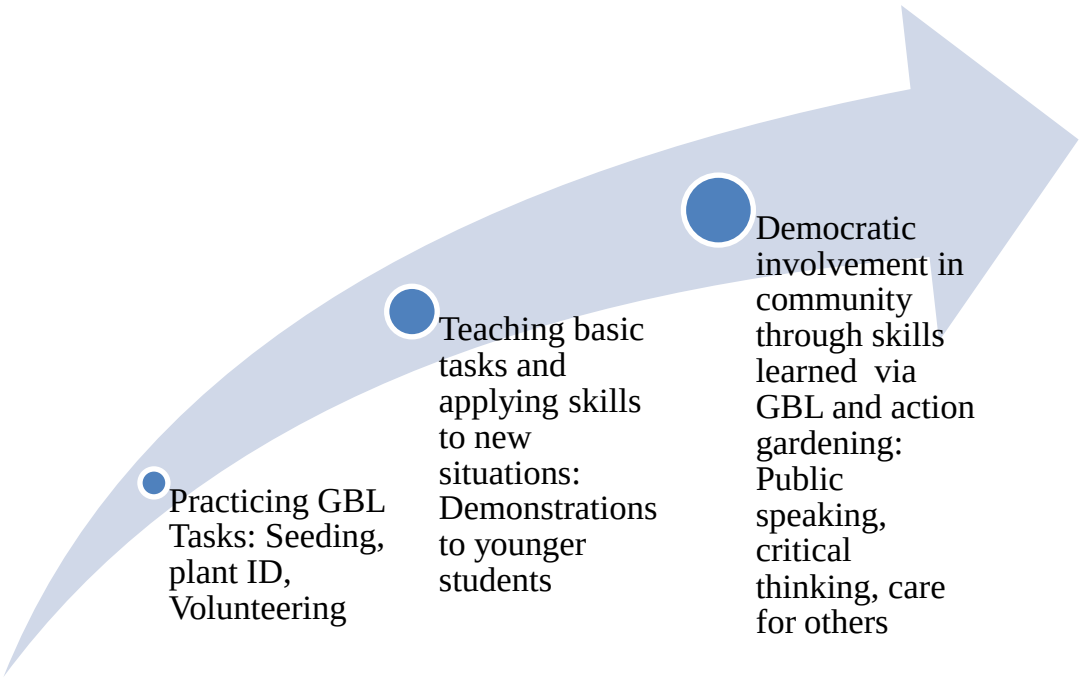

Figure 5.1 The GBL cycle emphasizes action gardening tenets through increasing and repeated exposure between the garden, students, and the community.

Theme 1: "I Know Jacar Since We Be Like in Kindergarten": Students Live in a Strong Stable Community Where Family and Peer Relationships Contribute to Shared Common Values.

Students' families have lived in the same community for generations, often know each other, come to school with shared histories, form lifelong relationships, and have strong connections to family. Similar to what students recognize as their community is Sergiovanni's (1993) definition of community:

> Communities are collections of individuals who are bonded together by natural will and who are together binded to a set of shared ideas and ideals. This bonding and binding is tight enough to transform them from a collection of "I's" into a collective "we."As a "we," members are part of a tightly-knit web of meaningful relationships. The "we" usually shares a common place and over time comes to share common sentimants and traditions that are sustaining. (p. 9)

Sergiovanni (1993) drew his definition from Tönnies' (1957) who described community further by dividing it into three forms: kinship, place, and mind. Tönnies (1957) defined community by kinship as that which comes from a unity created by similarities found around families and other closely connected people. Community of place was defined as emerging from living in a common location for extended periods of time. Community of mind was defined as binding people to common values, goals, and conceptions of living. Together these components of community "represent webs of meaning that tie people together by creating a sense of belonging and a common identity" (Sergiovanni, 1993, p. 11). Not knowing they were part of a well established community, Denise told students early in the semester that she wanted them to be a

community of learners. Establishing a community is an important part of action gardening. Later she realized that the students already were a community and she was the newcomer. She said:

> "There are a lot of names that are deeply embedded here and so there are generations of people that have been here for a very long time. I've lived here for twenty-one years but this is *their* place. I am a visitor." (Teacher interview 3)

As Denise commented, she was an outsider to the students' community's histories. Nino and Summer demonstrated families' interconnectedness when they mentioned how they both knew Nino's cousin, Jacar. Nino said, "When I transferred schools, I knew everybody. It wasn't nothing new" (Student interview 2). However when Summer changed schools, she already had a friend in the new place, "But I knew Jacar. Jacar had transferred with me" (student interview 2). Summer finished her description of growing up where everyone seems to know everyone and their relationships, "I've known Jacar since I was a little girl and our mamas know each other. He know my grama. I knew Jacar since we be like in kindergarten and stuff" (Student interview 2). As Nino and Summer described, families in this community have known each other for at least three generations and despite transferring schools during their lifetimes, students always know someone wherever they go. Students in this class came from a stable community in which they have lived for years. The community was described by students through family and peer relationships.

Family Relationships

Strong family relationships were common among the students, with matriarchal influences mentioned most often. Anytime I asked about family or their home lives, mothers and grandmothers were the first people mentioned. When Denise called family members at home to talk about students' misbehaviors, she was given phone numbers of mothers and grandmothers.

Summer and Nino both told me about their high regard for their grandmothers and then their respect for their mothers because as Summer put it, “Because at the end of the day you ain’t got nobody but your mama” and Nino added, “and grandmama” (Student interview 2).

Students told me about fathers and grandfathers when asked directly. For example, when I asked Janice about their garden at home, I asked if all of her family helped, she said, “No, mostly me and my mom. When I asked if she had other family nearby, she told me her “grandpa had cancer and that’s when they came to live with us” (Fieldnotes, December 1). Janice’s mention of her grandfather did not indicate feelings toward him other than he needed care which was provided when he moved in with her immediate family.

Nino and Summer shared strong disregard for their fathers. When asked about their obvious respect for their grandmothers and mothers and lack of mention of fathers, Nino answered, “I never ever ever EVER EVER EVER like my daddy.” Summer echoed, “I never respect my daddy. I won’t even call him Daddy.” (Student interview 2). Wondering about how their opinion might impact their decisions if they have their own families in the future, I asked, “What can you learn from that though? Like if you decide to have kids and be a mom…” Nino immediately spoke up which made me feel like he had given it thought, “Like don’t be like him.” Summer, too had an answer right away, “Exactly, to have somebody that going to be by my side either way, if I have a child, you know” (Student interview 2). They seemed to understand that there was a learning opportunity available despite having a negative relationship with their fathers and I felt that it may have come from the strength of their relationships with their mothers and grandmothers.

Peer Relationships

Students grew up near and walked to each others' houses, though they did not always go to the same schools. Summer explained a longtime friendship she shares with Nino's cousin saying, "The same as Jacar. I met her in fourth grade too" (Student interview 2). Students came to school with peers who have been lifelong friends and "associates," as labeled by Nino.

Students'families know each other and students have developed into groups that are friends and "associates." While they did not seem to intentionally exclude each other, every day certain students sat together or worked together on projects within the class setting. For example, while working on the first of two sink stands, a long ongoing project, I observed:

> One student is drafted to help cut the board. He tries to convince Janice to trade him mints for the nails. Another boy tries the tactic of, "C'mon, we've known each other since second grade." She laughs and eventually hands out some mints. (Fieldnotes, November 4)

These students indicated their long involvement with each other by trying to convince Janice that she had known them so long, they must be old friends who would share the mints. She took their teasing good naturedly and finally relented. According to the second boy, they had known each other for six years already.

Knowing each other for years did not always indicate friendship. Nino told me how he differentiated between friends and associates, "Some of them like annoying folk, they ain't my friends. They my associates. Everybody ain't your friend" (Student interview 2). While they have spent many years together, Nino was pointing out that he did not necessarily like everyone in this peer group. Students especially did not like those who were loud and caused trouble for the rest of the class. On the other hand, Summer explained that she had been friends with Nadine,

a student not in the study, since they were in the same class in fourth grade, "Me and Nadine, you know we play sometimes and stuff, you know, laughing but you know she my friend" (Student interview 2). Nadine and Summer were part of the "loud" group and Summer expressed a higher tolerance for the noisiness of her friends while than some of the other students, like Nino, were bothered by the high noise levels. Nino also indicated play fighting as an acceptable way of interacting with friends but not in the classroom.

Clowning around to entertain each other was another way friends interacted in class. One day while making hot pepper sauce I wrote, "Scott is clowning around by trying on a coat in the lost and found that is too small for him. Sierra laughs at him. He has a small crowd he is entertaining while the peppers cook" (Fieldnotes, November 17). In this comment, Scott, Sierra, and Janice passed the time by playing but not in a way that interrupted class work. They were a group that often worked together on a task, with smiles and silliness but with determination to do the job. Peer relationships and shared family connections supported similar values for the students.

Common Community Values

Strong family relationships, matriarchal influences and lifelong relationships with their peers contributed to knowledge of common values. Being social, showing respect for elders, using appropriate manners when addressing elders compared to friends and appreciation for a good work ethic were values students supported. When asked where his grandmother worked, Nino said, "My grandma she used to work at the school district about thirteen years. She used to be a paraprofessional for special ed. Now she work at a day care down the street from my house" (student interview 2). It was important to him to share that she worked consistently for a long period of time and to know where she worked. He took pride in his grandmother's work ethic.

Similarly, Summer told me her grandmother went to work every day "on the spot," meaning on time.

Besides work ethic, good manners were valued. Nino said, "There's some people that in this class period that don't got no manners." He said he could tell who the people were who lived north of the school because they did not have good manners, meaning they did not address people who were not peers as "Ma'am" or "Mister." Summer explained that using this form of address is expected in public places, "When my grama go to McDonalds or something, the people in the window, they'll be like, "Yes ma'am" so like that. Yeah, that's just the way, everybody been taught like that." (Student interview 2). Consequences of not having good manners for Nino were, "My mama slap me if I would do that to anyone." (Student interview 2). Denise confirmed when I asked her if she knew manners were this important saying, "I've seen parents reach through the car window and haul off and slap one of the kids." (Teacher interview 2). Appropriate behavior was expected and consequences dealt as determined necessary by family members.

Students in this study have grown up as part of a stable, long term community surrounding MMS. Their parents and grandparents know each other and they often live within walking distance of each other. Not everyone is a friend, though they have spent a lifetime together. Displaying appropriate manners is very important and when the community rules are followed, members are accepted and supported. Students knew they were valued by their grandmothers, as indicated by Summer who said she was "spoiled right," or in the right way. A good work ethic, close family ties, and a strong matriarchal presence are normal in this community.

Reflection on Theme 1

McInerney et al. (2011) described place as a lens through which people begin developing their view of the world and of themselves and learn about a sense of community. It is where social networks are formed and where people learn to live with others. For example, at MMS most students are familiar with the community where the school is located due to longstanding family relationships with the place. This connection to place is rooted in time, despite changing conditions over the years relating to social and cultural differences, and families have lived here for generations producing knowledge that is tied to place. Lim (2010) regarded time as an important component of place. She proposed that we rethink how historical consideration of place can be used in the way we approach understanding place and therefore, how we approach PBL. In an effort to promote decolonization, she considered whose history and which history is included in PBL. At MMS, students know how to cook "greens," a common food in the southeastern United States, and this knowledge was passed to them from their grandmothers demonstrating an intergenerational connection between family and a food grown in this place. Growing greens in the garden and cooking them or making them into smoothies demonstrates value for knowledge these students bring from their communities that may be overlooked in typical ag science curriculum.

Sierra, whose family recently moved from Florida and who has extended family in another country, was able to "bring" place with her in the move through plants brought from the family's garden in the previous state. Family knowledge was transferred through the continuing growth and cooking of home grown herbs. The importance of knowing how to cook was a shared common value for many students and was closely tied to place whether cooking greens or hot sauce, a common condiment in the southeast.

Peer relationships were supported by place because students remembered shared experiences based on places they went during school events or daily life. When Summer and Nino discussed cooking with their grandmothers, they talked about which grocery store was preferred and why. Another student found a picture in a magazine that reminded her of a field trip her class took two years prior which provoked good memories for Janice. Though Janice and her classmate typically did not work together during this ag science class, shared memories of place was part of their peer relationships.

Though Nino and Summer grew up within walking distance of each other, they experienced place differently when it came to working in the garden. Nino exuberantly proclaimed that he loved to be outside and enjoyed alone time. Summer preferred to have company when she had to do things outside like water plants. Some of the students saw outdoors as a place to run and be loud while others worked happily in one place alongside their friends, almost every day. When it was time to propagate strawberries, some students did not want to get their hands in the dirt, while others dug right in and enjoyed it. Still other opportunities came when students were encouraged to walk to a nearby elementary school and help pull dead plants to add to the compost pile. In this case, they experienced place as a service opportunity by helping a neighboring school with their garden tasks.

Whether experiencing place in their neighborhood, within their homes, at Sweetgum Elementary or even in the classroom, students had common values related to their family and peer relationships which were also connected to the strong community of which they were a part. Students may have experienced GBL differently based on their interests but they knew "correct" behaviors according to community values such as answering, "Yes, ma'am," when asked a question and knew that word of their actions would get back to their families. In this example of

appropriate behavior, their families at home provided a support system that students could rely on to back them up when they felt wrongly accused as well as a place where they would be reprimanded if they did not follow customs.

Lim and Barton (2010) investigated urban children's sense of insideness, made up of interactions between environmental understandings, environmental competence, and diverse affective relationships with a place. They learned that children's sense of place develops in many ways, routes and dimensions. Similar to the MMS students, Lim and Barton found that children actively and purposefully explore their environments and nurture their sense of place which is developed through the use of boundaries and through where they want to go (affordances). Through their lived experiences, children construct their own understandings of their place of which their community is a part.

