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A Narrative Inquiry Into the Lived Experiences of Early Childhood Teachers Who Implemented Garden-Based Learning

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Abstract

The purpose of this narrative study was to investigate the lived experiences of early childhood teachers working in preschool settings who have implemented garden-based learning for more than one year. The seven preschool teachers who agreed to participate in the study were asked to describe significant life experiences that influenced them to implement gardening into their curriculum. Additionally, the teachers were asked to describe the bridges and barriers to implementing garden-based learning and how school gardening has impacted their students' learning and development. The data collection process included semi-structured interviews and teacher journal entries over a two-month period. The interviews were transcribed by the researcher and returned to the participants for their review. Initially, the interview transcriptions and journal entries were manually coded and analyzed by the researcher. Then, each transcription and journal entry was thematically coded using NVivo v12 software. Findings from the study showed: (a) Childhood gardening experiences and professional work experiences shaped the teacher's decision to implement garden-based learning, (b) Support from family members enabled implementation, (c) Funding, time, space, and teacher knowledge impeded implementation, (d) Multiple student developmental domains are impacted by garden-based learning. In light of these findings, this study resulted in several implications for childcare administrators and teachers.

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Chapter 1

Introduction

School gardens have a long history in the United States. It has been argued that school gardening has persisted over the years as an approach and context for education because of its versatility in meeting the changing social, political, and health priorities of communities (Burt, 2016). In the present era, school gardens are increasingly visible in early childhood settings (United States Department of Agriculture, 2015). It has been proposed this proliferation is attributed to the positioning of school gardens as a multi-faceted solution to various childhood concerns. Current research cites intentional garden education as a promising strategy to improve student nutrition and potentially reduce childhood overweight and obesity rates for children under the age of five (Langellotto & Gupta, 2012; Sharma et al., 2015; Wansink et al., 2015). Garden-based education can also help young children develop school readiness skills by enhancing their social, emotional, physical, and cognitive developmental domains (Berezowitz et al., 2015; Blair, 2009; Williams & Dixon, 2013). Furthermore, outdoor gardens have the potential to actively engage children while reconnecting them to nature through experiential learning opportunities (Chawla, 2015; Louv, 2008; Ohly et al., 2016).

Garden-based learning is supported by a number of states' early learning standards including those of California, South Carolina, New York, Oregon, and Washington, DC, as well as Head Start Performance Standards, and is recognized as a

useful tool for addressing multiple domains of young children's learning and development (National Association of the Education of Young Children, 2008; 2016).

Their inclusion in early childhood settings and curricula is supported a number of domestic and international organizations. On a domestic level, the *Edible Schoolyard Project* and the Farm-to-School Network advocate and provide resources to help early childhood educators implement gardening into their curricula. Internationally, the United Nations and the World Organization for Early Childhood Education (OMEP) are becoming increasingly supportive of school gardening. This is reflected in the organizations' sustainable development goals and projects (Engdahl, 2015).

Although school garden programs seem well-positioned to become fixtures in early childhood settings given the recent interest and support, little is known about the experiences of early childhood teachers who have implemented garden-based learning. In general, teachers face multiple challenges when implementing garden-based learning into their curriculum. The literature shows that commonly listed barriers to implementation include insufficient time and space, poor funding, few volunteers, and inadequate training (Burt et al., 2018; Huys et al., 2017). Moreover, the research shows that without multiple levels of support, successful implementation of garden-based learning may not be possible (Blair, 2009; Murakami et al., 2016).

By examining early childhood contexts, using a qualitative narrative approach and involving early childhood gardening teachers as participants, we may be able to better understand the factors that enable or impede the implementation of garden-based learning. In interviews and journal entries, the teachers described their personal and professional experiences with gardening and considered how these experiences impacted

their decision to add gardening to their curriculum. Furthermore, the teachers' discussed how gardening has impacted their students' learning and development. The findings of the research are presented in Chapter 4.

This study is designed to further investigate the lived experiences of early childhood gardening teachers, and in particular, to investigate how these personal and professional experiences have influenced the teachers' decision to implement garden-based learning. The study utilized a narrative research methodology with seven early childhood gardening teachers. The research was designed to answer these questions:

1. How do teachers' experiences shape their decision to implement garden-based learning?
2. What bridges and barriers do teachers describe in their efforts to implement garden-based learning?
3. How do teachers describe the impact of garden-based learning on their students' socio-emotional, physical, and cognitive learning and development?

Statement of the Problem

Presently, there are two competing trends occurring in early childhood education. First, there is an increased emphasis on situating health interventions within early childhood settings. These interventions are designed to improve students' nutrition (Izumi et al., 2015; Sharma et al., 2015). Second, there is an increased pressure on early childhood teachers to provide academically rigorous instruction so students perform well on mandated standardized tests (Fuller et al., 2017). Both trends have gained momentum as the result of governmental policies and initiatives. Despite associated linkages between

health and academic performance (Berezowitz et al., 2015), these initiatives compete for a place in the early childhood curriculum.

In recent years, early childhood teachers have explored creative opportunities to address the competing pressures of providing health and academic interventions. One opportunity to address both objectives is through garden-based learning. In the school garden, early childhood teachers are facilitating academic lessons that integrate math, language arts, social studies and science while involving children in the planting and caring for their gardens (Hirschi, 2015). Moreover, early childhood teachers are using gardens to provide school-based health interventions that target increased consumption of fruits and vegetables (Carbone et al., 2016) in efforts to reduce children's risk of cardiovascular disease and cancer (Bleich et al., 2013).

The extant literature provides examples of early childhood gardening teachers, but only a few of these studies have focused exclusively on the lived experiences of preschool teachers, and how these experiences have influenced their decision to add gardening to their curriculum (Murakami et al., 2018). Additionally, a limited number of studies have identified the bridges and barriers that preschool teachers encounter when implementing garden-based learning (Davis & Brann, 2017; Murakami et al., 2018). This gap in the literature is troubling given that teachers interested in garden education often struggle to establish, implement, and sustain gardens (Burt et al., 2017; Loftus et al., 2017). In order to support early childhood gardening programs, an inquiry in the storied lives of early childhood teachers is warranted. The teachers' responses to interview questions and journal prompts may reveal the complex factors that contribute to their implementation of garden-based learning in their early childhood classroom.

Statement of the Purpose

The purpose of this narrative study was to investigate the experiences of participating early childhood teachers working in preschool settings who have implemented garden-based learning for at least two years. The teachers were asked to describe significant life experiences that influenced them to implement gardening into their curriculum. Additionally, the teachers were asked to describe the bridges and barriers they encountered when implementing garden-based learning and how school gardening has impacted their students' learning and development. The data collection process included semi-structured interviews and teacher journal entries to ascertain the lived experiences and perceptions of preschool teachers' who have implemented garden-based learning into their curriculum.

Research Design

For this study, a qualitative research design was carefully selected (Creswell & Creswell, 2018). This decision was based on the nature of the research problem being addressed. Also, the intersection of philosophy and specific methods for data collection and analyzation were considered when designing the study.

As the researcher, I brought philosophical worldview assumptions to the study. The social constructivist worldview is most aligned with this study of early childhood teachers' lived experience with garden-based learning. Social constructivists hold assumptions that individuals seek understanding of the world in which they live and work (Creswell & Poth, 2018). The constructivist worldview assumes the participating teachers have developed subjective, multiple, and varied meanings directed at garden-based learning through their interactions with others and through historical and cultural norms.

In order to explore the teachers' multifaceted meanings of garden-based learning, I used two data collection methods: interviews and journaling. Face-to-face interviews were conducted at one point in time at the discretion of the participant. Follow-up interviews occurred through phone calls and text messaging. Data collection also included journaling. At the conclusion of the interview, participants were asked to complete four journal entries.

An inductive approach to analyzing the data was undertaken. According to Patton, "Inductive analysis means that the patterns, themes, and categories of analysis come from the data; they emerge out of the data rather than being imposed on them prior to data collection and analysis" (1980, p.306). However, the categories and subcategories did not emerge on their own. They were developed through an iterative qualitative analysis. By visiting and revisiting the data during the data collection and analyzation process, I was able to refine my focus and understanding of the emerging insights. The iterative process included an initial round of manual coding of the transcribed interviews and journals. This was followed by a content analysis using NVivo v.12 analysis software. The interview transcriptions and emerging themes from the data analysis was shared with the participants to increase trustworthiness and credibility. The findings of the study are presented in Chapter 4.

Significance of the Study

Current research indicates that garden education supports children's academic growth and healthy development (Berezowitz et al., 2015; Ohly et al. 2016; Williams & Dixon, 2013). These studies include gardening experiences within formal K-12 grade settings. However, there are only a sparse number of studies solely focused on preschool

settings (Murakami et al., 2018). Furthermore, previous research studies focused on the impact of gardening education on students' learning and development are quantitative in nature (Burt et al., 2018; Christian et al., 2014; Murakami et al., 2016).

This study was designed to bridge the research gap by providing a qualitative report on how garden-based learning benefits students attending preschool programs. Description and analysis of preschool teachers' interviews and journal entries were used to help us better understand how young children were impacted by their gardening experiences. Furthermore, this study is unique in being one of a few studies that provided preschool teachers a platform to share their own lived experiences with gardening, and to describe how it impacted their decision and efforts to implement garden-based learning into their classrooms (Murakami et al., 2018). Both administrators and teachers may use this study to promote and enhance garden-based learning practices in preschool.

Chapter 2

Review of the Literature

This study used a narrative inquiry to investigate the lived experiences of early childhood educators who have implemented garden-based learning. More specifically, the study explored how early childhood teachers' lived experiences shaped their decision to add gardening to their curriculum. Moreover, the study examined how early childhood teachers describe the bridges and barriers to implementing garden-based learning, as well as how the teachers describe the impact of garden-based learning on their students' social, emotional, physical, and cognitive learning and development. A two-month data collection period included semi-structured interviews and teacher journal entries.

The purpose of this chapter is to provide a review of peer-reviewed and foundational literature related to school gardening in the context of early childhood education. This chapter is divided into four sections, which include an overview of garden-based learning, the history of school gardens in the United States, an examination of garden-based learning in the context of early childhood education, and a description of early childhood educators who implement garden-based learning.

Overview of Garden-Based Learning

Garden-based learning has been defined quite simply as "an instructional strategy that utilizes a garden as an instructional resource, a teaching tool" (Williams & Dixon, 2013, p. 213). While this definition is frequently referenced in research, it does not fully

describe the curricular approaches and historical significance of garden-based learning. In the following sections, deeper examinations of the curricular and historical roots as well as expected outcomes of garden-based learning are provided. Then, a section detailing garden-based learning outcomes is presented.

Curricular Approaches to Garden-Based Learning

Two curricular approaches have contributed to the foundation for garden-based learning. The educational traditions of school gardening fall principally within experimental education and environmental education.

Experiential Education

The educational practice that most closely ties curriculum to garden-based learning is experiential education. Quite simply, in an experiential mode of learning, the student learns by doing. The teacher's role is to facilitate the learning process by guiding or focusing students' activity, and then helping them to make meaning from the experience (Hirschi, 2015). David Kolb is credited with creating the experiential theory. Kolb's (1984) Experiential Learning Model asserts that the learning process is a cycle of direct observation, reflection, making connections to abstract concepts, and applying the concepts into future experiences (Baker et al., 2012).

Kolb's model was heavily influenced by curriculum scholars, John Dewey and Maria Montessori. John Dewey's (1938) foundational text, *Experience and Education*, argued against traditional forms of teaching methods such as rote memorization. He viewed these practices as passive and ineffective. Dewey proposed that a more effective approach to education involved active learning. For example, Dewey's experimental curriculum required University of Chicago lab students to learn a range of subjects

through the planting, tending, harvesting, and preparation of garden produce. In the garden, students learned to apply scientific skills such as how to test the alkalinity of the soil and how to conserve water, as well as practical skills like planting, cultivating, harvesting, and preparing their own food (Smith et al., 2011).

Maria Montessori was an early proponent of experiential education. Montessori's vision for schools was a combination of indoor and outdoor education. Montessori proposed that children learn from an exploration of the natural world through observation. In nature, children can have rich sensorial experiences that cannot be replicated in an indoor classroom. Furthermore, Montessori believed that teachers needed to be "decentered" in the learning process. In a Montessori classroom the focus is on the students, not the teacher. According to Montessori, students should move freely around the indoor or outdoor learning environment for an undetermined amount of time. With this expectation, students learn from the environment and each other. The Montessori teachers are not passive though, as their role is to introduce learning materials and to assist children in making intelligent choices. This educational approach stands in stark contrast to teacher-centered modern classrooms where students are confined to sitting at desks throughout the school day (Swiderski, 2011).

Environmental Education

Environmental education is a multi-faceted curricular approach. The North American Association for Environmental Education (NAAEE, 2020) defines environmental education as "a process that helps individuals, communities, and organizations learn more about the environment, and develop skills and understanding about how to address global challenges." Given the complexity and importance of

environmental education, several professional groups have supported teachers in incorporating environmental education into their curriculum. For example, the NAAEE (2010) has published *Guidelines for Excellence* that outlines six essential underpinnings of an environmental education curriculum: Systems, Interdependence, The Importance of Where One Lives, Integration and Infusion, Roots in the Real World, and Lifelong Learning.

The emphasis on environmental education is nothing new. In the United States, the teaching of environmental education in schools can be traced back to the Nature Study movement of the 1890s when curriculum reformers introduced science education in nature (Kolstedt, 2010). In 1977, the first concerted efforts to establish guiding environmental education principles and frameworks occurred at the *Intergovernmental Conference on Environmental Education* in Tbilisi, Georgia. An outcome of the conference, the *Tbilisi Declaration*, and other pivotal documents that followed encouraged environmentally educated educators to play a prominent role in helping bring transformative change to education (Davis, 2010).

Environmental educators, including classroom teachers, heeded the call by designing gardening curricula based on transdisciplinary, long-term thinking, which was in contrast to the fragmentary, short-term thinking that had been the norm (Burt, 2016). For example, in 1979, classroom teachers at Green Acres Elementary School in Live Oak, California banded together to design a garden curriculum based on children's motivation to learn scientific process skills (Burt, 2016). Over the years, that school's curriculum has grown from a local initiative to a national contributor to environmental education. In 2017, more than 1,000 teachers who reported serving 597,000 students

received training in the garden curriculum that was borne of the environmental education movement, Life Lab, in Santa Cruz, California (Life Lab, 2020). Today, environmental education has much in common, and often intersects, with garden education traditions such as scientific learning and place-based education (Sobel, 2014).

Expected Outcomes of Garden-Based Learning

Recent research has demonstrated there are many benefits to planting school gardens. These include improvement in participating children's academic performance in math, reading, and science. The benefits of gardening are not limited to academic outcomes though. Other benefits of school gardening programs include improved diet, enhanced health, social development, and a commitment to protecting the environment outcomes.

Academic Performance

Over the last decade, researchers have taken an interest in documenting the impact of garden-based learning on academic performance. Blair (2009) reviewed twenty-one studies from the United States to explore whether school gardening created measurable and observable improvements in student achievement. She identified qualitative and quantitative studies that described how school garden initiatives enhanced students' science achievement. Similarly, Williams and Dixon (2013) reviewed 48 studies to investigate the direct and indirect impacts of garden-based learning on student academic outcomes. They identified qualitative and quantitative studies that measured or observed how garden-based learning had a positive and direct impact on student achievement in science, math, language arts, writing, and social studies. Moreover, they identified studies that described how school gardens had a positive and indirect impact on

students' social development, nutrition knowledge, and attitude towards school. In a recent study, Ray and colleagues (2016) conducted a quantitative analysis of fifth graders' math, reading, and science standardized scores in Washington, DC and found that schools with a garden-based learning curriculum have higher reading and science test scores than schools with a traditional science curriculum. Together, these studies indicate that the use of garden-based learning can improve student academic performance.

Health Outcomes

With an international concern about increased rates of childhood obesity, school gardening has received increased attention from public health research. Ohly and colleagues (2016) reviewed forty studies to understand the health and well-being impacts of school gardens. The researchers reported that most studies included the perceived nutritional benefits of school gardening programs as greater knowledge and awareness of healthy foods, improved attitudes towards new foods, and healthier eating habits. Other studies have described school gardening as an opportunity for increased physical activity for students and adults (Ahmed et al., 2011; Passy et al., 2010). In particular, boys who were referred to in several studies as busy or unable to concentrate in class benefitted the most from the physical aspect of the gardening (Block et al., 2012; Chawla et al., 2014; Passy, 2014).

Ohly and colleagues' (2016) review of literature also reported the personal and social well-being impacts of school gardening. The studies reviewed by those authors described the personal well-being impacts and included enjoyment and feelings of achievement, as well as satisfaction and pride stemming from taking care of plants, observing plant growth, and harvesting the crops. A study with similar findings reported

the impact of the garden environment on stress management (Chawla et al., 2014). In that study, a child perceived gardening as a form of meditation, "like my body is present but my mind just kind of drifts off and goes someplace else" (Chawla et al., 2014, p. 8). In a few studies the impact of gardening at school on social well-being outcomes is reported, and includes improved relationship building (Block & Johnson, 2009; Chawla et al., 2014; Henryks, 2011) and heightened cultural awareness (Cutter-Mackenzie, 2009).

Commitment to Protecting the Environment

Many researchers and parents are concerned that today's youth are becoming increasingly disconnected from the natural world, and thus are not learning the values they will need to become environmentally conscious adults (Louv, 2008). In several countries, school gardening has been promoted as a pedagogical approach to bring children closer to nature. Weldemariam et al. (2017) reported that Norway, Sweden, and Australia have embedded gardening, as well as other sustainability concepts into early learning frameworks. Similarly, evidence from a study in the United States revealed that young students who actively participate in multiple school-gardening experiences are likely to develop an "ecological worldview" (Emery et al., 2017). Likewise, Chawla (1998) found that children who have positive experiences in nature are more likely to be environmentally sensitive and active as adults. Chawla discovered the children were often accompanied in nature by an adult who modeled how to view nature in positive and meaningful ways.

Conclusion

Much research shows the benefits of garden-based learning on the academic performance, health outcomes, and environmental experiences of children. Garden-based

learning has the potential to be a significant component of an educational curriculum. This is especially true for early childhood education where experiential, hands-on learning is particularly valued. However, teachers face challenges in implementing garden-based learning into their classrooms. This study attempts to reveal the complex factors that contribute to the teachers' successful implementation of garden-based learning into their early childhood classrooms.

History of School Gardens in the United States

The idea of incorporating gardening into the American school landscape and classroom curriculum is not a new idea. Evidence of school gardens' presence in the U.S. has been well-documented. A thorough examination of school gardens' history from a diverse range of sources was necessary to gain a better understanding of the historical trends and motivations that led educators, communities, and policy-makers to adopt school gardens as valuable sites for learning and food production.

According to Desmond, Grieshop, and Subramaniam (2004), there are three eras in which the school garden movement was particularly in vogue. The authors describe the impact of historically contextualized influences, including educational and social reform efforts on each of these three eras:

- Early twentieth century (1900–1930s)—Progressive education, the Back to Nature movement, and war mobilization
- Middle twentieth century (1960–1970)—Counter-culture and environmental movements
- Late twentieth century (1990–2000)—Renewed interest in education reform, environmental education, and nutrition/health issues for children

Early Twentieth Century (1900–1930s)

A substantial body of literature documents the origins of the initial American school garden movement and the reasons for its rise and fall in popularity. Kohlstedt (2010) argues that European philosophers and pedagogical practices of the 16th and 17th century had a significant influence on the emergence American school gardening in the 1890s.

In the mid to late nineteenth century, American educators were fascinated by prominent European philosophers such as Comenius, Rousseau, Pestalozzi, and Froebel, all of whom promoted learning in nature and gardening (Kohlstedt, 2010; Marturano, 1999). Comenius (1592-1670) believed in a universal and practical education that focused on the social aspects of life and has been credited with the earliest concept of school gardening. Comenius stated, "A school garden should be connected with every school, where children can have the opportunity for leisurely gazing upon trees, flowers and herbs, and are taught to appreciate them" (Weed & Emerson, 1909, cited in Desmond et al., 2004, p. 26). Rousseau (1712–1778) developed his theories of childhood education from a host of disciplines that included botany, music, and philosophy (Gourevitch, 2019). Rousseau believed nature was a child's greatest teacher, and the garden is where humans can reconnect to nature later in adulthood (Neumeyer, 1947). Pestalozzi (1746-1827), whose ideas were profoundly shaped by Rousseau, described the need for children to learn by observation in nature. At Pestalozzi's school, children were introduced to gardening and farming as practical skills (Subramanian, 2002). Froebel (1782-1852) extended Pestalozzi's ideas of learning by including "doing" with observation in nature.

He believed that active learning in the garden supported young children's health and development (Hirschi, 2015).