Theme 2: Meet Mr. Johnson: The Community Supports Garden Based Learning by Participating in a Network that Contributes to the Perception of School as a Place of Learning Rather than a Work Place.

Denise involved the community with the students through garden-based learning (GBL) on many occasions, reaching beyond the classroom to involve students with their neighbors. One day, "a man appeared near the outside door and Denise introduced him as a volunteer to help with plumbing the sink today" (Fieldnotes, October 21). Another day I met Mr. Johnson, a retired community member, who volunteered to set up a fish tank to raise trout that would later be released in mountain streams. As Denise explained, raising fish provided many opportunities to learn science topics such as population management, fish as environmental indicators of stream cleanliness, and the significance of pH and nitrogen levels. Mr. Johnson told me he

enjoyed his time at schools and teaching students about fish. He also enjoyed surprising the students with his playfulness when he joined in with theirs:

> Mr. Johnson walks into the room, slaps one dancer on the butt in jest, dances along with the group, and then keeps walking back to the fish tank area. It seems out of character for an older white man to dance with a bunch of middle school kids and be so silly that Denise and I burst out laughing, especially at the students' reaction which seemed to say, "Did he really just do that?!" and then they had a good laugh at their puzzled peer. (Fieldnotes, September 12)

This was a very busy day, full of action and misbehaving students. Mr. Johnson's interruption of their antics by joining in paused their mischief making, giving the teacher and I a good laugh. He supported GBL when he helped Denise with the class by teaching Scott and another student how to use a handsaw that day. Later that skill was appreciated when they worked on cutting boards to build the sink stand.

Recognition of Students and Community Members Working Together

The local community was involved in various ways through the gardens. People helped set up fish tanks, participated in weekly organic produce sales, worked on weekends, and donated gardening supplies such as lumber. . For example, Denise made students aware of community and students' involvement by showing pictures to the class taken while people were building the fence around the garden:

> "Sixteen workers from the Caterpillar plant came to build the fence around the garden. You probably recognize some of the middle school students as your friends. They worked together to build a deer fence to keep them from eating our garden and to build compost bins." (Fieldnotes, August 27)

Then she took the class outside, walked them around the fence, and had them contribute finishing touches with Wren, the VISTA worker's help. In this example, Denise made connections between community support of the garden and students' peers by providing pictures of them interacting.

Garden-based learning provided opportunities to expand learning beyond class time. Community involvement with the class supported the idea that school is a place people want to be even when it is not required. This is an important concept to promote for students like Summer who declared, "I hate school" (Student interview 1) but knew she had to finish school so she could get a job later. One form of community involvement happened on Friday afternoons. When there was produce left after the school's needs, Wren and a student (from another class) sold crops to the public that were picked from the school garden, washed and prepared for sale by students. People stopped by until the stand was sold out to purchase affordable, organic fruits and vegetables which varied with the season and were familiar food items to patrons:

> I leave the peace and quiet of the butterflies and plants to see what Wren is doing at the produce stand. I see the UGA leadership student as she smiles and waves to me in greeting. The student who was helping last week is here again. A woman and a man are buying produce. I realize the other person standing in front of me is Denise. After telling the student that he can't use his time out here helping Wren in place of math class, Denise offers to take me on a tour of the eighth grade hall. (Fieldnotes, October 17)

Sales at the produce stand showed students one way their community valued the garden. Out of school involvement was reflected in Saturday workdays, and in the summer student-run restaurant. A summer program offered learning opportunities for a few interested middle school

students to make different lunches mostly from ingredients grown in the school garden with the help of local chefs for community and family members. “There was something about that serving. I think that’s huge” (Teacher interview 2). Denise described students demonstrating pride in their work when they participated in the summer restaurant and being able to share what they were learning with valued members of the community as “huge.” Efforts of MMS students, teachers, and community participants were noted and written up in the local newspaper.

A Supportive Network for Urban Supervised Ag Experience

As a part of agriculture science, middle school students are required to spend eight hours on their supervised ag experience (SAE). Urban SAE time can be harder to do because students have less access to land for growing plants or raising animals. One way this time requirement is managed is through community members working with the agriculture science teacher to provide opportunities at local events where students can provide services. Denise explained some of the options available to her students:

> “The state botanical garden is having a fall festival and the farmer’s market is having a heritage and urban ag festival. To support the national recycling week, the county solid waste division has this annual fund raising event…If students went and brought me back some sort of evidence that they have gone to these things, I tell them I will give them credit for at least an hour. Wick will be at the botanical garden and Ms. Smith, she works with the county solid waste, these people would recognize MMS students.” (Teacher interview 2)

Denise worked with organizations like the county solid waste division to make sure students had many chances during the semester to complete their eight hours of SAE. Community members

were very supportive of her effort as shown in the number of people and events she cited in one week who were willing to work with her students.

Denise organized weekend clean up days as another opportunity for students to put in SAE time and work with community volunteers after hours at their school. I attended my first weekend clean up day in January 2014 on a school holiday to meet Denise and look at the school garden areas. There were parents and students everywhere doing jobs like moving compost, raking dead leaves, and cleaning up dead plants in flowerpots. Later in the semester, "Denise reminded them there is another opportunity to get SAE time this Saturday by working in the garden at school." (Fieldnotes, November 6) It was less well attended but there were many school employees, students, and parents that day as well. Denise supported SAE time by arranging her schedule to stay after school from 4-5pm on some days. She said students enjoyed "the one-on-one time with chickens or in the greenhouse. They're often the students who join FFA." (Teacher interview 2).

FFA meetings and contest participation were after school opportunities that demonstrated to students that they might want to be at school. Denise said, "The students that I have that end up being in FFA or wanting to go to FFA CDE's, (career development events), they were students that stayed after with me last year"(Teacher interview 2). FFA provided support for the idea that school could be an enjoyable place to spend time by being part of an organization of peers who used their knowledge of agriculture to travel to local, regional, and national contests. Being in FFA begins a cycle of lifetime learning because SAE projects started in middle school can continue into high school and result in scholarships for college degrees.

In summary, forms of authentic community involvement in support of GBL included interaction with the public when they came to buy organic produce at the weekly sales. Local

groups provided opportunities for students to work toward their SAE time requirements during community events. Individual people shared their knowledge in support of GBL by coming to class and teaching students skills like plumbing and how to build a supportive wooden frame for a fish tank. After school one-on-one time with Denise was additional support she offered. All of these forms of support provided additional demonstration of authentic community involvement with GBL for students at MMS.

Reflection on Theme 2

Sobel (2004) argued, "Place based education is the process of using the local community and environment as a starting point to teach… across the curriculum. Emphasizing hands-on, real work, learning experiences…" (p. 7). An example of community involvement with MMS and GBL was found in the opportunities made available for students to work toward their supervised ag experience (SAE) time of eight hours. It might be more difficult for students in urban areas such as those at MMS to find ag experiences but the community organizations worked with Denise to make time and opportunities available for students who needed it. These included helping during the recycle events and helping at the farmer's market. McInerney et al. (2011) argued for the importance of innovation and of caring teachers who saw opportunity to involve students' communities in their learning.

In addition to providing students time to work within the community for their SAE hours, the community came to the school on weekend work days to support the efforts of Denise in this GBL program. The first interaction I had with MMS was on one of these day:.

> On a holiday weekend, I can't believe how many people are here helping out. It is a beehive of activity and when I attempted to find Denise in the crowd, it was like trying to

> find a moving needle in a haystack. Amazing support! (Researcher's journal, January 20, 2014)

I wrote about my surprise at the number of volunteers and how cheerfully they cleaned, composted and prepared the garden area for another season of growth. The network provided by the university, local organizations, and community residents in these learning and teaching situations was supportive of the GBL Denise had put into place at MMS. Working together, these groups of adults showed students that they valued the school as a place of learning and doing. As a community centerpiece, the garden made the school lively and people were invested in the lives of youth. As Smith (2002) described, this was a case of borders frequently being crossed by students and community members as a part of place conscious education.

Theme 3: "Maybe that Will Work" Curriculum Structured around Relevancy, Prior Knowledge, Cultural Values and Physical Activity Encourages Students' Active Involvement in the Learning Process.

Garden-based learning curriculum builds on students' community values and peer relationships, thus providing experiences relevant to them to build their content knowledge base. Students' interests and prior knowledge can be accommodated according to which tasks they become involved in. Some, like Janice were interested in all agricultural information. When asked what her favorite part of the class was, Janice said, "All of it," but finally narrowed it down to her experience with animals (Fieldnotes, November 4). She was involved in FFA and went to livestock judging events. During the previous school year, she went to a wildlife judging where they looked at habitat to determine if it was time to "harvest" the deer.

Other students happily participated in GBL activities and expressed their love of being able to be outside, as one student put it when he ran past me yelling, "I LOVE manual labor!"

Nino, who was usually quiet in the classroom during lesson time, was able to share his prior knowledge of using a handsaw and hammer from working with his grandfather. He also socialized with a peer group with which he enjoyed spending time. Using that knowledge to help build the sink stand was his favorite part of the class.

Students were interested in exciting activities like building different structures and enjoyed figuring out how things come together and work as a whole. For example, they collected eggs from the hens and carefully placed them in the classroom incubator. Eagerly, they checked on the eggs every day to see if chicks were poking out of the shells.

> One day I walked in and saw two students at the incubator, talking excitedly to each other. Curious if the eggs had hatched, I walked over to ask what they were up to. Scott and his friend are trying to find out why the light that indicates the heating unit is on, keeps turning off. The eggs have not hatched. "The light keeps turning off. We plugged it into a different outlet. Maybe that will work." (Fieldnotes, November 10)

Denise knew these two students were interested in how things work so she let them investigate a problem relevant to their prior knowledge of electricity, which they learned in science class that semester, to try to understand and fix the incubator when it stopped maintaining a constant temperature. Together, the students conducted tests to try different solutions to problems. This was one way Denise used GBL to support the different interests and abilities of her students.

Inclusion of Student Values in the Curriculum

Bringing students' family members to class was another technique used to instill relevancy to the curriculum. The first day of the researcher's observation, students were preparing for open house and Denise had several tasks for them to work on so family members

could see what they were involved in during the semester. Later in our co-written reflective journal, Denise wrote about her intentions in setting up the curriculum:

> "A parent of a student in that class came to open house and told me how much her student loved it. It reinforces the thoughts that I have had over the past year or so, that kids who already have had some exposure to gardening tend to be those who like the class. Those who have not or who have no memories or connections to it, find less meaning and enjoyment in it" (Reflection, August 28)

Building on this thought of the importance of students' prior experiences, Denise mentioned Sierra's mother coming to talk about herbs used to flavor the food that they grew in their container garden. Denise said Sierra's mother might also discuss how her family participated in the farmer's market. Both options were examples of supporting the value of the knowledge that students like Sierra were learning from gardening at home with family members.

Not all students were interested in gardening in the beginning. Finding ways to include the disengaged students was where the flexibility of GBL was demonstrated. Tasks could be socially oriented such as watering or building the sink stand but could be worked on by an individual if a student preferred to work alone such as using the rototiller to prepare a new garden bed. In the case of Summer and her friends, who were more interested in socially oriented activities, Denise integrated their inclination to talk and travel in a group with garden tasks that could easily accommodate it, such as watering plants and picking spinach. "They went in the garden to pick spinach instead of staying on the sidewalk like they usually do!" (Teacher interview 2). She found using students' tendency to socialize during tasks as a successful technique to get them out away from the fenced in area between the chicken coop and the greenhouse and into the actual garden.

While there was usually a group of three to six working together on building projects, some preferred to work alone. For example:

> "One of the quiet boys works nearby with a pickaxe, trying to loosen some soil and mix it into the compost. It looks like he is trying to break up a brick because the clay soil is the color of brick and with each thump of the pick axe, only a tablespoonful of dirt seems to loosen. (Fieldnotes, October 2)

He was intent on his work to prepare new ground for an herb garden and seemed bothered when I approached and talked to him so I left him to work on his own. It was not always the same student working alone but being able to mix up what they did depending on how they felt was another way of showing value for students' abilities and feelings each day. Another day students worked with Wren to make hot sauce with jalapenos grown in the school garden. It was one of the few cool days of the semester and students were not wearing clothes appropriate for outdoor work at that temperature so they did an indoor GBL experience. A large stainless steel bowl of green jalapenos rested on the countertop behind Wren. Also on the countertop were two electric burners with small stainless steel pans heating while students stirred the contents with wooden spoons. They were focused on what they were doing and two were of the noisy crowd so I was thrilled to see them so involved. Keeping an eye on them while they stirred, Wren directed the students from the work island set apart from the main countertop by a few feet.

> "Now, young lady, scrape your pan of peppers into the food processor and then careful with that lid. It may have only cost me $8 at the thrift store but it'd cost me $80 to replace it. Now push that button there. Ok, hold it. If you push it up, it'll stay on." (Fieldnotes, November 17)

In the above quote Wren used an economic example students could relate to when he explained how he would have to pay to replace the procesor if they did not use the machine correctly. He always addressed students respectfully, calling them “young lady” or “young man.” While it is true he did not interact with them often enough to know many names, it was also a way of showing respect to them and they responded positively. In contrast, Nino and Summer pointed out that Denise discouraged students from saying yes ma’am to her. They felt like it was a disrespectful response for her to request this—something that was counter to what they were taught at home. One young lady decided Wren should remember her name so she corrected him and very clearly pronounced her name for him. Wren provided a message for them to be respectful and responsible by example.

Curriculum in this ag science class was based on state guidelines but having a variety of topics and activities to choose from accommodated learners’ needs in every class period. Tasks could be socially or individually oriented. The multitude of options built on what students knew and then added to it. Through this flexibility, learners’ needs were met and prior knowledge was valued. Garden based learning tasks demonstrated relevancy between what students brought to school and what was learned in class.