American educators were equally as impressed with contemporary gardening pedagogical practices then being implemented in Europe (Nowatschin et al., 2017). Many Americans learned of these methods after Mary Tyler Peabody Mann translated Erasmus Schwab's (1879) *The School Garden, Being a Practical Contribution to Education* into English. In the text, Schwab described European educators' exploratory and experiential lessons within the garden. Americans revered this pedagogical methodology, and often referenced Schwab to strengthen their argument for active student learning in the outdoors.

By the late nineteenth century, American educators were emulating their European peers' gardening practices. In fact, the first American school garden at the George Putnam School in Roxbury, Massachusetts was established after Henry Lincoln Clapp toured European school gardens. In his narrative, *School Gardens*, Clapp (1898) discusses the intergenerational, communal aspects of European gardening practices:

> Since 1877 every public school in Berlin, Prussia has been regularly supplied with plants for study every week, elementary schools receiving specimens of four different species and secondary schools six. During the summer, at six o'clock in the morning, two large wagons start from the school gardens, loaded with cuttings packed and labeled for the different schools. The daily papers regularly announce what plants may be expected, and teachers consult with gardeners as to what ought to be sown or planted. (p. 446)

Clapp's work at the Putnam School reflected the communal European approach to gardening implementation. Working alongside the Putnam School janitor and students, Clapp established a wildflower garden for aesthetic and demonstration purposes. Clapp admitted being disappointed with the limited scope of the garden because he wanted more active student participation. Eventually, Clapp and his students acquired and revitalized a vacant lot close to the school with multiple garden plots of vegetables and grains (Clapp, 1898; Kohlstedt, 2010; Trelstad, 1997).

In the early 1900s, American educators' infatuation with European theory and practice began to dwindle, and thus a new motivator for school gardening implementation emerged. Kohlstedt (2010) contends the new driver for school gardening came from education and social reformers' pressing need to address local concerns and circumstances. Nature-Study advocates and Progressive reformers, alike, recognized the benefits of learning in nature and school gardening. Although differing in their agendas and approaches, the two reform efforts were vital in confronting complex issues in rural and urban areas of the United States.

In rural areas, farmers faced limited food production and profit margins due to the economic depression following the Panic of 1893 (Rezneck, 1953). Many who could not sustain a living agriculturally migrated to cities for occupational and financial opportunities (Fligstein, 2013). For the remaining residents of farming communities, the quality of education declined. In response, Cornell University professors, Liberty Hyde Bailey and Anna Botsford Comstock, developed a nature study curriculum to encourage country schoolteachers to teach science education, and relatedly, to develop school gardens. The Nature-Study program they developed became a widely accepted model that

spread to various parts of the United States (Berlage, 2016; Dorf, 1956; Johnson, 1912; Kohlstedt, 2010).

Meanwhile in crowded urban settings, the plight of children living in bleak conditions was the focus of Progressive reformers, as well as Wilbur S. Jackman, the "father" of the Nature-Study. As a pious man, Jackman argued extensively for the inclusion of school gardens in cities to expose children to nature and to improve their bleak living conditions (1891). For Progressive reformers, school gardens became a "convenient means to achieve multiple social aims: city beautification, the reduction of juvenile delinquency, improved public health and nutrition, Americanization of immigrants, and the creation of good workers and citizens" (Trelstad, 1997, p. 164).

In 1906, the United States Department of Agriculture estimated there were at least 75,000 school gardens in the United States (Burt, 2016; Jewell, 1907). The numbers continued to rise throughout the 1910s when national gardening and agricultural organizations endorsed school gardening. Most notably, the national Garden Association of America formed in 1912. Its leadership met on an annual basis with the National Education Association to promote open air classrooms. By 1915, all 50 states had the national School Gardening Association (Kohlstedt, 2010).

At the outset of World War I, a new driver of the school gardening movement surfaced. Hayden-Smith (2014) reported the United States' Bureau of Education preempted an international food crisis by sponsoring the United States School Garden Army. The program funded by the Department of Defense implemented an unprecedented policy that nationalized the teaching of agricultural education. School gardens spread as esteemed garden educators, Ernest B. Babcock and Cyril A. Stebbins,

promoted the standardized curriculum to rural and urban communities as a means to educate children about life skills and civil responsibility (1911). Every child was expected to participate in wartime efforts by growing fruits and vegetables in their schools' victory gardens (Hayden-Smith, 2006, 2014). By 1918, several million children had enlisted in the United States School Garden Army (Nowatschin et al., 2017).

The cultivation of school gardens slowly declined after the war. While there were no significant changes to the principles and policies towards school gardening programs, Gaylie (2011) reported vocational programs, like gardening, became less appealing to rural and urban youth. Nature Study transitioned from schools to new educational spaces like nature centers and parks (Comstock, 1923). Progressive reformers shifted priorities by focusing on technology advances in food and agriculture (Burt, 2016). In time, school garden plots were replaced with playgrounds and athletic fields (Gayle, 2011).

Middle Twentieth Century (1960–1970)

The dawn of the Civil Rights Era in the early 1960s saw a renewed interest in school gardening. Educators attempted to address health disparities related to race and class, and school gardening was seen as a tool to address these concerns (Burt, 2016, Gaylie, 2011). In 1964, school gardens became an educational reform strategy of President Lyndon B. Johnson's "War on Poverty". Gardening was conceived as a progressive, interactive approach to connect children to life processes and their local environment. Burt (2016) reported that while school gardens slowly increased in numbers, gardening as an educational reform initiative never fully gained widespread support because gardens remained largely unconnected to core academic subjects.

In the 1970s, school gardening was given a boost by governmental policies that focused on improving food systems within urban areas of the United States. In 1976, the Farm Bill sponsored the USDA Cooperative Extension Garden Program to provide gardening education and assistance in twenty-three major cities (Burt, 2016). In Detroit, a city battered by social, racial and economic unrest, the urban garden program was welcomed by grassroots organizations focused on education. For example, a group of Black elders in Detroit, known as the "gardening angels", used the program to educate and empower students within community and school gardens (Gaylie, 2011, p. 11).

In 1977, the school gardening movement received another boost when farmer-turned-educator, Robbie Jaffe established a school greenhouse building program, *Project Blossom*, at Live Oak School in Santa Cruz, California. By 1979, Jaffe and Project Blossom grant writer, Erica Clark, had created Life Lab, the first organization to develop a nationally disseminated science-based gardening curriculum, *The Growing Classroom* (Burt, 2016). In 1980, the Department of Education identified *The Growing Classroom* as an exemplary program. With this distinction, Life Lab became a professional development destination for teachers who aimed to implement garden-based learning into their classrooms.

Collectively, the socio-political movements of the 1960s and 1970s had direct and peripheral impacts on the reemergence of school gardens. But by the beginning of the 1980s, food activism was replaced by socioeconomic conservatism throughout the United States (Gaylie, 2011). In the education sector, the release of the National Commission on Excellence in Education's report *A Nation at Risk: The Imperative for Educational Reform* (1983) commissioned by President Reagan prompted an immediate redirection in

curriculum development and implementation. In an effort to keep up with international competition, rigorous academic standards and state tests to measure student achievement in math and English language arts became prioritized resulting in a decreased interest in and support for gardening in schools.

Late Twentieth Century (1990–2000)

At the end of the 20th century a renewed interest in education reform, environmental education, and children's nutrition and health were catalysts for the third school garden movement (Gaylie, 2011).

During the early 1990s, the United States government's interest in agriculture and food education prompted a revival in school gardening. Importantly, the USDA's *Agriculture in the Classroom* initiative evolved from being a disjointed entity to a nationally coordinated program. The *Agriculture in the Classroom* initiative allowed states to develop their gardening and agriculture programs with consideration to their own needs and services (Burt, 2016).

In 1995, the first school garden policy was established. The *Garden in Every School* initiative was formally implemented by the California Department of Education Nutrition Services Division to improve nutrition in schools. California State Director of Public Instruction Delaine Eastin encouraged schools to apply for mini-grants to construct instructional gardens. Some schools also used the funds to teach and practice environmentally-responsible waste practices such as composting and recycling. Within five years, over 2,000 academic gardens had been established in schools across California (Burt, 2016; Ozer, 2007).

As gardens became funded and supported, the emerging trend to connect students to food production and the environment through school-based programs further ignited the public's interest in school gardens. For example, at Martin Luther King Middle School in Berkeley, California, Chef Alice Waters established the *Edible School Yard Project* (2020). Waters envisioned the garden to be a setting where essential life skills and academic learning were supported and learned. Waters encouraged educators to integrate cooking and gardening education into the school curriculum (Salter, 2010).

By the late 1990s, school gardens became an attractive component to a multipronged approach designed to target multiple social and health concerns. The steady rise of childhood obesity rates, vast declines in fresh food consumption, and the need to build local economies caused states like Florida and North Carolina to first establish Farm-to-School (FTS) programs. Hoffman et al. (2017) reports the FTS movement promotes three major initiatives: local food procurement, food and nutrition education, and school gardening.

Early Twenty-First Century Garden Movement (2010–Present)

It has been argued there is a current school garden movement occurring (Nowatschin et al., 2017). An emerging body of research, practices, and energy supports this proposition. The present movement is national and international in scope, representing a growing interest in garden-based learning.

On an international level, school gardening has appeared in several important documents and initiatives that aspire to aid humanity. In October 2015, the United Nations' General Assembly adopted the '*2030 Agenda for Sustainable Development'* as a blueprint to address global challenges, including those related to poverty, inequality,

climate, environmental degradation, prosperity, and peace and justice (UN General Assembly, 2015). Given the importance and ambition of the *2030 Agenda*, the *Curriculum Framework for the Sustainable Development Goals* (Osman et al., 2017) was created to support countries in their efforts. The curriculum framework recommends participatory and experiential outdoor learning as focus areas for "knowledge and understanding" and "skills and applications" within early childhood care and education. More specifically, school gardening is referenced in the following sustainable development goals *(SDGs)*:

- *Goal 2—Zero Hunger*: Growing food in school gardens contributes to food security (p. 17).
- *Goal 11—Sustainable Cities and Communities*: Make cities and human settlements inclusive, safe, and sustainable through field trips and gardening as students learn about natural cycles and systems (p. 58).
- *Goal 13—Climate Action*: Take urgent action to climate change and its impact through gardening and plant-growing skills (p. 67).
- *Goal 15—Life on Land:* Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat deforestation, halt and reverse land degradation, halt biodiversity loss through experiential learning—seeing wildlife in its natural environment and participating in school gardening (p. 75).

In the United States, efforts have been made to align school garden initiatives with the United Nations' sustainable development goals. In the state of this research, South Carolina, several policies and grants provide schools and educators the opportunity to establish edible gardens (Jones et al., 2015; Taylor et al., 2017). Several states have

linked garden curricula with state subject area standards (Williams & Brown, 2012). Furthermore, Head Start, the largest early childhood program for low-income children in the United States, has collaborated with the National Farm to School Network to create resources that align gardening activities with Head Start program performance standards (Gibson et al., 2014; Stephens & Oberholtzen, 2020).

In the present era, American school gardens are flourishing. The United States Department of Agriculture (2015) reported that the number of school gardens has more than doubled. In 2010, there were an estimated 3,000 school gardens (National Gardening Association, 2010; Fisher-Maltese & Zimmerman, 2015). By 2015, the number had increased to 7,000 school gardens. Moreover, the USDA reported that school gardening programs were operational in over 40,000 schools in all fifty-three U.S. states and territories, serving over 23 million students (2015).

It has been proposed that the current school garden movement has been influenced by multiple sources. Wake and Birdsall (2015) argue that garden "champions" have increased the popularity of school gardens. Wake and her colleague suggest garden advocates, like Robin Moore, Richard Louv, Alice Waters, and Stephanie Alexander have used their celebrity status to bring greater awareness and recognition to the potential of garden-based learning. First Lady Michelle Obama also used her political and celebrity status to encourage school gardening. The *Let's Move* initiative established by Mrs. Obama includes a step-by-step school garden checklist for teachers. Wake and Birdsall (2015) point out the ways that funding has influenced the growth of school gardens. This argument is supported by the US Department of Agriculture. In 2020, it is anticipated a record amount of funds exceeding $9 million will be awarded to USDA farm-to-school

grant recipients. Previous recipients of The USDA Farm to School Grant Program used the funds to plan, implement, or provide training on farm to school activities, including those related to school gardening.

Critiques of Adding Gardens to Schools

There are those who are critical of the implementation of school gardens. Wake (2008) argues that school gardens are adult-dominated spaces that ignore student's interest and needs. Likewise, Wake and Birdsall (2015) view school gardens as a tenuous construct both as an entity and educational tool. The authors propose that many school gardens are lacking in scope as they do not go beyond the ubiquitous vegetable garden. Diversification of garden models is recommended. Similarly, Payne (2014) questions the design of natural school spaces, such as gardens. He argues that environmental educators need to include children in the design of school gardens. In doing so, school gardens can play a prominent role in promoting constructivist teaching styles that facilitate students' cross-curricula learning opportunities.

Garden-Based Learning in Early Childhood Education

Garden-based learning is an interdisciplinary approach to early childhood education that has experienced a resurgence of interest over the last 20 years (Williams & Dixon, 2013). The United States Department of Agriculture (2015) reported there are over 7,000 school gardens in the United States. Many of these gardens are located in early care and education settings that serve young children from birth to age eight (USDA, 2015).

While it is acknowledged that garden-based learning and school gardens have emerged in early childhood education settings, several reviews of literature on school

gardening highlight the need for additional research to be conducted in these settings. Blair (2009) found that early child education and high school were underrepresented in studies evaluating the benefits of school gardening. In the few studies pertaining to early childhood education, the research was conducted in K–5 classrooms. Ohly and colleagues' (2016) review of literature focused on the health and well-being impacts of school gardening discovered that only three studies were conducted in preschool settings. An additional fifteen studies were conducted at "primary schools" but the researchers did not provide a definition or an explanation of what constitutes a primary school. Burt and colleagues' (2016) synthesis of research to determine the impact of garden-based learning on academic outcomes showed that most studies were conducted in third, fourth, and fifth grades. This draws attention to the need for research in the grades that to date have been neglected in the research.

Due to the lack of studies on early childhood gardening programs, very little is known about the teachers who facilitate early gardening experiences for students. This study attempts to address this gap in the literature by exploring the lived experiences of early childhood gardening teachers, and explores how these personal and professional lived experiences are reflected in their practices, motivations, and negotiation of opportunities and challenges for implementing garden-based learning.

Early Childhood Teachers Who Implement Garden-Based Learning

Early Childhood Teachers' Curriculum Decision Making

Early childhood teachers play an important role in the lives of children. Teachers directly impact their students' cognitive, socio-emotional, physical, and language development. In order to make an impact, early childhood teachers are required to make

curriculum decisions that reflect the best interest of the students. The National Science Teachers Association (2014) *Position Statement on Early Childhood Science Education* states that teachers should incorporate outdoor experiential learning opportunities within the general education curriculum. However, the exact amount and definition of access is not clearly outlined in the position statement. Without a clear interpretation, early childhood teachers are left to make many more decisions about what access to outdoor experiential learning looks like in their classroom.

Early childhood learning standards play a vital role in teachers' curriculum decision-making. Standards can support teachers' selection of appropriate curricula, materials, and assessments. They can also give emphasis to all domains of learning and develop. However, teachers who implement garden-based learning have struggled to connect their curriculum to gardening. Feille (2013) reported that gardening teachers often experience difficult in linking learning standards to gardening. The teachers expressed a desire for more professional development and training to overcome their challenges in connecting gardening to their classroom curriculum.

Early Childhood Teachers and Garden-Based Learning

Early childhood settings are particularly well-suited for gardening education (Hoffman et al., 2017). Teachers in early childhood have the opportunity to facilitate hands-on experiential and play-based educational activities in garden-based learning. Not only do these experiences meet state and national learning standards, they also support students' cognitive, emotional, social, and physical developmental goals. Additionally, early childhood teachers often have the autonomy to promote healthy eating during snacks and mealtime.

Challenges for Implementing Garden-Based Learning

Over the last two decades, early childhood teachers have often experienced many challenges to implementing garden-based learning. Starting with the passage of the No Child Left Behind (2002) and the recent Every Child Succeeds Act (2015), teachers have faced intense pressure from local and state administration to prepare students for high-stakes, standardized tests. In some schools, time for play and exploration has been reduced or eliminated, while tested content areas have experienced increased time allocations (Levin, 2013; Rivkin, 2015; Waller et al., 2017). In these schools, scripted curricula designed to prepare young children for the formal assessments have often been mandated (Brown & Weber, 2016). Advocates for high-quality early childhood programs insist that relying on a standardized, academic-based focus is not ideal or recommended, given that exploration and discovery fosters young children's curiosity for learning (National Science Teachers Association, 2014).

Chapter 3

Methodology

This chapter will provide a description of my interest in the study, the research methods I used to collect data, and the analytical and reflective processes I used to interpret the information I intended to collect. Creswell (2008) advises researchers to consider the intersection of philosophy, strategies of inquiry, and specific methods when planning a study. My research was interdisciplinary and was influenced by my training in early childhood education, gardening education, and anthropology. The research was also be impacted by my social constructivist worldview that holds assumptions that individuals seek understanding of the world in which they live and work.

Narrative inquiry is defined by Clandinin and Connelly (2000) as a way of understanding and inquiring into experience through "collaboration between researcher and participants over time, in a place or series of places, and in social interaction with milieus." (p. 20). The narrative researcher considers three specific dimensions during the inquiry: temporality, sociality, and spatiality. Connelly and Clandinin (2006) explain each of the dimensions:

- *Temporality*—The understanding that experiences are composed and lived over time. Narrative inquirers investigate experiences that occurred in the past and in the present. They also explore how participants imagine future experiences and events.

- *Sociality*—Attending to the personal and social conditions. Connelly and Clandinin (2006) define personal conditions as "the feelings, hopes, desires, and aesthetic reactions and moral dispositions" of the participants and inquirers (p. 480). Social conditions refer to the cultural, familial, and institutional narratives that impact an individual's experience.
- *Spatiality*—The recognition that all experiences and events occur in some place. Connelly and Clandinin (2006) view spatiality as "the specific concrete, physical and topological boundaries of place or sequences of places where the inquiry and events take place" (p. 480).

In this research study, I attended to temporal, social, and spatial dimensions through two methods: interviews and teacher journaling. In one-on-one interviews, I asked the participants to tell their stories of gardening from childhood to the present. Teachers shared how certain people and contexts had impacted their decision to implement garden-based learning. During the interviews, I attended closely to the participants' responses while resisting the urge to interject and probe. In teacher journaling exercises, I created writing prompts to encourage teachers to share stories about gardening. The writing prompts were a means to facilitate reflection, deepening personal understanding, and stimulate critical thinking (Dyment & O'Connell, 2011; Lindroth, 2015). Furthermore, the writing prompts were particularly helpful in understanding how the teachers utilized gardening to impact student learning and development.

Narrative inquiry is the study of experience as a story (Connelly & Clandinin, 2006). The story has been metaphorically described as a portal in which the participant

enters the research process and where the experience is interpreted and made personally meaningful. Most narrative inquiries begin with the researcher asking the participant to tell their stories. The stories often reveal not only the individual's experience but also how social, cultural, and historical narratives impact individual's experiences (Creswell & Poth, 2018).

Another key feature of a narrative inquiry is to give voice to participants (Chase, 2011). I strove to offer an insider perspective into the lived experiences of the early childhood gardening teachers. Clandinin (2013) describes narrative research as "the study of people composing, and living, complex lives" (p. 10). In my role as the researcher, I worked to understand the complexity of the participants' personal and professional lives, and how my outsider positionality impacted the data collection, analysis, and interpretation processes.

Research Participants

The participants in this study were seven preschool teachers who had at least two years of implementing garden-based learning into their curriculum. The criteria for selecting teachers working in preschool centers, and not home-based care providers, were based on the differences in formal education training. Bassok and colleagues (2016) reported that many states do not require home-based care providers to receive training, whereas preschool teachers are mandated to possess a four-year teaching degree and annual professional development. Thus, I limited my search to teachers working in preschool centers serving children from birth to five years old. The criteria for selecting teachers with at least two years of implementing garden-based learning was based on the researchers' interest in locating teachers with at least two years of experience in

observing and documenting the impact of gardening on student learning and development.

In the fall of 2019, I recruited preschool teachers who had implemented garden-based learning for more than two years to participate in this study. To recruit participants, I used the purposive sampling technique, referral sampling, because the population of teachers I was interested in studying was few and difficult to locate. In September 2019, I consulted with colleagues about my interest in studying preschool teachers who gardened with their students. In October 2019, I used the social media platform, Facebook, to recruit additional teacher participants. In total, I was given the names of fifteen preschool teachers who had implemented gardening into their classrooms. Seven of the teachers agreed to participate in the study.