Garden Based Learning is Embodied

Garden based learning requires activities involving whole body learning and build on students’ interests, social relationships, and skills learned at home. Tasks are adaptable to each student’s activity, strength, and coordination levels. For example, running from one area of the garden to another could be acceptable behavior. Sitting on the ground to transplant strawberries was also acceptable. I often felt like motion was the word of the day as written in this fieldnote, “I walk into the room and groups of students, Denise, and Mr. Johnson are all in motion”

(Fieldnotes, September 12). As described in chapter four's narrative, this was a day students were making a dance video that had to do with promoting agriculture on the school's television channel. The video incorporated the dance team moves they were learning from an after school group. Other students were learning to use a handsaw, as previously mentioned, to help Mr. Johnson build the trout tank stand and later they carried five gallon buckets of water from the outside faucet to fill the tank.

Garden-based Learning Used All Senses

Besides dancing and building, Denise started class one day by explaining that pesto is made from basil like that which students were cultivating outside in the pocket herb garden on the fence. While some students were involved in other tasks associated with the day's curriculum, based on personal interests, Denise took a small group outside to show them what basil looks like and to pick some to make the pesto. When they came back inside where the blender and other ingredients were, she continued her explanation and then left Janice and Kassandra with me to make it. I offered suggestions on how to work the blender because they seemed unsure of that and reminded them to add nuts but mostly I watched and let them talk it out. They rinsed the leaves, picked them off the stems, added them to the blender with some olive oil, and turned it on. When they decided they were done, we dipped some out of the container and tasted it. We agreed that it was not bad! "What dat green stuff you eatin?" Summer asked suspiciously so we shared with her and other curious classmates (Fieldnotes, September 12).

Janice and Kassandra were involved in every step of preparing pesto in this example of embodied learning. They were encouraged to practice plant identification when Denise took them out to pick it. Senses of sight, smell, touch and taste were included as well as the physical

acts of picking the leaves, carrying them inside to the work station, getting water from the bathroom to rinse the leaves, and learning how to work a blender. Students made pesto fresh from plants they helped grow and experienced it as an inquiry activity. The teacher gave advice but never told them to measure precisely or that they did it wrong. She used a "let's see what happens" approach as long as they were behaving safely toward each other. Then, bringing in a community aspect of GBL, they shared their product with classmates. A similar process happened later in the semester when students picked kale from the garden and made smoothies.

Students working with Wren to make hot sauce were involved in embodied learning as they took turns measuring, stirring, using the food processor, and following Wren's step by step quietly given instructions. As I noted, "They watched the processor smooth the dark green chunks into smooth lighter green pudding. 'It warm,' Summer remarked when she held her hand over the chute.

'Right because we were just heating it'" (Fieldnotes, November 17). Wren never made it sound like they said obvious things and never put them down. He continued directing them, allowing students to do almost all the steps:

"Ok, pour it into this big pan. Where'd our water go?"

"That look like guacamole," one of the students echoed my thoughts. Someone hands the pitcher of water to him.

"We're going to pour most of the vinegar in and then some water. Who wants to help?" "I do!" Several hands go up as the students call out and one says to one of the stirrers, "Why you think you get to do everything?!" (Fieldnotes, November 17)

Wren watched, instructed and spread the work so everyone who wanted had a chance to stir, pour, measure, and hand him ingredients or equipment. Students demonstrated a high level

of concentration while they asked questions and stayed focused on what he instructed them to do. Finally, he surprised them when he dipped the spoon in and tasted it. Then he explained how he liked hot sauce to taste with sounds and verbal gestures.

> "No, it's mild which is the way I like it. Not woo-ie!" He motions with his hand, using it to show how hot "woo-ie" is, holding his hand high above his head. "I like it down here," holding his hand nearer to his waist. (Fieldnotes, November 17)

He was always very patient sounding and polite which students responded to by mostly being polite and quiet when they talked to him. After tasting it, and providing a visual idea of how hot he considered it, he had students take turns ladling it into their small plastic containers. By providing actions in step by step directions, Wren gave students the chance to participate in whichever part of the process they were interested in and this resulted in a physical experience where they learned exactly how it felt to stir, measure and smell the vinegar, heat the sauce, use a food processor, and how to spoon it into containers without overflow. Sending the containers of sauce home was a way to connect what students did in school with food they were used to eating at home. Most students told me that they had not made hot sauce before but they all really liked eating it.

Garden-based learning involved physical movement which enabled students to use all their senses. Activities encouraged students to follow their interests which included tasks like holding and petting the rooster, watering plants, tasting what they picked and being social during class. Experiences provided daily opportunities for embodied learning that further reinforced lessons learned at home like using good manners, while participating in making tangible products that could be shared with their families.

Reflection on Theme 3

Critical characteristics of place conscious education included an emphasis on learning experiences where students are knowledge creators and not just consumers of others' knowledge which is often the case in formal learning settings (Eppley, 2011; McInerney et al., 2011; Smith, 2002). Smith (2002) argued that students' questions and concerns should be central in determination of what is studied because it results in ownership and engagement in learning (Smith, 2002). The students in Denise's class were encouraged to create knowledge by asking questions and exploring, rather than being given prescriptive directions in their activities. For example, when they planted seeds, they were encouraged to choose from a large pile of various packages from herbs to squash to flowers and the directions for planting were that large seeds should be planted deeper than small seeds. Allowing students to chose which seeds based on what they were interested in and backing away to provide the freedom to make mistakes in how students planted them was an example of another critical characteristic in which the teacher acted as a "broker of community resources and learning possibilities" (Smith, 2002, p. 593).

Scott and his friend investigating the egg incubator was another example of students creating knowledge based on what they found relevant. They were provided with information about the problem, temperature fluctuation, and allowed time and space to fix it, also connecting what they learned in science class about electricity with helping chickens incubate. By encouraging them to work with her limited guidance, Denise helped students acquire skills necessary to become lifelong learners (Mitchell, 2013; Smith, 2002).

Similar to Dewey's (1897) warning of a disconnection between school and home life, relevancy to prior knowledge and cultural values was an important part of how curriculum was structured in this classroom. As Dewey sought to recover the relationship between formal

education and community life in his educational approach, GBL with the ag science class did the same by immersing children in community activities such as cooking and carpentry. Many contemporary academic disciplines such as chemistry and physics came from activities like those in which the students were involved. In contrast to learning material that may be on a standardized test with no immediate value to them, students participating in this GBL class learned about issues that compelled them at the moment. Relevancy relates to motivation which seems to increase engagement in learning and retention in school, resulting in a higher graduation rate (Ruiz-Gallardo, et al., 2013). Buxton (2010) mentioned that in his study with middle school students, science oriented, PBL was used to help students learn to answer the questions "Why here?" and "So what?" to find out why science matters to them. McInerney et al. (2011) found that when material was demonstrated to be relevant to students, they were more likely to stay in school.

By including physical activity every day, students were actively engaged in the place and were often not ready to leave it. Middle school students are physically diverse and changing fast. In some ways, they are as young as the elementary students they recently were, still bursting into song or dance when the mood strikes. In other cases, they are serious, focused individuals ready to use their increasing strength to do the work of physical adults. The physical sensations and activities available through GBL included all of these capabilities as students felt their needs, curiosities and abilities change even from day-to-day.

People learn with their bodies *and* minds. Called embodied learning, it is embedded within GBL in a way that is flexible for the students. Bresler (2004) called for embodiment in curriculum, calling the concept of embodiment a Grande Idée. O'Loughlin (2006) stressed the importance of the senses in learning, saying, we "receive the world around us through eyes, nose,

hands and the skin which covers all of our body" (p. 40). Tasting strawberries just picked from a container garden or working up a sweat while using a pickaxe to prepare a new garden bed are both examples of embodied GBL in which students participated. Garoian and Gaudelius (2007) summed it up as "embodiment …is a signifier of multiplicity existing within a complex web of cultural understandings and significations" (p. 9). The flexibility of experiences and projects that can be included in GBL contributes to its relevancy in some way to all students and leads to learner engagement so that sometimes they do not want to stop.

Theme 4: "Can I Do Something?" Garden-Based Learning Engages Students in Learning which Promotes Problem Solving and Critical Thinking, Leading to Learners Becoming Teachers and Displays of Autonomy.

Garden-based learning resulted in fully engaged students who enjoyed the learning processes. There were obvious differences in the students' actions, expressions, and interactions with each other when they were working on garden related tasks compared to doing the daily seatwork. The starter and mini-lesson took about twenty minutes, sometimes less. During that time, less than half the class participated. For example:

> Denise tries to yell over them. One student notices it not working so he yells louder what she has just said. When Denise is done with the starter and has written the daily jobs on the whiteboard, she says in a normal voice that it is time to go outside, just once, and most of the students respond. (Fieldnotes, November 4).

In the class when students were supposed to pay attention and participate, they did so half-heartedly or not at all. When they were outside or involved in classroom experiences that resulted in moving and working together in small self-selected groups, many more of them participated fully. They had to think to do some of the jobs, like which plants to pick, where to

dig for the new herb garden, how to hold the hammer without smashing a finger or how to direct the rototiller. Seatwork in the classroom did not challenge them. When he was supposed to be writing a report about a tree species, Scott was playing games on his phone. I asked how long he thought it would take him to do it when he decided to complete the assignment. "About 5 minutes," he says with a grin. "Is that why you aren't working on it now?"I asked. "Yep!" (Fieldnotes, November 6)

In contrast, donut making brought this response:

> Wren has mixing bowls, ingredients, hot grease, and some prepared donuts for students to taste. The change in some students is fascinating to me. Twelve out of eighteen are actively participating now. The others come and go. Only a few are running around screaming but not all of the time. Even they drift in and out of the work area, pausing to stand still and stare at the process. They respond, except for the uninvolved students, by paying attention to what their task is and taking it very seriously but joyfully. They are smiling, volunteering, helping each other, working together, and asking meaningful questions. Maria is stirring. "Can I do something?!" a non-participant volunteers. (Fieldnotes, September 18)

Students responded positively to Wren's deliberate, quiet way of interacting with them. Their attention was focused on their assigned task and doing it well, shown by asking meaningful questions. They asked to be chosen to be involved in the experience and not just in eating the donuts. They were curious and engaged in the learning experience. Not all students were required to participate, a difference from the way seatwork was conducted.

Students were often so engaged they wanted to continue their GBL projects. For example, one day when I went outside I found Denise smiling and surrounded by students. I

meant to help outside sooner but had been distracted by students inside who were painting okra pods for Christmas ornaments. Denise and her group were by the tool shed. Janice stood on one end of a 2x4 on a picnic table as Luke sawed the other end. I noted: Nearby students were hammering. I apologized for forgetting about coming out here. I felt like Denise was happy that I forgot. "Five minutes 'til lunch," she announced, smiling. "Time to clean up!" Students continued rototillering and sawing" (Fieldnotes, November 10). In this example, Denise was able to work outside with students who were happy to continue their efforts even when she told them it was time to stop for the day. When they did stop, most of the clean up was left for one student to do but even he seemed to enjoy it. "He soon runs past me, smiling and yelling, 'Time for lunch. I'm going to be late!'" (Fieldnotes, November 10) This was one example of students being so involved in GBL tasks like building the sink stand, they did not want to stop even when they were supposed to leave for lunch. I often felt the same, not ready to leave these spontaneous joyful learners to return to my university responsibilities.

Promoting Problem Solving and Critical Thinking Skills

The variety of GBL opportunities capitalized on students' strengths and their autonomy. This was manifested through products such as organic produce grown for the community market, assisting GBL projects at a nearby elementary school, and in the projects built for use in the garden. For example, one day I walked out to the groups near the sink stand. They told me Wren was not there but they wanted to work on it anyway. I watched as four of them began hammering and sawing. Scott and Taki worked together to nail a board down while Janice and Luke sawed the next board (Fieldnotes, October 2). This example showed GBL as promoting problem solving and critical thinking skills when students took responsibility on themselves to organize and continue building without the adult who had been supervising their effort.

Another day, one of the students had been working with his classmates cleaning up the garden area at Sweetgum Elementary School. He walked up as I was talking to Wren in the garden still wearing work gloves long after the other students had left for lunch. He stood still, lingering near us. Wren thanked him for his help and asked if he wanted to leave the work gloves with him. The student liked the gloves and asked to keep them. Wren seemed skeptical that he would bring them back but allowed the student to take them as long as he remembered to bring them when he returned. The student smiled and left, wearing the gloves. "That one, he's a good one," Wren commented, turning back to spread mulch. (Fieldnotes, September 24). Allowing the student to keep the gloves when Wren did not expect them to be returned was a demonstration of trust in the student's judgment and encouraged development of following through in what he said he would do. Both of these examples show student autonomy as they worked cooperatively, assigned tasks, and took responsibility for use of garden equipment.

Projects became more complex during the semester as students' skills grew, they became surer of themselves and the teacher became aware of their interests and abilities:

> "Well, look at this sink; it's a little different from the other one. See how it has one sink and a built in shelf?" She walks over to an old porcelain kitchen sink propped up on boards next to the shed where we keep gardening tools. She turns it over so they can see how it is different as she points and talks. "So this time, we only need one shelf built into the stand because this sink came with its own." She continues to talk them through the next few steps they need to do to build a slightly different sink stand. She turns to me and asks, "Do you mind supervising this?""No, I like it. Thanks! (Fieldnotes, October 10)

Denise gave brief instructions to students who had built a similar structure and left them to work on it together. They built two sink stands during the semester so more than one group of

students could have running water and a place to rinse produce at one time. Encouraging self-efficacy and use of critical thinking skills are tenets of action gardening.