I collected the demographic information from each participant at the conclusion of their interview. The demographic data was recorded on a "Post-Interview Demographics Form" (Appendix C). This information was gathered to provide the reader a better understanding of the detailed presentation and data analysis in Chapters 4 and 5.

The Participants

All the participants were selected because they met the criteria as a preschool teacher who had implemented garden-based learning into their curriculum for at least two years. They included seven past and current preschool teachers who gave themselves the following pseudonyms: Fern, Amy, Marion, Irene, Lila, Sarah and Tammy. The participants also provided pseudonyms for the preschools in which they implemented garden-based learning.

All of the participants were similar in that they identified themselves as white females. The participants did not work at the same preschool, yet they all described their worksites as being private funded preschools. They had a range of experience teaching young children spanning five to thirty-two years. Moreover, the teachers had a wealth of experience teaching gardening to preschool children ranging from two to thirty-one years. A brief biographical sketch of the participants is provided below and is followed by a complementary table (Table 3.1) of the participants' demographic data.

Brief Biographical Sketch

Fern grew up in a small, rural town in central South Carolina. She learned gardening at an early age from her parents, grandparents and family friends. She described herself an avid home gardener who enjoyed collecting seeds and plants. At the time of the interview, Fern had been a practicing certificated teacher for seven years. In 2014, Fern returned to her hometown to work at Gardendale Preschool, a faith-based center with a half-day program. Gardendale served two-to-five year old students from September-May. Fern implemented garden-based learning in her first year of teaching at Gardendale with her four year-old preschoolers.

Amy grew up in the Midwestern part of the United States. Her gardening interest began at a young age with the support of her sister. Later in life, her husband and father-in-law played a prominent role in her efforts to implement garden-based learning. Amy was a certified teacher of three years. She worked with three year-old students at a faith-based preschool. Her preschool, Lillie's Garden, was located in the central region of South Carolina and was open year round.

Marion spent a lot of time with her grandparents as a young child in rural South Carolina. Her grandfather and grandmother taught her the skills needed to implement garden-based based learning in her future classroom. In 2104, Marion initiated a school gardening program while working at Ocean Academy. Marion had taught gardening to children of various ages, including four and five year-olds. She earned a Master's degree in Technology & Education and possessed a South Carolina teaching certificate. At the time of the interview, Marion had twenty years of teaching experience.

Irene grew up learning to gardening with her parents in suburban North Carolina. Over the last twenty-four years, Irene had shared her passion for gardening with her four and five year-old students. She worked at Downtown Garden Preschool, a faith-based preschool that served students from August-May. Irene had a Special Education degree and a teaching certificate from North Carolina.

Lila had fond memories of working in the garden with her parents and grandmother in rural South Carolina. Lila earned an undergraduate degree in interior design but discovered her passion for working with young children while serving as a substitute teacher. Over the last eleven years, Lila had worked in various preschool settings throughout South Carolina. At the time of the interview, Lila had been gardening with three year-old children for three years. She worked at Studio Rose Preschool, a year-round Waldorf-inspired preschool located in rural South Carolina.

Sarah spent her childhood in a rural Northern town. She especially enjoyed gardening with her two brothers as a child. Sarah worked for Palmetto Preschool, a university lab preschool operating from August-May. Over the last thirteen years, Sarah

had provided gardening education to her four and five year-old students. Sarah had a Master's in Education and possessed a South Carolina teaching certificate.

Tammy grew up in a suburban setting. She spent a lot of time gardening with her mom. Tammy continued gardening throughout college and into adulthood. Over the last thirty-one years, Tammy has taught gardening at SW Preschool. She has taught gardening to infants as well as students as old as eighth grade. Recently, Tammy had transitioned into a leadership role at SW Preschool, a year round faith-based preschool within a suburban area of South Carolina.

Table 3.1 *Demographic Data of Participants*

Demographic Data	# of Participants
Race: White	7
Gender: Female	7
Age: Under 40	2
Age: 40-50	2
Age: 50+	3
Number of Years Teaching: Less than 10	2
Number of Years Teaching: 10- 20	2
Number of Years Teaching: 21+	3
Number of Years Teaching Gardening to Children: Less than 5	2
Number of Years Teaching Gardening to Children: 5-10	2
Number of Years Teaching Gardening to Children: More than 10	3
Presently Teaching in Preschool Setting: Yes	5
Presently Teaching in Preschool Setting: No	2
Implemented Gardening at Faith-based Preschool	4
Implemented Gardening at University Lab Preschool	1
Implemented Gardening at Waldorf Preschool	1

Implemented Gardening at Corporate Preschool	1
Implemented Gardening at Private Funded Preschool	7

Ethical Considerations

The study was accepted for IRB exempt status. Teachers were provided an invitation to participate letter before participating in the study (Appendix D). The teachers were assured that their confidentiality will be protected in written descriptions of the research or in future conference presentations. The teachers were also informed their participation is voluntary and they may discontinue their participation at any point in the study. The data was stored in a secure location. The teachers were not provided any form of compensation for their participating in the study.

Data Collection

Qualitative narrative studies use multiple methods of data collection in order to gain an understanding of the participants' lived experiences (Creswell & Poth, 2018). My data collection period occurred during the 2019 fall semester from November 1–December 27, 2019. I collected data through individual interviews and written journals. As with most narrative inquiry studies, data collection was analyzed as it is collected (Glesne, 2016). Most of the data was collected through individual interviews. The transcribed interview data was shared with the participants within two weeks of the interview.

Interviews

I developed a semi-structured interview guide to use with each interview participant (Appendix A). Semi-structured interviews allow for flexibility and the

inclusion of new questions and probes when necessary (Glesne, 2016). In these interviews, I began by asking the teachers a series of questions about their childhood memories of gardening: how they came to learn about gardening, where they learned to garden, and how these experiences may have impacted their decision to add gardening to their curriculum. Next, I asked the teachers to tell their stories of how they came to decide to implement garden-based learning. I used probes to better understand the bridges and barriers encountered by the teachers during the process. Then, I asked the teachers to share their observations of student participation in garden activities. More specific questions related to how gardening benefitted their students' socio-emotional, physical, and cognitive learning and development.

The participants decided on the location of the interview. I conducted interviews in a variety of locations including public libraries and their worksite. Interviews lasted between 30 and 60 minutes. Each of the interviews was recorded on the researcher's I-phone through the Just Press Record app. I transcribed all of the interviews and used manual and electronic methods to code the data. I relied on the assistance of the qualitative software, NVivo v12 as an electronic method.

In efforts to be an active listener, I wrote few notes during the interview. I suspended my note taking until the interview was completed. At that time, I wrote reflexive notes from the interview on my I-Phone. These notes included how the participant responded to questions, any tensions or unanticipated surprises within the interview, and general thoughts of the interview. I also used the reflexive notes as a space to be critical of the research process.

In certain instances, a follow-up phone interview or text messaging was necessary. While the follow-up interview and text messaging was not a part of the original research design, they provided the participant an opportunity to clarify or expand on their previous statements. On a few occasions, participants provided additional statements through text messages.

Written Journals

I designed four writing journal prompts for the participants to complete (Appendix B). The prompts are aligned with the three guiding research questions for this study. For example, Journal Entries #1 and #2 were designed to answer the research question focused on how teachers' experiences shape their decision to implement garden-based learning. Journal Entry #3 was intended to answer the bridges and barriers to implementation research question. Lastly, participants were asked to complete Journal #4 that sought to answer how teachers describe the impact of garden-based learning on their students; socio-emotional, physical, and cognitive learning and development.

The participants received the prompts and an accompanying letter with directions and options for returning their responses at the conclusion of their one-on-one interviews was attached to the four writing prompts (See Appendix E). Upon receiving the participants' written journals, I transcribed the data into a Microsoft Word document. The written journal transcriptions were manually coded and later inputted into the qualitative software, NVivo v12, for analysis. If I had any questions about the content or meaning of the written journals, I contacted the participant through phone calls or text messages.

Data Analysis

Researchers who conduct narrative research have options for understanding and representing their interpretation of the participants' storied lives (Bochner & Riggs, 2014; Chase, 2011). In this study, I employed a pragmatic analysis of narrative, in which the researcher is the focal storyteller. The researcher positions himself as the analyst who is interested in using the story as data to answer specific research questions. The participants' stories are revealed in sets of themes (Bochner & Riggs, 2014).

My primary goal for the data analysis was to explore and discover common themes among the seven participants' interviews and written journals. In the process, I developed themes through verbatim and descriptive coding (Saldaña, 2015). I used descriptive coding to summarize the data into a few words or phrases. Additionally, I highlighted the actual spoken words of the participants though verbatim coding (Manning, 2017).

An iterative, multi-stage qualitative analysis occurred throughout the research process. In a preliminary analysis of data, I consistently returned to interview and written journal transcriptions, as well as my reflexive notes as I interviewed other participants. The interview and written journal transcriptions yielded the most useful data when identifying the earliest codes. These codes were written as notes on my I-Phone and later transferred into a Microsoft Word document. The reflexive notes seemed to serve a different purpose as it allowed me to be critical of the research process. At times, I experienced what Pillow (2003) called a "reflexivity of discomfort" as I questioned how my positionality, values, beliefs, and perceptions was impacting the analysis and

interpretation of the data. In order to reconcile this challenge, I returned to the participants for their guidance and input.

Once I finished interviewing all of the seven participants, I moved towards a more formal coding process. This stage involved manual coding. First, I read each line of the transcribed interviews and written journal responses. Then, I summarized the participants' responses into abbreviated phrases. Next, I highlighted the most poignant quotes and frequently used words from the texts. Finally, a list of potential codes and subthemes were entered into a Microsoft Word document.

In a second cycle of formal data analysis, I relied on the assistance of NVivo v12. This qualitative software allowed me to reorganize, reanalyze, and re-conceptualize the manually coded data. I began the process by uploading all transcribed interviews into an *Interview* folder within NVivo. I also created a *Journal* folder for the uploaded written journal responses. Next, I created a node for each of the three research questions. Further, unique codes were assigned to research questions and participant responses using two letters and one-digit code. For example, TB2 was assigned to time (category), barriers (factors), and research question (#2). Then, an open coding of words and phrases found in the transcriptions were used to identify codes. During this process, I returned to my manually analyzed data to compare codes. Finally, I used axial coding to create themes by grouping codes and labels given to words and phrases.

Throughout the second cycle of data analysis, I worked with an experienced qualitative researcher. We constantly discussed and compared our interpretations of coding categories and themes. Moreover, I shared codes and themes with the participants

over phone calls and text messages. Through these communication exchanges I was able to see similar themes, emerging information, and contrasting participant perspectives.

Role of the Researcher

The role of the researcher is that of a learner as well as a researcher (Glesne, 2011). Although I am familiar with facilitating garden-based learning in an early childhood setting, I did not embark on this proposed study as an expert. Rather, I sought to learn how preschool teachers' lived experiences influenced their decision to implement garden-based learning. Moreover, I wanted to better understand what factors enhanced or impeded the implementation process. Lastly, I wanted to gain insight into preschool teachers' perceptions of how school gardening impacted their students' learning and development.

Over the last 10 years, I have taught in early childhood classrooms. During this time, I have integrated garden-based learning into my curriculum. This decision has puzzled me. I often wonder about why I chose this curricula approach. Freeman (2016) argues that the vast panoply of reasons for making decisions, including those *proximal* (personal) and *distal* (historical and cultural), are often revealed through the storytelling and restorying processes.

As a young child, I was fortunate enough to grow up on a farm with adults who exposed me to a wide variety of experiential learning opportunities. I learned at an early age about plant life cycles, soil maintenance, and weather patterns. Unfortunately, many of these ecological lessons were absent in my K–12 school experiences, as well as my pre-service teacher training. As I began my teaching career, I noticed textbooks and prefabricated models were being used to teach lessons on plant life cycles. Clearly, my

bias was that foundational scientific concepts are abstract and complex and young students need hands-on, experiential learning opportunities.

I have met some, but not many, early childhood teachers who utilize school gardens as an instructional context and tool. Our conversations typically involve childhood stories like mine that pinpoint the adults who fostered learning in the garden. My great-grandfather ("Old Grandad"), grandfather ("New Granddad") and father ("Boom Boom") were my first gardening teachers and mentors. They were incredible teachers of indigenous agricultural techniques. By the age of five, I knew the importance of companion gardening and growing the three sisters: corn, winter squash, and climbing beans. Presently, my mom serves as my gardening mentor. Through the medium of gardening, our relationship has strengthened.

Trustworthiness

Quantitative researchers take into consideration the reliability, objectivity, and validity to ensure the trustworthiness of the research findings. Qualitative researchers use the terms credibility and dependability to describe the trustworthiness of the study (Guba, 1981; Schwandt et al., 2007). I employed various methods to ensure the rigor of my research findings.

Credibility is understood as the confidence that can be placed in the truth of the findings (Macnee & McCabe, 2008). I established credibility by adopting member checking as a credibility strategy. During the research process, I constantly provided the participants my data, categories, and interpretations for their review. Korstjens and Moser (2018) believe member checking strengthens the data because the researcher and participant will view the data differently.

Dependability is defined as "the stability of the findings over time" (Bitsch, 2005). Dependability is used by qualitative researchers to ensure consistency of the findings. Dependability involves the researcher providing the methods for data collection, analysis, and interpretation (Anney, 2014). I established dependability in two ways. First, I created an audit trial by keeping a detailed record of the research process. I included the methodological and analytical choices in my report. Tangible documents included interview transcriptions with manual coding, written journals, demographic data forms, NVivo printouts, and reflective notes. Second, I employed peer examination. On a bi-monthly basis, I meet with an experienced qualitative researcher to discuss the research process and findings. The colleague challenged me to become more reflexive about my interpretations of the data. Furthermore, the colleague helped me discover themes that may have been overlooked.

Limitations

This study had multiple limitations.

1. The analysis of the data and conclusions that I have drawn are my own interpretations. Certainly, as lead researcher, my knowledge of child development theory, goals for early childhood education, and beliefs towards garden-based learning impacted the analysis and interpretations of the interview and journal data. However, I shared the transcriptions and results with the participants to gather their input and to ensure my interpretations aligned with their own.
2. The use of a convenience sample to recruit preschool teachers who have implemented gardening education may be considered a limitation; however, it is

commonly used in qualitative studies such as this, where access to a particular group is difficult to obtain through other methods.

3. The study focused on early childhood teachers in a metropolitan area of South Carolina and does not represent all early childhood teachers in South Carolina.
4. Qualitative methods such as interviews provide detail and examples to support the participants' experiences and perceptions. However, the findings are not a representation of the larger population. To address this design characteristic, a survey may be considered in future research projects.
5. The participants had demographic similarities in terms of gender and race. All seven of the participants were White females. Future research should include a diverse-range of perspectives, especially from teachers of color, as well as male childcare providers.
6. The participants worked in faith-based or private care childcare settings. Further research could be conducted with gardening teachers who work in other types of early childhood programs, including Head Start, Montessori Schools, and homebased services.

Chapter Summary

I conducted research at multiple early childhood centers and public libraries in South Carolina. I interviewed the seven participating teachers over the course of two months. In some instances, phone call follow-up interviews occurred. Additionally, I collected written journal entries from the participants. These narrative qualitative research methods were used to understand the lived experiences of early childhood teachers who implement garden-based learning into their curriculum. The storied and told

lives of the participants and researcher were gathered, analyzed, and interpreted according to themes. Measures to ensure credibility and dependability were undertaken throughout the research process.

Chapter 4

Research Findings

The purpose of the current study is to explore and describe the lived experiences of early childhood teachers who implemented garden-based learning into their classrooms. The data were collected through interview questions and writing journal prompts. These methods put particular emphasis on how the teachers' lived experiences shaped their decision to implement garden-based learning into their classrooms. A second area of this study looked at the barriers faced by teachers as they implemented gardening and how they navigated these barriers. A third area focused on how the teachers described the impact on garden-based learning on their students' learning and development.

Data collection primarily focused on interviews with seven preschool teachers. In addition, data were gathered through their journal writing entries. All data was transcribed by the researcher and returned to the participants for their review. The data was analyzed using thematic analysis. This chapter presents data, and the analysis of the data, as related to the research questions.

This chapter will present the data in four sections:

- Part 1: Teachers' experiences shaping decision to implement garden-based learning findings
- Part 2: Bridges and barriers to garden-based learning implementation

- Part 3: Impact of garden-based learning on student learning and development findings

Part 1: Teachers' Experiences Shaping Their Decision to Implement Garden-Based Learning

All seven of the preschool teachers were interviewed about their lived experiences and how these experiences impacted their decision to implement garden-based learning. Participants were contacted through text message if additional information or clarification from the interview was needed. Out of the seven teachers who completed the one-on-one interview, four participated in the journal writing exercises. It is uncertain why the other participants did not complete the journals.

The interview began by asking the participant "Will you please describe some of your earliest memories with gardening?" During the interview, the researcher used judgment in asking probing questions. The first interview question was similar to Journal Entry #1: "Please share one of your earliest memories of gardening." A follow-up probe was included in Journal Entry #2: "Please share how your earliest experiences with gardening impacted you."

Findings showed the participants described three lived experiences that impacted their decision to implement garden-based learning (Table 4.1). The three themes identified were childhood gardening experiences, working in a school with a garden (culture), and interacting with children.

Table 4.1 *Catalysts for Implementing Garden-Based Learning*

Experiences	Aspects of Experiences
Childhood gardening experiences	Personal history
	Family members
	Community members
Working in a school with a garden (culture)	Presence of gardening space
	Educational value of gardening
Characteristics of Today's Young Children	Reconnect children to nature
	Provide food education

Childhood Gardening Experiences

Participants acknowledged one of their main reasons for implementing garden-based learning was the act of gardening in and of itself. For many, this interest was based on their personal history, with references to gardening as a lifelong activity. Lila explained: "working with plants has been a part of my life as long as I can remember." Tammy stated she was planting "probably at the age of three or four years old." Sarah claimed gardening has been "just a part of our everyday lives."

Sarah, like several of the other participants, credited family members with facilitating their lifelong interest in gardening. For Sarah, her grandparents provided the necessary guidance and instruction in gardening that carried over to her classroom garden. As Sarah fondly remembered:

> My grandfather, who was a farmer, and I would walk through the fields and he would show us how to check the corn. My grandmother, who had a flower garden, we would plant with her. She showed us how to plant the little sprouts that she started from seed.

Participants also mentioned parents as their earliest gardening teachers. For Tammy, her mom was engaged in the teaching process because "it was important for her to teach me where the food was coming from, the tomatoes and cucumbers that I liked." Lila's dad took a different approach to providing gardening instruction. Lila claimed "it was more of an observation type of experience … but he would involve me in the process if I was interested."

Amy was the lone participant who cited a sibling as having a significant impact on her decision to implement garden-based learning. Amy remembered her older sister "always growing vegetables and stuff: veggies, herbs, lettuces, kale, and carrots". Many of these plants were infused into essential oils and herbal medicines. Amy recalled her sister giving the natural remedies to her four children when they were ill. Through her sister's example, Amy was able to better understand how gardening positively impacted children's health and well-being.

Participants frequently recounted childhood experiences in the garden and connections they made with those in their communities. In the participants' stories, they mentioned community members and how they openly shared their gardening knowledge, which made implementing garden-based learning a perfect fit. For example, Fern shared a childhood memory of a close family friend who taught her how to construct "big, old school green beans tie ups, like teepees…I have those in my school garden now too." Other participants shared that a few community members opened up their residence and surrounding land so neighborhood children could learn about gardening. This was especially important for Tammy who grew up in a suburban setting. An inspired Tammy reflected:

(Mrs. Sawyer) would allow us to roam throughout the yard and play in the apple tree … she was teaching us things in the garden. She would explain things and why she was doing the things. She was great.

Sarah grew up in a rural setting but had a similar experience as Tammy. Sarah described an elderly neighbor that "was very happy for us to plant in her garden". In the neighbor's backyard garden, Sarah and her two teenage brothers grew seasonal vegetables. Sarah indicated that after the harvest they would "deliver the produce to her and she would have us into her house." This childhood experience was significant to Sarah as she learned how gardening can promote social and community connections.

Working At a School with a Garden (Culture)

Participants reported that the experience of working at a preschool with a garden was a driver for their implementation of garden-based learning. Two participants claimed they had access to raised garden beds when they initially considered implementing garden-based learning in their classroom. Amy felt like having garden beds accessible and "available for you, if you wanted to start a garden for your class" made the decision easier. Amy also stated that her implementation was most likely expedited because she was working in a school with a gardening culture. In her workplace, gardening was celebrated by administration, staff, and families as a powerful educational tool.

Fern, like Amy, worked at a school with an existing garden that supported her decision to implement garden-based learning. Fern remembered "the raised beds were there. They weren't being used." The vacancy of the garden boxes was not a deterrent though. After a conversation with her school administrator, Fern was allowed to use the raised beds to teach her students about gardening. Unlike Amy, a gardening culture did

not exist at Fern's school. Fern claimed that while she was supported by the school's administration and community, she remained the only teacher who engaged students in garden-based learning.