Learners as Teachers: Increasing Autonomy

Students showed engagement in GBL when they explained what they were learning to each other and to me. For example, when students decorated the stepping stones, Kassandra touched the soap they made the day she was absent and quizzed Sierra on how she made it (Fieldnotes, December 11). Another time, Janice explained to me how I was thinking wrong about how to cut the board they needed. Summer showed me how to prepare kale the day we made kale smoothies. I did not know to pull the leafy part away and discard the midrib. She had learned from her grandmother and demonstrated this for me.

Teaching elementary students how to plant seedlings was another example of the middle school learners becoming teachers. They were surprised when I told them how knowledgeable they seemed to the younger students. Teaching others reinforced what was already known and contributed to autonomy. Demonstrations and explanations were daily occurrences.

Garden based learning engaged students in the process of education which was shown in many instances throughout the semester. Engagement in learning resulted in changes in students' expression, interactions, and action. Students demonstrated autonomy as tasks increased in complexity and the teacher gave them more responsibility to work on more complex projects.

Reflection on Theme 4

Early in the nineteenth century, William Heard Kilpatrick (1937) argued for project completion as an open-ended method for connecting formal education and students' lives and supported social environments for learning. He and Dewey (1943) believed that the purpose of education was to prepare people for a democratic life. In addition, Counts (1932) promoted

schools as places to teach social improvement. He argued for the use of problem-solving and analysis. Almost 85 years later, educators are again, or still, arguing for these same things. Denise's class was constructed to support these methods of learning for social change. As Sierra and Janice assisted the Sweetwater Elementary first graders in learning to plant seedlings, they embodied these changes and by doing so, spread them to another generation. There were many GBL tasks that led to and promoted problem solving and critical thinking because they were open ended in nature. For example, in building the second sink stand for rinsing produce in the garden area, students had to use knowledge gained from their first design in which a double sink and no counter space was accommodated and adapt it to the second design which featured a single sink with built in counter space. Denise suggested how they might change their second structure and left them to discuss it without much other guidance. This carpentry task alone required innovation, social exchange, problem solving, inquiry, and students working together with minimal supervision from the teacher or researcher. It was one of the instances in which learners became teachers, teaching the researcher and each other when it became necessary to correct someone or explain a misunderstood step in the process. Through this teaching experience, students displayed autonomy.

McInerney et al. (2011) stated that PCE has many benefits beyond high school graduation. They argued that PCE helps people develop a sense of agency, promotes them to the status of knowledge producers, and provides relevant knowledge and experiences which contribute to active and democratic community participation. Eppley (2011) further supported the importance of PCE in schools in deliberately preparing citizens for democratic roles in communities. Activities and the organization of Denise's class curriculum supported these arguments as students participated in GBL tasks.

Theme 5: "Denise Can't Do Everything Herself": There are Supports and Constraints in the Use of Garden-based Learning

Supports of GBL have been provided in the above examples at the community, teacher and student level. At the school level, the principal provided support in various ways. Composting cafeteria waste was promoted, involving every student in school to contribute food wastes to sustain the garden. Compost was collected every day by agriculture science students and taken outside to the compost bins, later used in organically fertilizing the garden. The principal led the MMS Sustainability Committee, too. The core of the sustainability committee included the school's VISTA worker, the FCS teacher, and Denise, with intentions to include faculty and staff from throughout the school.

Teachers in life and earth sciences, as well as in art and foreign languages contributed ideas and engaged in activities toward the development of a school-wide initiative to use the garden as a unifying focal point across disciplines. For example, an entire grade level of earth science classes engaged in outdoor lessons in the garden about the sustainable farming practices that were being implemented, including crop rotation, cover cropping, and composting. Additionally, science and gifted teachers joined together to develop lessons and announcements for a "Zero Waste Day" in which students were educated about and encouraged to participate in composting, recycling, and energy saving efforts. School faculty planned to make it a semi-annual event, revisiting it on Earth Day in April and during National Recycling Week in November of each year.

The school cafeteria offered a salad bar once a month, some of which was harvested produce from the school garden. The structure for this "Garden Bar" was supplied by the district nutrition director and department and required labor for the storage and preparation of the

produce to meet federal guidelines. All who were involved recognized the health and educational benefits as being worth the extra effort.

Wren noted, “The idea is to make the garden program able to sustain itself and keep Denise from doing everything herself because she can’t.”(Fieldnotes, Friday, November 14). Support at the community, school, and student level, if maintained, should do exactly as Wren proposed.

Denise discussed one area of constraints of GBL as being of a cultural nature. While families enjoyed the organic produce sold at the Friday sale, she felt that gardening-related activities were considered to be an inferior use of time and energy by some of them. Denise referred to feeling this cultural difference between what she was used to and what she heard from students during interview three.

> “If they get a little [dirty], it’s like, ‘My mom is going to kill me.’ I think they’ve grown up not getting dirty. It’s important what you look like. It’s important how people perceive you, how you dress. I do feel like there’s a lot of the classroom management thing, that is cultural and I’m just not getting what they’re saying. You know, I’m the old white lady.” (Teacher interview three).

Gardening-related activities seemed to create perceived discomfort and/or anxiety regarding soiled clothes and shoes that were supported by relayed wishes from their caregivers. Denise worked around this concept of dirtiness by providing alternate activities to students who requested them. As a new teacher, Denise recognized classroom management and cultural differences as part of this constraint, as well. She was learning how to negotiate instances of students who did not want to be involved or who considered GBL as a time off from regular

classroom learning, like a recess. Wren argued it was a way for students to avoid doing what they did not want to do.

In addition to families considering gardening as a less important component of school, Denise had to work against the perception within the school of her class as less important than others. Agriculture science is less valued as a class by the school and students know it. Indeed, when completing the district standardized assessment, a student questioned whether it would be included in his grade for the class, contemplating random answer choices. Denise replied that it would not count toward his but it would count toward hers. She explained her class' place within the school curriculum as:

> "Ag class is a required elective. It's an elective but you're assigned there but anyway it's a connections course so connections is not core and so if they ever need to make up math or English or etcetera, it's from my class that they get pulled so it gives this perception of importance of my class is pretty low." (Teacher interview 1)

This perception of gardening practices as being less valued than core classes by the school culture combined with students' conception of being outside as "play" rather than "work." The structure of the school day may have added to students' need for physical activity and less effort of restraint from movement than practiced in their other classes. Students attended school from 8:25 to 3:45, attending six classes each day, a total of twelve different classes every week, with Physical Education class every other day or less. Most students rode buses to and from home. The school schedule did not include recess. Lunch was social but lasted thirty minutes and students could not go outside to eat. Classrooms I looked at had desks in rows with students passively sitting in them. It was understandable that students were more interested in running and playing when they went outside during agriculture science. Even with three adults present, at

times it was difficult to engage them in learning their assigned tasks. Occasionally, student play resulted in destruction of plants intended to become food and since a lot of GBL time included use of potentially dangerous tools, student safety had to be kept in mind at all times.

A final constraint came from growth which has resulted in a large-scaled endeavor. Management of a large-scale garden requires more time than the teacher had, even if all teaching and after school activities were centered on it. A teacher must first fulfill teaching requirements, including planning, classroom management, grading, and making contact with family members. Denise was also the advisor of the FFA chapters and worked with students after school on projects and career development events.

Fortunately, MMS had a solid foundation of support for sustainable school gardening due to the local university and the placement of the VISTA worker. As previously described, the VISTA worker provided a role of continuity throughout the school and into the community that a teacher was unable to fill. Without the forethought of sustainable measures, such as that which the VISTA worker at MMS provided, the growth in scale that comes with support can be a restraint.

Reflection on Theme 5

Garden based learning can be challenging. Tal and Morag (2009) studied the use of reflective practice in assisting teachers who were preparing to teach outdoors and found that a significant challenge for teachers was their lack of confidence. While Denise had extensive background in botanical knowledge, she was a new teacher and she felt her lack of experience affected how she conducted class. Similar to Tal and Morag (2009), she described the reflective journaling and conversations between herself and the researcher as beneficial. She stated that while it was sometimes uncomfortable to reflect on how she was conducting class in the journal,

it helped her recognize better ways to approach tasks or disruptive students the next time. For Tal and Morag (2009), a supportive environment provided by the researchers contributed to positive learning experiences for the student teachers. This supportive environment for Denise included her principal, the Sustainability Committee, Wren, the researcher, and community members and organizations that volunteered time and resources.

A common barrier to GBL was that teachers were often held accountable for tending the gardens (Cater et al., 2012; Eick, 2012; Graham et al., 2005). Denise did experience difficulty managing all of the details and demands on her time that GBL added. She described her concern that while it was wonderful that there was a lot of support and ideas to increase school involvement between the garden and the community, she might not be able to keep up with needs associated with that growth. Ag science teachers are responsible for teaching their classes, in Denise's case 12 classes each semester, and advising the FFA chapter. FFA came with its own set of demands including teaching and practicing additional information to compete in contests. Contests brought additional responsibility with the need for funding, travel arrangements, and parent consent forms. While GBL contributed wonderful opportunities, it added to the ag science teacher's work load and without support systems like Denise's, could become simply too much to perpetuate.

Chapter Conclusion

The findings of this chapter were grounded in the context of the ag science class at MMS and presented from a place-based education perspective. The key findings contributed to garden based learning as a way to fully engage students in the learning process. Simply put, students did not want to quit when it was time to go. This engagement in learning translated into student

autonomy. The community, school, teacher and students supported GBL in many ways but there were constraints that came with this type of learning such as the possibility of outgrowing resources in place to sustain the program. The community was working with the school and teacher to manage constraints that might keep GBL from continuing.

In the next, and final, chapter I will discuss the findings in relation to tensions associated with the research questions, referring to the current literature on GBL and PCE. I will make connections and applications from the findings to present possible implications for practicing teachers and researchers at the local level.

CHAPTER 6

DISCUSSION, IMPLICATIONS AND CONCLUSIONS

> *"If schools prepare Jo to succeed in the narrow sense—to do only her current job—she will be cheated. If they prepare her to think past her present circumstances in terms of a career—which implies movement and possibilities—she will have obtained an education that prepares her to grapple with her future." (Schultz, 1996, p. 538)*

Schultz' quote refers to relevancy of students' present learning experiences in relation to their ability to feel purposeful in their futures. Related to education and present life experiences, this ethnographic case study looked to middle school students' and their teacher's actions, descriptions, and interactions to explore how they experienced the enactment of the theory of action gardening in their ag science class. Through formal and informal interviews and observations, participants acted as sources of information about their experiences at Magnolia Middle School (MMS). Enactment of the theory of action gardening incorporated garden based learning (GBL) tasks and agricultural content with participants' interests and backgrounds into school learning activities and made relevancy a key ingredient in the course. A focus of action gardening is promotion of taking action, caring for other living beings, and democratic education as ways to learn how to make choices (Mitchell, 2013). Mitchell's theory of action gardening takes acting on these issues one step further, promoting action gardening as a life changing theory for the GBL participants and those with whom they interact. Making choices and enacting those decisions were skills practiced daily in this ag science class.

My research purpose for this study was to examine garden based science learning in an eighth grade ag science class. This purpose led me to the following three research questions: (1) How does a middle school teacher enact a theory of action gardening in an agriculture science class? (2) How do middle school ag science students experience the enacted action gardening curriculum? (3) What supports and constrains the enactment of action gardening in a middle school classroom? The theoretical framework used was place conscious education (PCE) which draws on the local community and environment as a starting point in the teaching process for learning across the curriculum. Curriculum, as used in this study, was defined by Bobbitt (1918) as "the entire range of experiences, both directed and undirected, concerned in unfolding the abilities of the individual (p.43). I chose PCE as a theoretical framework because it calls for a sense of agency in learning, emphasizing the importance of relevant knowledge as well as active and democratic community participation, all of which are tenets of the theory of action gardening.

Discussion and Interpretation

In this section, I explain tensions resulting from my study and relate them to additional literature with relevance to GBL, PCE, and the theory of action gardening, that became important over the course of the study. Findings in this chapter are discussed as "tensions." Britton (2011) described tension as a collective method to represent themes in a way that promotes more thorough analysis and discussion regarding the data. Tension is not negative or positive but instead, suggests questions and promotes further dialogue. Tippins (personal communication, June 15, 2014) described tensions like a tug of war where the ideas pull in opposite directions and the tension rests at the intersection of these ideas. I used tension to

extend discussion of enactment of action gardening around literature for enhanced understanding of how this study related to the existing body of science education research.

Literature has been discussed in chapter two relating to current research in garden based learning and place conscious education. Additional information in this chapter, in relation to the previously mentioned context, is cited and discussed as it enhances theoretical understandings of those tensions. Discussion focuses on significant literature that assists in making sense of the tensions which arose from the data. Table 6.1 displays a summary of the tensions that surfaced in relation to the guiding questions.

Table 6.1 Summary of Tensions and Research Questions to which They Relate

Tensions	1: The teacher struggled to connect two communities, that created by the local knowledge of students and that of the ag educator teaching content knowledge.	2: Learning needs to be relevant to students' lives now and to their futures.	3: Sustainability of GBL is related to the flexibility built into the project which is in contrast to the standardization trend being focused on in many of today's schools.	4: The lack of physical activity in learning experiences during the school day schedule contrasted with GBL which was a source of active learning.
Research Question 1				
Research Question 2				
Research Question 3				

Tension One: Outsider, Insider, Bridge Builder

The first tension was evident in relation to research question one: Denise struggled while trying to connect everyday knowledge of the students and the communities they are familiar with

and the ag science content she was expected to teach them. As a 21 year city resident, Denise was still an outsider to the students' community. As an outsider, determination of relevant GBL opportunities was more difficult for her as she did not possess in depth knowledge of the students' home communities. She described her outsiderness when she talked about students not wanting to get dirty and about their family names being on businesses within the city. Her positioning as an outsider was something that she constantly worked to understand and overcome.

Aikenhead (1997) argued that learning results from ever changing interactions between students, their environments, the culture of their nation, and the subculture of science and school science. Their environments included family environment, friend environments, television programs they watch, the school environment and the science classroom environment (Aikenhead, 1997). Through Denise's struggles to understand students' communities' knowledge, she and students learned from interactions as described by Aikenhead. This research of interactions between Denise and her learners' can provide directions to help students and teachers work together to effectively negotiate a third space or neutral zone where official school science information is challenged and its boundaries are pushed to include students' everyday knowledge. Garden based learning opportunities often created a third space within which students, Denise, and Wren interacted.

Geertz (1973) argued that researchers have to become engaged at a very close and personal level to learn about "foreign" cultures. Living history within students' familial generations was a place component Denise had access to only through permission of families and students. Members of a culture have to allow the researcher or in this instance, the teacher, to become close and personally engaged. Limited access kept Denise positioned as an outsider in

certain circumstances, such as understanding manners promoted at students' homes. As an outsider, she was allowed to "look" in to students' communities and then apply what she found to the learning situation she was attempting to create at MMS. Returning to previously discussed types of community, kinship was not something she could achieve but community of place was a concept she obtained at least peripherally. Community of mind was a concept she was in the process of establishing throughout the semester (Tönnies, 1957). For example, as a community of mind, several students bonded together to work toward a common goal of teaching elementary students how to transplant seedlings.

Given her past connections of having worked at the botanical garden and having earned a degree at the local university, Denise was familiar with certain components of the city students inhabited but which were outside their realm of local knowledge. Through PCE, she used her insider status with the botanical garden, university and county departments to decrease barriers between MMS and these organizations with which students might not normally have positive interactions. Denise's use of her connections supported what Mitchell (2013) described as development of a community that "extends beyond the classroom, a moral, reciprocally relational connection with the surrounding community and subsequent interactions with regional, national, and global communities" (p. 7-8). In this way, while there was a tension between her status to the students' communities and that of an ag science educator, she worked to maintain a balance.

Through application of concepts of action gardening such as working to establish bonds of community, Denise strived to overcome outsider status and become a part of students' communities. In her work to overlap or work within both communities, her role might be described as that of a bridge builder similar to Cornell West's (2004) concept of prophetic

pragmatism. Mitchell (2013) described prophetic pragmatism as building on American pragmatism by promoting "individual morality, autonomy, and creativity" (p. 22). West (2004) explained prophetic pragmatism as an "attempt to keep alive the sense of alternative ways of life and struggle based on the best of the past" (p. 167). Denise focused on the healthy and positive side of GBL through its promotion of nutrition, social interactions, connection with place and students taking pride in their autonomy rather than gardening as related to a past when it was done to supplement subsistent living due to economic conditions. West (2004) used a holistic approach of including the "not-so-good" with the good in spreading his idea of pragmatism, calling it "prophetic." He described prophetic as taking it to the young people he hoped to inform with his "danceable education" (West, 2004, p. 194). Denise followed this idea of prophetic pragmatism when she took her knowledge of teaching and GBL and spread them at the personal level to each person with whom she interacted.

Tension Two: Making Learning Relevant

Related to research questions one, two, and three is a second tension: Learning needs to be relevant to students' lives now and to their futures. High stakes testing that is being pushed in schools today seems to only be related toward students' drive to go to college and not necessarily connected to what is relevant to them as eighth grade students, for example. Relevancy has been defined in many ways since the mid-twentieth century. Dewey (1956) commented on the irrelevancy of education, "From the standpoint of the child…he is unable to apply in daily life what he is learning in school" (p. 75). During the 1950's and 1960's, the focus of curriculum was to be relevant in the competition between Western societies and the Communist threat and concentrated on preparation of more scientists (Eilks, Rauch, Ralle, & Hofstein, 2013), not to students' lives. By the late 1960's and 1970's, the focus of relevancy "shifted towards helping all

pupils cope with their life worlds though an understanding of the role that science and technology plays, both in their personal lives and in society" (Stuckey, Hofstein, Mamlok-Naaman & Eilks, 2013, p. 5). Hurd (1970) called for broader context with more social and personal goals in science teaching as a way to accomplish this shift but Fensham (1976) argued that many of the context-driven curricula provided inadequate detail of social connections and consequence. In the 1980's, "direct relevance of science for students' personal lives and the societies in which they live" (Stuckey et al., 2013, p. 7) was added to suggestions of how to improve science curricula. From the 1990's until now, two approaches have been used (1) involving high school teachers in curriculum design and (2) use of socioscientific issues to address current and future associations of science and technology (Sadler, 2011).

Stuckey et al. (2013) summarized many different meanings of the term relevance, distilling them down to five categories: (1) "a synonym for student interest" (2) "meaningful for understanding contexts connected to their lives" (3) "connected to students needs," (4) "used in the sense of real-life effects for individuals and society" and (5)" multi-dimensional and applied as a combination of" the previous four categories (p. 12-13). These researchers then proposed a definition of relevance as inclusive of individual, societal, and vocational dimensions "as well as present-future and intrinsic-extrinsic components" (p. 19). An illustration of their model is provided in Figure 6.1.

Stuckey et al. (2013) argued that science learning becomes relevant when learning has "(positive) consequences for the student's life" (p. 19). They further specified that "positive consequences can include: Fulfilling actual needs related to a student's personal interest or educational demands (of which learners are aware,) as well as the anticipation of future need (of which students are not necessarily aware)" (p.20). In their explanation, they stated, "The intrinsic

dimensions encompass student's interests and motives; the extrinsic dimension covers ethically justified expectations of one's personal environment and by the society in which they operate and live" (p.20). At MMS, an example of the intrinsic component for Nino would be his drive to become a professional basketball player while an example of external component would be working toward good grades to please his grandmother. Both of these examples contributed to how Nino perceived relevancy in the ag science curriculum.

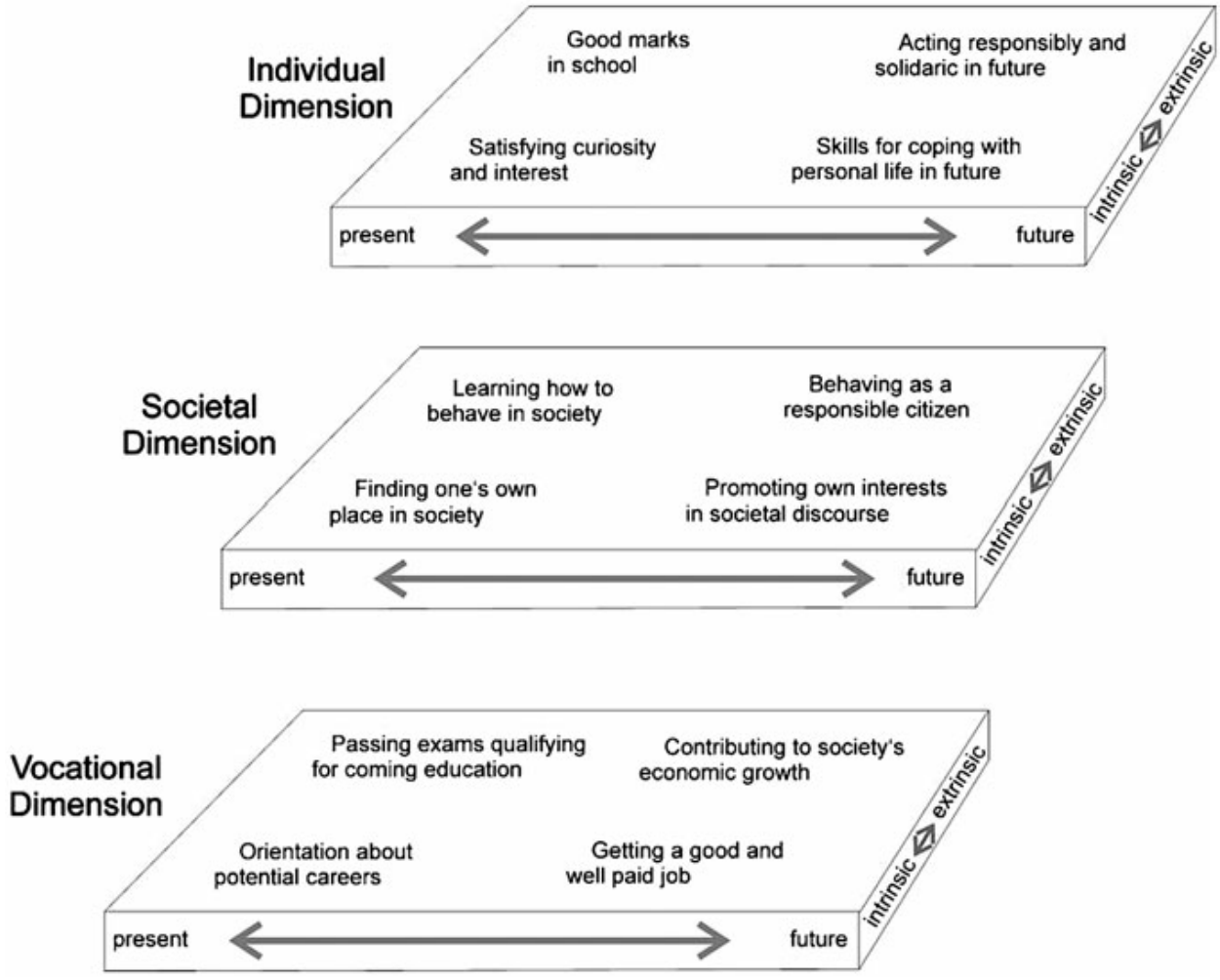

Figure 6.1 Stuckey et al.'s (2013) model of the three dimensions of relevance

Stuckey et al. (2013) completed their definition of relevance with an explanation of the three different dimensions:

> "individual, societal and vocational. For science teaching, this means that relevant education must contribute to pupils' intellectual skill development, promote learner competency for current and future societal participation and address learners' vocational awareness and understanding of career chances. Each of the three dimensions encompasses a spectrum of present and future aspects" (p.20).

Again, with Nino serving as an example, one of his present individual dimensions included enjoyment of being outside. A future individual dimension coincided with his future vocational dimension in that his grandmother was teaching him to cook and he enjoyed it so much that he wanted to become a professional basketball player in order to make enough money to go to culinary school. With those dimensions in mind, ag science could be relevant to him by teaching him about healthy soil conditions for growing his own vegetables for cooking and by teaching him physics concepts through tool use in an outdoor environment.

Stuckey et al. (2013) explained that the dimensions of relevance may vary during a learners' lifetime with the individual dimension being more significant in early years and vocational more important as students get closer to beginning careers beyond school. One suggestion I have to improve Stuckey's model is to draw the three dimensions in different sizes to represent how they relate to student's lives in varying amounts as affected by changes in age. For the eighth grade students in my study, I noticed a preoccupation with societal and individual dimensions. For example, they took a lot of pictures of themselves and each other while posing in front of their reflections in the windows and a lot of their individual off-task discussions revolved around what other students said. I referred to this in chapter four when I described

Janice and Kassandra joking about who Kassandra was dating and when I described the students dancing while watching their reflections. When I specifically asked students about their futures, they knew school was important because it would help them get a job. As if they had said, "We do not have to worry about getting a job now," *later* was a key component in their answers. Therefore, for them I would draw the vocational smaller than individual and societal dimensions. Within this class of eighth graders, the dimensions would differ as well. Stuckey et al. (2013) referred to my concern about different sizes to represent the dimensions when they recommended a balance of a combination of the three.

Several factors were described as inhibitive of effective implementation of the relevancy dimensions when Stuckey et al., (2013) stated, "Teachers quite often teach purely scientific concepts using a content-structure-driven, teacher-centered approach while tending to omit or diminish any student-centred strategies for teaching the relevant societal aspects" (p. 25). While many countries have greatly reduced societal dimensions in the curriculum, Denise's enactment of action gardening promoted societal dimensions through donation of extra produce to local food banks, sending it home with students, and encouraging family involvement in class and weekend activities.

Teacher's personal beliefs influence how they behave and make decisions about their classrooms and because they have often been taught traditionally, they may continue to perpetuate these practices (Stuckey et al., 2013). These personal beliefs affect student assessment, using traditional, concept-oriented, externally graded tests that do not support the goals, pedagogical approaches and contents associated with societal and vocational dimensions. Assessment is not likely to change soon because it is influenced by universities and centralized examination boards. Ag science classes, unlike sciences of biology, physics and chemistry, does

not have standardized testing in place so Denise was not constrained by the above mentioned expectations and constraints associated with high stakes assessments. Her efforts were supported by the local community and they have seen results through the weekly produce sales, newspaper reports, and their own interactions with Denise, her students, and the school environment (i.e. posters in hallways, the garden and greenhouse visible from the parking lot where students are picked up and dropped off, garden tours during open house). Through real-time, real life formative assessments, decisions were made by Denise, students, community members, and university contacts to support new and continuing GBL projects. In this context, assessment and GBL curriculum were both relevant.

Stuckey et al. (2013) recognized that there are diverse curriculum-related orientations available that can be "easily implemented with different objectives in mind…however, [they] do have different strengths and weaknesses in terms of the contribution they can make to the dimensions of 'relevance' stipulated" (p. 26). I would also argue that students even within the same grade may be at a place where different dimensions are significant to them compared to their classmates so the key rests in the teacher's ability and willingness to flexibly apply relevancy to the curriculum for the students of any one class. Students at MMS demonstrated a variety of interests, abilities and backgrounds and Denise arranged her curriculum to address these areas of student diversity through the planning and design of often changing GBL activities. Denise had the freedom to choose from a large group of appropriate topics which made it easier to find applicable ways of teaching in ways relevant to students' lives. The range of scientific applications in the content of this ag science class included animal husbandry, crop production, genetics, land maintenance, ecology, wildlife management and health sciences

Her willingness to adapt daily lessons to students' needs and to their present and future at societal, individual and vocational levels resulted in GBL as having the potential to be relevant to every student.