Characteristics of Today's Young Children

Participants frequently mentioned that a catalyst for implementing garden-based learning were their observations about the characteristics and previous experiences of the young children with whom they were working. They felt that "times are different" as children had fewer opportunities than previous generations. For some participants, they noted their students "don't come from places where they get outside a lot", and thus were less likely to develop an intimate relationship with nature. Gardening was perceived as a way to reconnect children to nature. Fern explained "I think just watching something grow and knowing that you took care of it, I think the kids would appreciate it. I don't think a lot of kids probably do those things anymore either. Times are different so I decided to do something about it." Fern felt confident that she had been successful in reconnecting her students to nature through learning "outside the classroom…not just sitting at the table doing work every day". Interestingly, Fern pointed out that the indoor classroom is a learning context where a relationship with nature can be promoted. Fern described her classroom as having "plants all over the place. Our science center has things that we grow."

Another participant, Marion, wanted to use gardening as a way to reconnect her students to nature. But for Marion, learning in nature was described in the context of "community." According to Marion, "I wanted to get my kids involved in the community … start a butterfly garden … (write) a grant for a solar-powered bluebird house … it

wasn't just the garden part." By intersecting garden-based learning and place-based education (Sobel, 2014), Marion imagined her students developing a deeper ecological understanding of their surrounding environment.

Other participants stated their decision to implement garden-based learning was shaped by their students' lack of food education. Gardening was perceived as a tool to educate "a lot of children (who) do not understand that plants are edible and food does not come out of the freezer or a can." Irene went on to say, "There are so many kids don't even go to the grocery store anymore. (Their parents) order food online. They have no sense of where this starts." It was Irene's belief that garden-based learning would provide more opportunities for "kids to see where (food) comes from … so they can make salads." Irene stressed the importance of healthy eating that comes from growing vegetables in a school garden.

Sarah, like Irene, was motivated to implement garden-based learning to educate her students about food. While Irene focused on growing food for health purposes, Sarah wanted her students to learn about the history of locally grown foods. In particular, Sarah wanted her students to have an understanding of rice, a historically significant crop to South Carolina. Sarah explained the spark for teaching about rice production occurred after attending a rice festival on the South Carolina coast. She remembered that "my friend and I asked people about rice. No one knew that rice had been grown around Walterboro." Confused by the adults' responses, Sarah returned to the classroom to ask her students questions about rice. The students stated that rice "came from the grocery store". Sarah concluded that "they had no concept that food grew."

From these concurring events in her personal and professional life, Sarah felt compelled to introduce rice production into her curriculum. Sarah initiated the garden-based learning experience by working with a local arts festival and a neighboring elementary school to install four rice bogs onto her preschool campus. After the installation was complete, Sarah's students planted rice seeds in the bogs. During the growing process, Sarah and her students learned that rice can flourish in various mediums including water and soil. In the fall, Sarah's students completed the entire process by harvesting and eating the locally sourced rice.

Part 2: Bridges and Barriers to Garden-Based Learning Implementation

All of the participants were asked to identify and describe the factors that enhanced (bridges) and impeded (barriers) implementation for garden-based learning. Interview questions included "What challenges did you face when you first implemented gardening into your classroom?" Follow-up interview questions usually pertained to bridges for implementation like "How did you overcome such challenges?" and "What supported your implementation?" Additionally, participants were asked to share their professional experiences with implementation in Journal Entry #3: "Please share a story when you first considered adding gardening to your teaching." The findings of the study outlined in Table 4.2 showed that the leading factors for enhancing implementation were support from students' families, school administration, school community, and teacher's family. The barriers included an overall lack of funding, time, space, and knowledge.

Table 4.2 *Factors Impacting Garden-Based Learning Implementation*

Bridges	Barriers
Students' Families Support	Funding
School Administration Support	Time
School Community Support	Space
Teacher's Family Support	Knowledge

Bridges to Implementation

Student Family Support

Students' families support was mentioned by four participants as a bridge to garden-based learning implementation. According to Fern, students' families' support alleviated some of the financial costs associated with gardening activities. Fern was able to gain the support of families though a "class page on Facebook that's private…we go live to show the parents the children are doing these things and being outdoors and planting their plants." Fern remarked that once the parents viewed the social media broadcasts they "became more engaged" and more willing to send in gardening supplies.

Like Fern, Marion used technology to influence gardening in her classroom. Marion provided two examples of how she generates parental support for gardening through technology. First, Marion sends emails to parents when her class needs gardening supplies. Marion elaborated, "I am also fortunate to work in a community that loves for their children to be doing this. All I have to do is send out an email requesting 14 bags of garden soil and I'd have it the next day." Second, Marion requests funding for more costly gardening projects on a website called DonorsChoose. Marion said in the last year

her parents' online financial contributions had allowed her to purchase three hydroponic gardening systems for the classroom.

Sarah also said that support from students' families provided her the means to implement gardening into her classroom. For example, Sarah mentioned that "parents will bring in seeds of foods their child loves to eat." The seed donations supported Sarah's garden implementation in multiple ways. First, the donations allowed Sarah to purchase other gardening supplies, like soil and fertilizers. Second, the gifted seeds from students' homes motivated Sarah to explore a curriculum that she described as "driven by the children." Sarah's exploration that started with the children's home experiences and what they know is aligned with a culturally relevant pedagogy framework (Howard, 2003; Ladson-Billings, 1995).

Lastly, Tammy stated that parental support had enabled her to implement garden-based learning. Tammy recalled that her students' parents "like going out there and seeing what's growing in the garden. They also like seeing their children excited about learning." From Tammy's perspective, she felt that her preschool parents have expressed their support for garden-based learning by donating items like soil, seeds, and plants.

Administrative Support

For Amy and Tammy, it was essential that they worked at preschools with a school administration that supported their decision to implement garden-based learning. Amy stated that in her first year of teaching she approached the preschool director and said "I want to do a garden". The director's immediate response was positive and encouraging. Amy claimed the administrative support never wavered and was demonstrated in multiple ways. For instance, the director was supportive of Amy's

decision to move an existing raised garden bed to a location closer to her classroom. This relocation allowed Amy the opportunity to teach gardening on a more frequent basis. Amy also said the preschool director was financially supportive of her gardening initiatives. Amy elaborated: "And the school pays for the dirt. They get that soil cube. It's huge. It's more than enough dirt for all of the raised beds and we've got seven of them now."

Like Amy, Tammy received financial support through her school administration. Tammy discussed how this was a bridge to implementation: "From the first director we have put it into the budget so it's worked out. Every year, we have an allotment of money we can spend … I could not have done it without this help." Tammy added the funding had remained constant for over two decades at her worksite, even when administrative changes had occurred.

School Community Support

School communities play a vital role in supporting place-based initiatives such as school gardening (Hazzard et al., 2011; Potapchuk, 2013). Several participants mentioned how school community members supported their implementation of garden-based learning. For example, Marion commented that a local non-profit organization "who owns the land (around the school), wanted to start a butterfly garden at the front of it. Someone got my name and asked if my kids and I were interested. So we said sure we would help them do that." The non-profit's support extended to assisting Marion's students with "raising funds through a lemonade stand." Marion also remembered that a state university with a local extension office played a critical role in providing the

financial support to implement and sustain the school's raised garden beds. Marion remarked:

> Fortunately, with this program you get a starter grant. It will sustain you for the first three years. They said from there you'll be on your own but really you're not … we pay Clemson Extension a nominal amount like $15/year and that covers any teacher that's farming here and they'll drop off seeds and transplants for us. So yeah I did think money was going to be a big issue [but] it has worked out.

Like Marion, Lila explained how community members supported her implementation. Lila said her rural community had opened up their property so she could "focus on nature studies". This was a necessity for Lila who stated that "we don't have a good space for a in the ground type of garden. We take nature walks for plant identification."

Irene also acknowledged that her efforts to implement garden-based learning were impacted by community support. Irene remembered that when she was "trying to make our playground into an outdoor classroom" a local art store donated the much needed supplies. The donation included a wooden crate. Irene recalled that the school's "maintenance man put it on legs and we filled it with dirt." Irene was able to utilize the raised planter for several years.

Teacher's Family Support

Amy was the only participant who mentioned her own family as a bridge to implementation. Amy named her husband and father-in-law as those who provided the support needed to successfully start a school gardening project. Amy said her husband encouraged her to grow vegetables at home. This experience gave Amy the confidence to

introduce gardening to her students. Amy's father-in-law also played a supportive role in her first attempt at school gardening. Amy remembered her father-in-law sharing "books that were helpful…I would use those to give me the knowledge of plants that are supposed to be in partial sunlight and those needed to be in full sunlight." Amy continued: "He has helped me with some tips. He also helped me by giving seeds."

Barriers to Implementation

Funding

Participants acknowledged that a general lack of funding was a barrier when implementing garden-based learning into their classroom. Most participants remembered the initial purchasing of gardening materials came "out of our pocket". Other participants stated they had received financial support from their school but it was an insufficient amount. For example, Fern stated: "They're (school administration) supportive but not moneywise. But they do give, as everybody gets a certain amount at the beginning of the year. And we use that money the first week on the garden so (every)thing else is up to us."

Lila asserted when she first implemented garden-based learning, she did not have the money to purchase the preferred raised garden beds. Instead, Lila decided to use container plants as an educational tool. This was a more cost-friendly option for Lila. Research on teachers' gardening implementation practices cites container gardening as a promising solution to overcoming financial and spatial barriers (Huys et al., 2017).

Participants also experienced other financial challenges, such as securing ongoing funding for gardening activities. For example, Irene explained that finances became a problem when her "planter fell apart after two years." Lacking the funds to rebuild the

raised planter, Irene said she has "shifted more towards my own classroom." Irene stated that most of her gardening activities are now occurring indoors and in the spring. In her interview, Irene expressed a desire to secure funding for another raised planter so her students have more outdoor gardening opportunities.

Like Irene, participants who described funding as a barrier to implementation were unaware of how to access it. Only one participant, Marion, mentioned grant funding. As previously described, Marion received a starter grant through a state university in South Carolina. The grant enabled Marion to provide gardening experiences to her students for multiple years. These findings were consistent with those of Davis and Brann (2017) who examined the benefits and barriers of instructional gardens in childcare settings. They found that childcare providers need additional assistance and access to financial resources to increase the sustainability of school gardening programs.