While at first glance it may seem that the vocational dimension illustrated in Stuckey et al's (2013) diagram does not fit in my argument for its use in discussion of relevancy with these students at MMS, it does. The suggestions in the model were introduced throughout the semester as Denise sprinkled them into "starters" and in her methods of wrapping up each class. Suggestions were made toward potential careers, contributing to society, and going to college. As shown in chapter four and five, students were beginning to discuss career choices but the significance of individual and societal dimensions were more relevant to them and were included more as Denise attempted to make her curriculum relevant. Concepts in Stuckey et al.'s (2013) model of relevancy interact constantly in people's minds and result in decisions about what is relevant to learn at this time to a particular person. This finding adds to literature that promotes the significance of relevancy in education to students' lives. The flexibility of GBL creates a tension when juxtaposed alongside high stakes assessments. In this study, flexibility was a key to supporting relevancy in science education.

Tension Three: Flexibility Leads to Successful Garden Based Learning Curriculum

The third tension is most closely related to research question three which is: Sustainability of GBL is related to the flexibility built into the project which is in contrast to the standardization trend being focused on in many of today's schools. The standardization trend emphasizes specific topics to be taught by subject and grade culminating in high stakes testing affecting federal financial support for the school (Welton & Williams, 2015). Marx and Harris expressed their concern about standardization of science instruction in 2006:

> "its emphasis on scientific thinking and reasoning skills in the context of meaningful real-world investigations will become a kind of 'upper-class science' available primarily to students in high-performing schools and districts and less common in schools that serve poor and minority students" (p. 471).

Their concern about standardized curriculum's affect on what gets taught was supported by Welton and Williams (2015) in their critical ethnography of a high minority, high poverty high school in Texas. Borgerding, Klein, Ghosh and Eibel (2015) found that whether or not evolution was taught by the pre-service teachers in their study was influenced by state standards. If a concept was not required by the standards, 2 out of 3 participants did not include it in their teaching. Fortunately, the ag science program is not reliant on federal funds for its support and only district standardized tests were administered.

Flexibility of what GBL involves contributes to it being able to be used in any school setting. At MMS, many projects were ongoing but any one of them could be chosen if space was a constraint in a class doing GBL. Flexibility in how space is used for GBL is similar to how it can involve a wide variety of students. GBL applies to all students including youth from nondominant groups who have extra challenges of language and epistemological barriers in addition to ordinary life problems that come with maturing. Integrating some of students' local knowledge can reduce some of these challenges. Students at MMS experienced support through the enactment of the theory of action gardening which promotes democratic education and values learners' contributions.

Flexibility was apparent through the involvement of students in the development of GBL projects which also promotes tenets of the theory of action gardening such as youth action, democratic learning, and decision making skills. For example, Denise's students were included

in designing what was done during GBL when they decided how to adapt their previous sink stand design for a different sink. They participated in democratic learning with back-and-forth verbal discussions of how to accomplish their designs. By being adaptable to learners' interests and abilities, GBL can accommodate any class, including those outside of ag science.

The ag science program at MMS is large compared to some school gardens indicated in the literature but it is small compared to Loutet Farm in Vancouver, British Columbia (Kurnicki, 2015). The Loutet Farm can be seen as a goal to strive for in GBL and PCE not because of its size but more because of its ability to unite city residents, policy makers, local school boards, First Nations, municipalities and Vancouver Coastal Health in a common goal. The Loutet Farm's organization is similar to but on a larger scale of community involvement at MMS.

Tension Four: Physical Movement and Learning

Tension four is evident in relation to research question 1 and 2 and is: The lack of physical activity in learning experiences during the school day schedule contrasted with GBL as a source of active learning. With childhood obesity listed as one of the United States greatest current health challenges, Wang et al. (2015) investigated behavioral risk factors of diet, physical activity, and television watching time between 6,796 children in grades 1 through 12, comparing students by income levels, age, gender, and ethnicity. They found that at the high school level, students exercised significantly more during the summer breaks. As age increased from first to twelfth grades, physical activity decreased by an average of 8.2 minutes per day per year and "overall level of MVPA[moderate-to-vigorous physical activity] dropped well under the recommended amount in all students after elementary level" (p. 461). Barrett et al. (2015) proposed a plan to increase actual time spent doing moderate to vigorous physical activity in physical education class in elementary schools, estimating Body Mass Index could be reduced

within 2 years. The potential reduction in health care to the simulated cohort of 6 to 11 year olds in their study would be $60.5 million dollars over 10 years though the policy would cost $235 million. These studies show recognition that American children do not regularly get the recommended physical activity levels.

In addition to the physical health benefits of exercise, physiological experiments support connections between learning and activity. For example, Glenberg (2010) argued that mirror neuron systems responded more to actions performed by the person than to actions the perceiver is familiar with but not performing, meaning students "learn better" when they are doing activity than when they are not physically engaged. Mirror neuron systems (MNS) are groups of neurons that work together in response to stimulation to produce muscle movement that results in copying an action the participant is seeing being done. In Rizzolatti and Craighero's (2004) research, MNS were found to be more sensitive to social actions than to nonsocial actions and responded both to visually perceived and to linguistic descriptions of actions. They proposed, "Action meaning seems not only necessary but also highly relevant for language" (, p. 581). Many researchers note the importance of action in promoting learning of the language of science and their work undermines the notion that perception and action are completely separate from thinking and logic (Avraamidou & Osborne, 2009; Claxton, 2012). In other words, students learn better when they move.

Despite the support in research of the significance of physical activity in learning, incentive days or physical education class were the only times scheduled for physical movement in the structure of the school day at MMS, except for ag science classes. In contrast to the sedentary nature of the school day, Denise's GBL curriculum provided many tasks every class period for at least 30 minutes that resulted in students physically moving while involved in

science learning. Marjorie O'Loughlin (2006) argued, "…our bodies and minds are in ceaseless interaction with the environment…Each of us 'receives the world around us through eyes, ears, nose, hands, and the skin which covers all of our body…" (p. 40). Denise intentionally planned tasks where students participated through action and sensory engagement in all stages of gardening, such as collecting compost, spreading it on the garden, weeding, planting seeds, transplanting seedlings, watering, harvesting, preparing, eating and serving. How much movement and sensory information was performed depended on the student. Students' bodies and minds learned together as they participated in ag science class. All GBL tasks included the potential of physical activity *and* science content learning. It is this potential which is a result of the flexibility of GBL described as tension three.

The tensions described above seemed to evolve from conflict or separation between ideals held at school and home for students. As Denise struggled to connect the systems of knowledge in place from both situations, she worked to form a bridge for student learning. Knowing about their lives and histories outside of the school environment benefitted Denise by enabling her to make lessons more relevant to everyone's lives which were especially influenced by the flexibility of GBL. In addition, flexibility of the ag science curriculum contrasted with "core" classes which were under the influence of the trend of high stakes testing and contributed to the "action" found every day in Denise and her students' learning environment.

Building a Bridge: Place Conscious Education and the Theory of Action Gardening

Place conscious education was evident in all themes discussed in chapter five beginning with a sense of community in theme one, learning in the local environment in theme two, continuing with active engagement in the learning process in theme three, building to learners becoming teachers in theme four, and finally in theme five working together to accomplish

bigger goals. Every day in Denise's ag science class brought experiences that connected PCE with the theory of action gardening whether it was community involvement in the school through providing opportunities to work toward students' required SAE time or participating in class activities like setting up the fish tank. More specifically, place as difference was seen in many instances throughout this study.

Karrow and Fazio (2010) described how place can be perceived differently based on economic, gender, social, historical and other forces. An example of social difference related to place within community was shown during an interview with Nino and Summer when they described manners they were expected to use when they were with family members compared to when they were in Denise's class. They also noted that people from the north of the school interacted differently within the community than they had been taught, coming from an area that was south. They saw this as a defining characteristic of manners based on where a person lived.

An economic source of place as difference was found in the community surrounding the school with a higher prevalence of single family dwellings found north of MMS and government assisted housing to the south. Students were familiar with this difference and how it impacted which school was attended as noted during a conversation overheard between two students one of which asked why a certain classmate was still at MMS when his parents clearly had money to send him to a better school. The second student answered was that their classmate was not smart enough to score high enough on a certain test to go to a different school to which his parents could afford to send him. Denise mentioned this perceived difference in city educational opportunities during an informal interview when she said the superintendent ended the practice of caretakers sending their children to schools outside of their neighborhoods when he stopped the busses responsible for this transport.

Place as difference was found within the school as Denise and I walked past and glanced in other classrooms where students quietly sat at desks writing and listening to the teacher at the front of the room. In contrast, the ag science class was a place of learning in motion and through degrees of social interaction. Even within ag science class, students had different experiences as shown by the description of one student working individually while breaking up dirt for a future herb garden with a pickaxe and other students working in groups to build the sink stands. Their experiences depended on Denise's curriculum for the day but the flexibility built into the activities allowed for learning as a social or individual activity.

These place as difference examples emphasize the importance that the theory of action gardening played in support of GBL during this ag science class. Students were at school learning science, practicing decision making, participating in reciprocal relationships with the garden, caring for each other and Denise, and were learning to participate in democratic educational opportunities, all components of the theory of action gardening. Dewey (1903) stated, "Democracy means freeing intelligence for independent effectiveness" (p. 193). He continued, "Just because education is the most personal, the most intimate of all human affairs, there, more than anywhere else, the sole ultimate and final source of power are in the training, care and intelligence of the individual" (p. 198) and further stated, "To subject mind to an outside and ready-made material is a denial of the ideal of democracy which roots itself ultimately in the principal of moral, self-directing individuality" (p. 199). Democratic education, as a part of the theory of action gardening, included students' involvement in the curriculum, practicing autonomy, having choices in what they participated in during class, and negotiating responsibilities. As an example of students and curriculum involvement, Denise allowed students to choose which tasks they participated in during most classes. Students were included in

choosing roles in their education during discussions between Denise and each individual or between students as they worked together on projects. This discussion was often a negotiation between students as to which role they wanted that day or at that time because sometimes they switched places even during one class period. Sometimes it was a discussion of responsibility between student and adult such as when one asked to keep the work gloves used during class and Wren allowed it on condition he return them during the next class meeting. Student autonomy has been described through examples of spreading their knowledge of planting to first graders and beginning to work on a building project that required working together to saw and assemble it with minimal adult supervision.

In trying to explain how PCE and the theory of action gardening relate to each other in this study, they are so interrelated it is difficult if not impossible to differentiate between them. Instead, they fit together like a jigsaw puzzle and form a more complete picture of learning in the context of this ag science class. Perhaps the best way to describe the interconnectedness found in this study is that the theory of action gardening and PCE as enacted by Denise work together forming a bridge between places of school and community. For example, Summer said she hated school but said she had to graduate to get a job. She said she would rather be at home than at "boring" school. In contrast, home was described affectionately by several students with references to family members and friends involved in interactive activities and supporting students' interests. When participants were asked about their family life, they mentioned active engagement in learning such as Sierra making breakfast with her sister and going to the farmer's market with her mother. The disinterest in school described by Summer and the positive association with community demonstrates a need for a bridge between school and home.

Participation in GBL at school provided a bridge between school and home through the similarly active, supportive, and relevant learning environment it provided.

Implications of Findings Related to Research in Science Education

This study at MMS provided a glimpse into what is being done at one school in one city. It contributes to the literature, adding middle school student input about why being outside, interacting with peers, and working in a garden was important to them. Possible implications for future research include:

- A longitudinal multicase study of the same students into their high school years
- A longitudinal case study of the teacher's changing enactment of the theory of action gardening
- Crosscase analysis of the enactment of action gardening in other middle schools in rural areas
- Ethnographic case studies of students' communities as promotion of students as researchers and of community involvement.

Further research could investigate what happens next for these students as they continue into high school classes. Longitudinal case studies could explore whether action gardening continues to be a part of the way they experience life as far as ongoing relationships with garden based projects such as planting, harvesting and cooking or if they make even further social connections by promoting gardens within their neighborhoods. Each student could become his or her own case in a multicase study bounded by their experiences as they see them supported by or in contrast to tenets of action gardening. Denise's continued use of the theory of action gardening over time would make another interesting longitudinal case study.

A different approach for research in science education would be to explore other middle schools as they establish their own versions of the enactment of action gardening. To contribute to middle school science education research, studies could be conducted at other middle schools in the same area of the country but in rural schools and these could be compared with MMS in a cross case analysis to reveal more details about the cases such as community interactions with the school gardens or how whole school engagement is attempted or how place is incorporated as part of the learning experience.

Another direction for future research could be an ethnographic case study involving students' communities. Students could be involved in the study as researchers by conducting interviews with family and community members. The study would provide more information about local views on the GBL that is being undertaken at MMS and could provide a sense of accomplishment for students as neophyte science and community researchers. The study could include oral histories and old photographs as data sources similar to the Foxfire studies of the 1970's. Students would serve as researchers while finding out more about their family connections to "this place." This study could lead to more relevant GBL projects and family involvement in the ag science program, contributing to further student engagement in the science concepts of their education.

Implications for Practice in Teaching Science at the Middle School Level

Implications for practice based on this study include:

- Creating a flexible plan before beginning to enact GBL,
- Development of a support system plan for teachers,
- Promoting community involvement as a way of increasing student engagement, delegating responsibility and embracing diversity of the community.

Putting a flexible plan in place at the beginning of the year that details what and where the garden will be grown, where supplies will come from, when crops will rotate and what to do when something does not grow will help support the program's success from the early stages of implementation. Another component of plan flexibility is related to the school location. Location affects what can be grown, the duration of the growing season, whether a greenhouse is needed, if container gardening is the best option, and if availability water will be an issue. Flexibility is a key idea to GBL because it is experimental by design. Sometimes plants will not grow, for example, which may be perceived as a failure but with flexibility in mind, it can instead be treated as a learning experience. Other potential learning experiences which could be included in the curriculum as problems to be solved are: Pollution, pests, soil condition, weather, and finding space. A flexible plan contributes to the sustainability of GBL programs.

Teachers need support to do a GBL program like what is in place at MMS. Denise has a VISTA worker, contributions of knowledge and labor from the local university, student and parent volunteers, a positive principal and school environment, and a supportive community. This points to the importance of establishing a sustainability plan when GBL is proposed. Besides the previously mentioned components related to the science of plant growth and food production, an outline of responsibilities of the ag science teacher, where additional labor will come from, where supplies will come from, and a planting guide for the year based on growing season, teaching experience and expected available labor and material are other important considerations. As this research has shown, GBL can have some real rewards in student autonomy and community involvement in the school but it can be a time and resource consuming endeavor if adequate planning has not been done.

To support a program of GBL like the one at MMS, the school needs to be promoted as a place of learning where people want to spend time. Community involvement could be supported through research about students' local knowledge to provide ways of working around the perceived "inferior" use of time and dirtiness of gardening. As shown through students' excitement to share their pride in their grandmothers' cooking skills, there is a connection between their home life and gardening. Parents and grandparents can be great sources of information regarding the family history of gardening and may be able to contribute their knowledge to the class. This involvement of family members could result in increased student engagement as they interact at school, learning from each other and providing further support of the significance of their value as a community that involves the school and science learning. Asking grandparents, as respected members of their communities, to be part of the classroom culture at times would be a way of emphasizing the significance of their knowledge to their grandchildren's education. Inclusion of grandparents' skills could be a way of reminding students' caretakers of pride in growing healthy food for families rather than considering gardening as a dirty or menial job. Consideration of the history of the place they live could promote community and students' embracement of diverse funds of knowledge.

Conclusion

One African American doctoral student voiced her concern upon hearing about my study, suggesting that GBL was merely perpetuating the skills necessary for manual labor under a different name within a school largely populated by minority students. Voicing my appreciation for her question and concern, I described how all encompassing GBL can be as students learn how to measure soil pH, identify animals and microbes that promote healthy soil which leads to healthy plants and healthy humans, and develop physical, social, and emotional connections to

the natural world supported by time spent together outdoors in the garden. I see gardening and ag science as a combination of all science and as contributing to every aspect of healthier happier living for the present and future communities involved with it.

Students inhabit and imagine multiple worlds. Research shows that disengagement from school is an ongoing problem (McInerney et al., 2011; Schultz, 1996). I began this dissertation by referring to my own disconnect as a student from learning experiences in school from those I participated in with my community and family. I see the value now in making those connections with students and as an educator, plan to listen to and join with students to construct an education that gives them resources for their futures as the quote that began this chapter implored. Like the students, I loved the opportunities that came with being OUTSIDE and look forward to learning more about “throwing it down.” As Summer said, “It just bring joy.”

REFERENCES

AERA. (n.d). American Educational Research Association. Retrieved from http://www.aera.net/tabid/10208/Default.aspx

Aikenhead, G. (1997). Toward a First Nations cross-cultural science and technology curriculum. *Science Education, 81*, 217-238.

Avery, L. M., & Kassam, K.-A. (2011). Phronesis: Children's local rural knowledge of science and engineering. *Journal of Research in Rural Education, 26*(2), 1-18.

Avraamidou, L., & Osborne, J. (2009). The role of narrative in communicating science. *International Journal of Science Education, 31*(12), 1683-1707. doi:10.1080/09500690802380695

Azano, A. (2011). The possibility of place: One teacher's use of place-based instruction for English students in a rural high school. *Journal of Research in Rural Education,26*(10)

Bailey, L. H. (1895). Horticulture at Cornell. *Science, 2*, 831-839. doi:10.1126/science.2.51.831

Barrett, J. L., Gortmaker, S. L., Long, M. W., Ward, Z. J., Resch, S. C., Moodie, M. L., . . . Cradock, A. L. (2015). Cost effectiveness of an elementary school active physical education policy. *American Journal of Preventive Medicine, 49*(1), 148-159. doi:10.1016/j.amepre.2015.02.005

Blair, D. (2009). The child in the garden: An evaluative review of the benefits of school gardening. *Journal of Environmental Education, 40*(2), 15-38.

Block, B. A., & Weatherford, G. M. (2013). Embodied identities: Using kinesiology programming methods to diminish the hegemony of the normal. *Quest , 65*(1), 31-43. doi:10.1080/00336297.2012.727370

Bobbitt, F. (1918). *The curriculum*. Boston: Houghton Mifflin.

Borgerding, L., Klein, V., Ghosh, R., & Eibel, A. (2015). Student teachers' approaches to teaching biological evolution. *Journal of Science Teacher Education, 26*(4), 371.

Bowker, R., & Tearle, P. (2007). Gardening as a learning environment: A study of children's perceptions and understanding of school gardens as part of an international project. *Learning Environments Research, 10*(2), 83-100. doi:10.1007/s10984-007-9025-0

Bresler, L. (Ed.). (2004). Knowing bodies, moving minds: Toward embodied teaching and learning. Boston: Kluwer Academic Publishers.

Britton, S. A. (2011). *Citizen science as a framework for secondary science teacher preparation. [electronic resource] : A hermeneutic ethnography* (PhD). Available from U of Georgia Catalog. (gua3929455).

Buxton, C. A. (2010). Social problem solving through science: An approach to critical, place-based, science teaching and learning. *Equity & Excellence in Education, 43*(1), 120-135.

Calkin, J. B. (2005). *An arts-based narrative inquiry into co-planning and teaching elementary science using the visual arts [electronic resource]*. (PhD, University of Georgia). (Internet Resource Copy location:). Retrieved from U of Georgia Catalog. (gua3237085).

Cater, M., Fox, J., & Fletcher Jr., B. (2012). Louisiana 4-H seeds of service school gardens: A descriptive view. *Journal of Extension*, *50*(4), 17-17.

CFED history and highlights. (2014). *In Corporation for enterprise development.* Retrieved from http://cfed.org/about/purpose/history_highlights/

Charmaz, K. (2014). *Constructing grounded theory* London ; Thousand Oaks, Calif. : Sage, c2014; 2nd ed.

Coakley, J. (2009). *Sports in Society: Issues and controversies* (10th ed.). New York, NY: McGraw Hill.

Comstock, A. B. (1939). *Handbook of nature study (24th edition).* Ithaca : Cornell University Press.

Counts, G. S. (1932). *Dare the school build a new social order?* New York: The John Day Company.

Cronin, P., Ryan, F., & Coughlan, M. (2008). Undertaking a literature review: A step-by-step approach.*British Journal of Nursing, 17*(1), 38-43.

Cutter-Mackenzie, A. (2009). Multicultural school gardens: Creating engaging garden spaces in learning about language, culture, and environment. *Canadian Journal of Environmental Education, 14,* 122-135.

Dewey, J. (1897) My Pedagogic Creed. *School Journal, 54*, 77-80**.** Retrieved from http://dewey.pragmatism.org/creed.htm

Dewey, J. (1903). Democracy in Education. *The Elementary School Teacher, 4*,(4) 193-204. Stable URL: http://www.jstor.org/stable/992653 .

Dewey, J. (1916). *Dewey on education*. New York: Teachers College.

Dewey, J. (1943). *The school and society.* (Rev. ed.). Chicago, Ill.: University of Chicago press.

Dewey, J. (1956). *The child and the curriculum, and the school and society.* Chicago, IL: University of Chicago Press.

Dirks, A. E., & Orvis, K. (2005). An evaluation of the junior master gardener program in third grade classrooms. *Horttechnology, 15*(3), 443-447.

Dopico, E., & Garcia-Vazquez, E. (2011). Leaving the classroom: A didactic framework for education in environmental sciences. *Cultural Studies of Science Education, 6*(2), 311-326.

Duffy, P. B. (2014). The blended space between third and first person learning: Drama, cognition and transfer. *International Journal of Science Education, 19*(1), 89-97. doi:10.1080/13569783.2013.872428

Eick, C. J. (2012). Use of the outdoor classroom and nature-study to support science and literacy learning: A narrative case study of a third-grade classroom. *Journal of Science Teacher Education, 23*(7), 789-803.

Eilks, I., Rauch, F., Ralle, B., & Hofstein, A. (2013). How to balance the chemistry curriculum between science and society. In I. Eiks & A. Hofstein (Eds.), *Chemistry teaching-a studybook* (pp. 1-36). Rotterdam: Sense.

Emerson, R. M., Fretz, R. I., & Shaw, L. L. (2011). *Writing ethnographic fieldnotes* (2nd ed.). Chicago : The University of Chicago Press.

Eppley, K. (2011). Teaching rural place: Pre-service language and literacy students consider place-conscious literacy. *Pedagogies, 6*(2), 87-103. doi:10.1080/1554480X.2011.563495

Fensham, P. J. (1976). Social contention in chemistry courses. *Chemistry in Britain, 12,* 148-151.

Fleszar, E., & Gwardys-Szczesna, S. (2009). The school gardens in preserving biological diversity for education of sustainable development. *Bulgarian Journal of Science & Education Policy*, *3*(2), 216-232.

Flyvbjerg, B. (2006). Five misunderstandings about case-study research. *Qualitative Inquiry, 12*(2), 219-245. doi:10.1177/1077800405284363

Freeman, M., Marrais, K. d., Preissle, J., Roulston, K., & Pierre, E. A. S. (2007). Standards of evidence in qualitative research: An incitement to discourse. *Educational Researcher*, *36*(1), 25-32.

Freire, P. (2000). *Pedagogy of the oppressed / Paulo Freire ; translated by Myra Bergman Ramos; with an introduction by Donald Macedo.* New York : Continuum.

Fusco, D. (2001). Creating relevant science through urban planning and gardening. *Journal of Research in Science Teaching, 38*(8), 860-877.

Garoian, C., & Gaudelius, Y. (2007). Performing embodiment: Pedagogical intersections of art, technology and the boyd. In S. Springgay & D. Freedman (Eds.), *Curriculum and the cultural body* (pp. 3-20). New York: Peter Lang.

Garrison, P. (1991). *Augury* Athens : University of Georgia Press.

Geertz, C. (1973). *The interpretations of cultures.* New York: Basic Books.

Georgia Department of Education. (2014). *Middle school performance standards: Middle schools Georgia career, technical and agricultural education*. Retrieved on May 30, 2014, from http://www.gadoe.org/Curriculum-Instruction-and-Assessment/CTAE/Pages/Middle-School-Performance-Standards.aspx

Georgia Standards Agriculture. (2013). *Georgia Standards.org*. Retrieved from https://www.georgiastandards.org/standards/Georgia%20Performance%20Standards%20CTAE/Agriculture_8th_grade.pdf

Graham, H., Beall, D. L., Lussier, M., McLaughlin, P., & Zidenberg-Cherr, S. (2005). Use of school gardens in academic instruction. *Journal of Nutrition Education and Behavior, 37*(3), 147-151. doi:http://dx.doi.org.proxy-remote.galib.uga.edu/10.1016/S1499-4046(06)60269-8

Green, M. (2008). From wilderness to the educational heart: A tasmanian story of place. *Australian Journal of Environmental Education, 24*, 35-43.

Green, M. (2012). Place, sustainability and literacy in environmental education: Frameworks for teaching and learning. *Review of International Geographical Education Online, 2*(3), 326-346.

Gruenewald, D. A. (2003). Foundations of place: A multidisciplinary framework for place-conscious education. *American Educational Research Journal, 40*(3), 619-654.

Gruenewald, D. A. (2008). The best of both worlds: A critical pedagogy of place. *Environmental Education Research, 14*(3), 308-324. doi:10.1080/13504620802193572

Gruenewald, D. A., & Smith, G. A. (Eds.). (2008). *Place-based education in the global age : Local diversity*. New York: NY: Lawrence Erlbaum Associates.

Halilovich, H. (2014). Behind the emic lines: Ethics and politics of insiders' ethnography. In L. Voloder & L. Kirpitchenko (Eds.), *Insider research on migration and mobility: International perspectives on researcher positioning* (pp. 87-102). Burlington, VT: Ashgate Publishing Company.

Hammond, L., & Brandt, C. (2004). Science and cultural process: Defining an anthropological approach to science education. *Studies in Science Education, 40*(1), 1-47.

Hammond, L. (2001). Notes from california: An anthropological approach to urban science education for language minority families. *Journal of Research in Science Teaching, 38*(9), 983.

Hancock, D. R., & Algozzine, R. (2006). *Doing case study research : A practical guide for beginning researchers*. New York, NY: Teachers College Press.

Handa, V., & Tippins, D. (2013). Tensions in the third space: Locating relevancy in preservice science teacher preparation. *International Journal of Science & Mathematics Education, 11*(1), 237-265. doi:10.1007/s10763-012-9364-x

Hurd, P. D. (1970). Scientific enlightenment for an age of science. *The Science Teacher, 37,* 13-16.

Isogai, A. D., McCarthy, D. D., Karagatzides, J. D., Vandenberg, S., Gardner, H., Edwards, V., . . . Tsuji, L. J. S. (2012). The collaborative-geomatics informatics tool: Engaging youth using place-based education.*International Journal of Technology, Knowledge & Society, 8*(1), 131-142.

Jackman, W. S. (1907). Opportunity to found a model school. *Elementary School Teacher, 7,* 297-302.

Karrow, D. & Fazio, X. (2010). Educating-within-place: Care, citizen science, and ecojustice. In D. J. Tippins, M. P. Mueller, M. van Eijck & J. D. Adams (Eds.), *Cultural studies and environmentalism* (pp. 193-214). Netherlands: Springer Science. doi:10.1007/978-90-481-3929-3_16

Kelley, S. S., & Williams, D. R. (2013, May). Teacher professional learning communities for sustainability: Supporting STEM in learning gardens in low-income schools. *Journal of Sustainability Education, ,* 327-345.

Kilpatrick, W. H. (1937). Future of education in America and for America. *Vital Speeches of the Day, 3,* 706-708.

Kirby, T. (2008). A garden of learning. *Science & Children, 45*(9), 28-31.

Klemmer, C., Waliczek, T., & Zajicek, J. (2005a). Development of a science achievement evaluation instrument for a school garden program. *Horttechnology, 15*(3), 433-438.

Klemmer, C. D., Waliczek, T. M., & Zajicek, J. M. (2005b). Growing minds: The effect of a school gardening program on the science achievement of elementary students. *Horttechnology, 15*(3), 448-452.

Kurnicki, A. (2015). City park: City farm. *Landscapes/paysages, 17*(2), 52-53.

Lapum, J., Angus, J. E., Peter, E., & Watt-Watson, J. (2010). Patients' narrative accounts of open-heart surgery and recovery: Authorial voice of technology. *Social Science & Medicine, 70,* 754-762. doi:10.1016/j.socscimed.2009.11.021

Lee, O. & Buxton, C. A. (2010). *Diversity and equity in science education: Research policy and practice.* Teachers College Press: New York, NY.

Lindgren, R. & Johnson-Glenberg, M. (2013). Emboldened by embodiment: Six precepts on embodied learning and mixed reality. *Educational Researcher, 42,* 445-452. doi: 10.3102/0013189X13511661

Lim, M. (2010). Historical consideration of place: Inviting multiple histories and narratives in place-based education. *Cultural Studies of Science Education, 5*(4), 899-909.

Lim, M., & Barton, A. C. (2010). Exploring insideness in urban children's sense of place. *Journal of Environmental Psychology, 30*(3), 328-337. doi:http://dx.doi.org.proxy-remote.galib.uga.edu/10.1016/j.jenvp.2010.03.002

Lincoln, Y. S., & Guba, E. G. (1986). But is it rigorous? trustworthiness and authenticity in naturalistic evaluation. *New Directions for Program Evaluation, 1986*(30), 73-84

MacDonald, B. (1971). The evaluation of the Humanities Curriculum Project: A holistic approach. *Theory in practice*, *10*(3), 163-167.

Marx, R. W., & Harris, C. J. (2006). No child left behind and science education: Opportunities, challenges, and risks. *The Elementary School Journal*, *106*(5), 467-477. doi:10.1086/505441

Maxwell, J. A.,. (1996). *Qualitative research design : An interactive approach*. Thousand Oaks, Calif.: Sage Publications.

McInerney, P., Smyth, J., & Down, B. (2011). "Coming to a 'place' near you?" the politics and possibilities of a critical pedagogy of place-based education. *Asia-Pacific Journal of Teacher Education*, *39*(1), 3-16.

Miller, B. G., Hougham, R. J., & Eitel, K. B. (2013). The practical enactment of adventure learning: Where will you AL@? *TechTrends: Linking Research & Practice to Improve Learning, 57*(4), 28-33. doi:10.1007/s11528-013-0674-9

Miller, C. (2003). In the sweat of our brow: Citizenship in american domestic practice during WWII—Victory gardens. *Journal of American Culture, 26*(3), 395-409. doi:10.1111/1542-734X.00100

Mitchell, D. N. B. (2013). *Action gardening: Sowing seeds of change through cornel west's prophetic pragmatism in science education* (Doctoral dissertation). Retrieved from U of Georgia Catalog. (gua4135499).

NSTA. (2015). National Science Teacher Association website. Retrieved from http://www.nsta.org/search.aspx?cx=000595497003495966486:w02godv4_pe&cof=FORID:11&q=garden

O'Loughlin, M. (2006). *Embodiment and education: Exploring creatural existence.* Dordrecht: Springer.

Pascoe, J., & Wyatt-Smith, C. (2013). Curriculum literacies and the school garden. *Literacy Learning: The Middle Years, 21*(1), 34-47.

Peacock, A., & Pratt, N. (2011). How young people respond to learning spaces outside school: A sociocultural perspective. *Learning Environments Research, 14*(1), 11-24. doi:10.1007/s10984-011-9081-3

Piersol, L. (2010). Tracking self into place. *Canadian Journal of Environmental Education, 15*, 198-209

Pigg, A. E., Zajicek, J. M., & Waliczek, T. M. (2006). Effects of a gardening program on the academic progress of third, fourth, and fifth grade math and science students. *Horttechnology, 16*(2), 262-264.

Pugh, K. J., & Girod, M. (2007). Science, art, and experience: Constructing a science pedagogy from Dewey's aesthetics. *Journal of Science Teacher Education, 18*(1), 9.

Radley, A., & Chamberlain, K. (2012). The study of the case: Conceptualising case study research the study of the case: Conceptualising case study research. *Journal of Community & Applied Social Psychology, 22*(5), 390-399. doi:10.1002/casp.1106

Resor, C. W. (2010). Place-based education: What is its place in the social studies classroom? *Social Studies, 101*(5), 185-188. doi:10.1080/00377990903493853

Rizzolatti, G., & Craighero, L. (2004). The mirror-neuron system. *Annual Review of Neuroscience, 27*, 169-192.

Root, E. (2010). This land is our land? This land is your land: The decolonizing journeys of white outdoor environmental educators. *Canadian Journal of Environmental Education, 15*, 103-119.

Roulston, K. (2010). *Reflective interviewing: A Guide to theory & practice.* Thousand Oaks, CA: Sage.

Rudolph, H. (2014, September). *Learning place: A Northwesterner's move to the Deep South.* Synopsis of paper presented at Southeastern Association of Science Teacher Education in Savannah, GA.

Rudolph, H. (2009). Why I live here. In L. Craig (Ed.), *A sense of place: An eastern Oregon anthology* (pp. 122-124). Moro, OR: Libraries of eastern Oregon.

Rudolph, J. L. (2002). *Scientists in the classroom : The cold war reconstruction of American science education.* New York : Palgave.

Ruiz-Gallardo, J., Verde, A., & Valdés, A. (2013). Garden-based learning: An experience with "At risk" secondary education students. *Journal of Environmental Education*,*44*(4), 252-270. doi:10.1080/00958964.2013.786669

Rye, J. A., Selmer, S. J., Pennington, S., Vanhorn, L., Fox, S., & Kane, S. (2012). Elementary school garden programs enhance science education for all learners. *Teaching Exceptional Children, 44*(6), 58-65.

Sadler, T. D. (2011). *Socio-scientific issues in the classroom.* Dordrecht: Springer.

Schultz, K. (1996). Between School and Work: The Literacies of Urban Adolescent Females. *Anthropology & Education Quarterly, 27*(4), 517-544.

Schwandt, T. A. (2007).*The SAGE dictionary of qualitative inquiry (3rd ed.).* Thousand Oaks, Calif.: Sage Publications.

Schwandt, T. A., Lincoln, Y. S., & Guba, E. G. (2007). Judging interpretations: But is it rigorous? trustworthiness and authenticity in naturalistic evaluation. *New Directions for Evaluation,* (114), 11-25. doi:10.1002/ev.223

Semken, S. & Brandt, E. (2010). Implications of sense of place and place-based education for ecological integrity and cultural sustainability in diverse places. In D. J. Tippins, M. P. Mueller, M. van Eijck & J. D. Adams (Eds.), *Cultural studies and environmentalism* (pp. 287-302). Netherlands: Springer Science. doi:10.1007/978-90-481-3929-3_24

Sergiovanni, T. J. (1993). Organizations or communities? Changing the metaphor changes the theory. *Presented at the Annual Meeting of the American Educational Research Association.* Atlanta, GA.

Simons, H. (2009). *Case study research in practice.* Thousand Oaks, Calif.: Sage Publications.

Skinner, E. A., Chi, U., & The Learning-Gardens Educational Assessment,Group 1. (2012). Intrinsic motivation and engagement as "Active ingredients" in garden-based education: Examining models and measures derived from self-determination theory. *Journal of Environmental Education, 43*(1), 16-36. doi:10.1080/00958964.2011.596856

Showalter, D. A. (2013). Place-based mathematics education: A conflated pedagogy? *Journal of Research in Rural Education, 28*(6), 1-13.

Smith, G. A., & Sobel, D. (2010). *Place- and community-based education in schools*. New York, NY: Routledge.

Smith, G. A. (2002). Place-based education. (cover story). *Phi Delta Kappan, 83*(8), 584.

Smith, L. L., & Motsenbocker, C. E. (2005). Impact of hands-on science through school gardening in Louisiana public elementary schools. *Horttechnology, 15*(3), 439-443.

Sobel, D. (2005). *Place-based education : Connecting classrooms & communities (2nd ed.).* Great Barrington, MA: Orion Society.

Stake, R. E. (1967). The countenance of educational evaluation. *Teachers College Record, 68*(7), 523-540.

Stake, R. E. (c1995). *The art of case study research : Perspectives on practice*. Thousand Oaks, Calif.: Sage Publications.

Steele, A., Brew, C., Rees, C., & Ibrahim-Khan, S. (2013). Our practice, their readiness: Teacher educators collaborate to explore and improve preservice teacher readiness for science and math instruction. *Journal of Science Teacher Education, 24*(1), 111-131. doi:10.1007/s10972-012-9311-2

Stevenson, R. B. (2008). A critical pedagogy of place and the critical place(s) of pedagogy.*Environmental Education Research, 14*(3), 353-360. doi:10.1080/13504620802190727

Stuckey, M., Hofstein, A., Mamlok-Naaman, R., & Eilks, I. (2013). The meaning of 'relevance' in science education and its implications for the science curriculum. *Studies in Science Education, 49*(1), 1-34. doi:10.1080/03057267.2013.802463

Tal, T., & Morag, O. (2009). Reflective practice as a means for preparing to teach outdoors in an ecological garden. *Journal of Science Teacher Education, 20*(3), 245-262. doi:10.1007/s10972-009-9131-1

Tönnies, F. (1957). *Community and society*. East Lansing, MI: Michigan State University.

Tzu-Chien Liu, Peng, H., Wen-Hsuan Wu, & Ming-Sheng Lin. (2009). The effects of mobile natural-science learning based on the 5E learning cycle: A case study. *Educational Technology and Society,* 12(4), 344-358.

van Eijck, M., & Roth, W. (2010). Towards a chronotopic theory of 'place' in place-based education. *Cultural Studies of Science Education, 5*(4), 869-898.

Wang, Y. C., Vine, S., Hsiao, A., Rundle, A., & Goldsmith, J. (2015). Weight-related behaviors when children are in school versus on summer breaks: Does income matter? *The Journal of School Health, 85*(7), 458-466. doi:10.1111/josh.12274

Welton, A., & Williams, M. (2015). Accountability strain, college readiness drain: Sociopolitical tensions involved in maintaining a college-going culture in a high "minority", high poverty, texas high school. *High School Journal,98*(2), 181-204.

West, C. (2004). *Democracy matters: Winning the fight against imperialism*. New York: Penguin Books.

Whiting, M., & Sines, D. (2012). Mind maps: Establishing 'trustworthiness' in qualitative research. *Nurse Researcher, 20*(1), 21.

Wigginton, E. (1972). *The foxfire book: Hog dressing, log cabin building, mountain crafts and foods, planting by the signs, snake lore, hunting tales, faith healing, moonshining, and other affairs of plain living*. New York, NY: Doubleday & Company.

Williams, D. R., & Dixon, P. S. (2013). Impact of garden-based learning on academic outcomes in schools: Synthesis of research between 1990 and 2010. *Review of Educational Research, 83*(2), 211-235.

Wolcott, H. (1994). *Transforming qualitative data: Description, analysis, and interpretation.* London: Sage.

Yin, R. K. (2008). *Case study research : Design and methods* (4th ed. ed.). Los Angeles: Sage Publications.

APPENDIX A

Interview Questions

Student interview #1 questions:

Tell me about this drawing of the garden that you made.

Tell me a story about your favorite thing you did in this class that has to do with the garden.

Tell me about the science you're learning in this class.

What is your favorite part about this class?

Student interview #2 questions

Tell me about what was happening in these pictures you took.

Describe the most interesting science information you have learned that has to do with the garden.

What can you tell me about how gardening is connected with the environment?

Teacher Interview Questions #1

Describe how you use the garden in your curriculum with this class.

Tell me about what you have learned about garden based learning through this class.

What is the biggest change you have had to make this year since you started, as far as including the garden in your curriculum?

One of the main ideas of your theory of action gardening is that gardening at school can act as a bridge between the world of the school and student's everyday lives, promoting their growth as

participating citizens of the earth. Can you describe an incident that you have observed that demonstrated this since you started teaching this year?

How have you tried to connect the community and the environment through action gardening with your classes this year?

Teacher Interview Questions #2

Tell me about what the summer program has involved for you and the garden learners.

How have you included your theory of action based gardening in the summer learning projects?

What are you doing now to prepare for classes to start in August?

Describe projects you have done during the summer or will do in the fall that included or will include garden based learning.

Teacher Interview Questions #3

Tell me about your favorite garden based project with your students.

Describe one way you think action based gardening is accomplishing what you hoped and give an example.

Thinking back to your theory of action gardening, what do you think about it now that you have had time to put it to practice?

What advice do you have for teachers just beginning to use garden based learning?