Time

Participants discussed time as a barrier to implementing garden-based learning. Three participants felt there were no issues with time at all; others felt that not have enough time in the school day to "fit it in" was an issue. For example, Tammy said it was difficult to find time to include gardening into her crowded teaching schedule. Tammy addressed this challenge by integrating gardening "during their free play. We would be over at a table doing things. Kids would circulate in and out and ask 'What are you doing? What are you planting?'"

Amy also experienced challenges with time. Like Tammy, Amy attempted to resolve the lack of time issue by integrating gardening with free play. Unfortunately, Amy's raised garden beds were permanently located on the school playground. Amy

elaborated on this challenge: “On the preschool playground you got infants through kindergarten on there every day. So you have a very tight schedule and you only have so much time on the playground … So sometimes (gardening) has to be broken up into a couple days.”

Interestingly, Marion referenced significant events in her personal life as a barrier related to time. In her interview, Marion explained “having children” caused her to delay taking a gardening class that would have enhanced her implementation of garden-based learning. Marion felt she “just wasn’t into (the course work) at the time.” Marion mentioned that she eventually completed an online gardening course because it did not interfere with her home life.

Space

Participants acknowledged that space was a barrier to implementation. Some participants felt a general lack of space was a prominent challenge to outdoor gardening. For example, Irene stated that “being downtown, space is an issue.” Irene described her worksite as a preschool within an urban setting with “little space to grow.” Sarah also worked in an urban preschool with a limited amount of space. Sarah discussed the difficulties of limited gardening space and included the impact of environmental toxins on urban gardens. She said that a city agency “spraying for mosquito larva killed off our butterfly garden.” The following year, Sarah decided to not grow native plants that attract butterflies and other pollinators within the school garden.

Other participants discussed issues about the physical location of the school garden as a space concern. Amy described the location of her school’s raised garden beds as being “out there in the woods.” Amy said the remote location presented several

challenges that included limited access to a water source and the walking distance for her three year-old students. Another participant, Irene, reported her implementation was interrupted by the location of the school garden. Irene asserted the garden was not in an ideal space because it was near the school playground. On multiple occasions, she observed students "pulling plants out of the planter" and "throwing Legos over the fence" into the garden space. Irene disclosed this was frustrating because it disrupted and delayed her planned gardening instruction.

Teacher Knowledge

Participants discussed a general lack of knowledge of outdoor gardening as a challenge to implementation. For example, Amy said, "I feel like I struggle with a lack of knowledge on growing things." When asked to describe specific aspects of gardening that were the most difficult, Amy replied "I don't how to determine which one needs to be put into the soil and which one is ready to be put outside." Amy felt she needed additional support from gardening experts to address this challenge. Another participant, Irene, stated her lack of knowledge pertained to year-round gardening. She stated "I need to learn more about seasons and which plants to plant- and when." Irene felt confident in instructing her students how to grow summer vegetables but wanted to use the garden in all seasons. Irene aspired to grow cool season plants like lettuce for the purpose of educating her students about nutrition and healthier eating options.

Perhaps paradoxically, the participants who discussed gardening knowledge as a challenge often cited multiple ways they had strategically obtained gardening information. Some participants attended gardening classes to learn how to grow seasonal plants. Others researched gardening through various sources: books, social media, and

blogs. And there was one participant, Sarah, who gathered gardening information through a local farmer. Sarah offered:

> Caroline, the farmer at the garden, will help me when I have a question. She let me know about the incorrect dates on the seed packages. She said we should plant earlier on the coast. She helped me grow carrots because I struggled with the seeds. She told me to put wet newspapers on the carrot seeds for 14 days without peaking.

Part 3: Impact of Garden-Based Learning on Student Learning and Development

The interview typically concluded with each participant being asked to describe how garden-based learning had impacted their students' socio-emotional, physical, and cognitive learning and development. Additionally, the participants were asked about their students' learning and development in Journal Entry #4: "Please share a story how gardening has benefitted your students." Findings showed the participants' perceived impact of garden-based learning on students' socio-emotional, physical, and cognitive learning and development (Table 4.3).

Table 4.3 *Impact of Garden-Based Learning*

Learning & Developmental Domains	Indicators
Socio-emotional benefits	Positive sense of self More likely to interact positively with other children Form meaningful relationships with familiar adults
Nutrition	Healthy eating Student and family involvement

Cognitive	Language Arts
	Mathematics
	Social Studies
	Science

Socio-Emotional Benefits

Participants described how garden-based learning impacted their students' socio-emotional learning and development. The participants discussed that gardening provided their students the opportunity to develop a positive sense of self, interact positively with other children, and form meaningful relationships with familiar adults.

Positive Sense of Self

Participants discussed how their students developed a positive sense of self through garden-based learning. For example, Lila said that her students became more self-confidence after growing pumpkins at school. She said, "they were adamant about checking on their pumpkin seeds…and it was a great surprise to us all that they came up." Over the next few weeks, the students cared for and tended to the plants until the pumpkins were harvested in the fall. Lila claimed growing pumpkins motivated her students to grow other plants throughout the school year.

Other participants noticed their students attempting difficult tasks in the garden. For example, Fern observed her students becoming more precise and careful with watering the garden plants. Fern said that after several heavy rainfalls the children came to realize that "you could actually give (the plant) too much water and kill it." Amy witnessed her three year-olds transition from playing in the garden soil to taking care of

the plants. She said by the end of the school year, the students are able to plant, water, and harvest a plant. Irene also noticed her four year-old students become more responsible. She said that "they take a great deal of pride and ownership in taking care of their own plant. They have to water their plant every day."

Interact Positively with Other Children

Participants described how school gardening has nurtured students' interactions with each other. More specifically, participants discussed students interacting cooperatively. For example, in Sarah's classroom, gardening is understood as a "shared enterprise". She stated that students share in the work of caring for the plants. Furthermore, sharing amongst students extends to consuming crops. Sarah said that while all harvests are communal, some students needed peer-support in understanding cooperation. Sarah explained: "Well, they do it together. Like in our garden, we are growing fennel. There is a child who loves fennel. Another child told him that he couldn't eat it all. Then, we won't have any more."

Other participants discussed children forming and maintaining friendships with a few other children. Sarah believed that "children often become friends over activities they like and gardening is the same way." In agreement, Irene shared: "I think it brings kids together that wouldn't normally play together during center time. They get excited and help. 'Let me help put dirt in your cup' or 'I have extra seeds.'" Marion had similar experiences, "These are children that wouldn't necessarily seek each other out on the playground to play and hang out but they're just sitting back talking and sharing stuff. I think that's another benefit, it sort of breaks down any barriers."

Form Meaningful Relationships with Familiar Adults

Participants described how gardening activities fostered meaningful relationships between students and the adults in their lives. Marion remembered two students, Rose and Chris, who made positive relationships with adults while gardening. Rose was a child born with a mouth deformity. At an early age, Rose had surgery to widen the roof of her mouth. The surgery had a significant impact on Rose's speech. She was very self-conscious of her speech so she spoke minimally to any of her peers and teachers. Marion said Rose remained reluctant to talk until she became invested in school gardening. Marion explained:

> As we started gardening, she volunteered every single day. And eventually, she started talking to me a little bit, more and more, as we were pulling weeds or layering the garden. By the time it's all said and done, I knew what color her bedroom was. I knew the name of every single one of her cats. It was a way for her. It was an environment that was stress free. She really came out of her shell.

Marion also discussed Chris, a former student, who made meaningful relationships with adults through gardening. Chris came from a family of gardeners but did not live near his relatives. Chris' mom informed Marion that Chris became closer to his grandparents once he started gardening at school. Chris would regularly call his grandparents to share his gardening experiences and accomplishments.

Fern shared a heartfelt memory of a former student, Heather. Fern remembered Heather as being a preschool student who thoroughly enjoyed gardening. Although they had not seen each other in several years, Heather invited Fern to her second grade classroom. Upon her arrival, Fern learned that Heather had initiated a garden project with

her second grade peers. Heather told her peers the project was inspired by her former teacher and the moments they spent in the garden.

Nutrition

Participants described how garden-based learning impacted their students' health and nutrition. The participants discussed that school gardening was a tool to support children and their families' learning about healthy eating habits.

Healthy Eating Habits

Participants indicated that garden-based learning activities had an impact on their students' eating habits. The participants shared their observations of times in which their students developed healthier eating habits after participating in growing and harvesting plants. For instance, Sarah told a story about how her two year-old students came to prefer cowpeas for a snack. She explained: "Last summer, we threw cowpeas on the ground. In the fall, the class harvested the beans. We had the peas with rice. It was their favorite snack so they wanted to grow more … we did some research and we learned it [was] too cold [to grow] the peas." Alongside this example, Sarah provided other stories of her young students enjoying the healthy foods they grew at school.

Fern too frequently mentioned that garden-based learning activities had encouraged her students to become healthier eaters. For example, Fern recalled that her students said they did not like green beans, butter beans, and cherry tomatoes until they grew them in the school garden. Fern believed that "positive peer pressure" was one factor in students' willingness to try new foods. She said that her more reluctant eaters became motivated after watching their classmates try fresh fruits and vegetables. Furthermore, Fern believed that family involvement in garden-based learning was a

motivator for children developing healthier eating habits. Fern facilitated involvement by inviting families to her classroom event called "Tasting Tuesday." At the event, students and their families were encouraged to try fresh food grown in the school garden. The remaining harvested food was shared with the families. Some students told Fern that "their mom cooked it or sautéed it and they tried it."

Cognitive Learning and Development

Participants described how garden-based learning impacted their students' cognitive learning and development. More specifically, the participants discussed how gardening supported their students' growth in language arts, mathematics, social studies, and science.

Language Arts

Two participants discussed the role gardening played in supporting their students' language development and communication. Tammy said that as her students became more invested in school gardening projects, they started asking questions in order to get information. Tammy said some students asked general questions like "What are you planting?" while others asked more sophisticated questions that considered how weather conditions impacted gardening. Fern felt her students shared stories with greater detail and enthusiasm after learning in the garden. For example, Fern recalled her students using more "colorful" adjectives when describing the plants growing in the raised garden beds. Fern elaborated on why she felt gardening played a significant role in this aspect of the students' language development: "I saw them pay attention more…They were excited about learning…They were focused on doing the planting."

Irene discussed how garden-based learning had impacted her students' foundation for reading. Irene felt her students' interest in books was fostered when she integrated gardening into literacy classroom literacy activities. Irene remembered her students gravitating towards books with a gardening theme such as *The Tiny Seed* by Eric Carle. Irene also claimed that her students became more interested in fairy tales and nursery rhymes because of their "Jack in the Beanstalk" unit that included growing green beans in the classroom garden.

One participant discussed foundations for writing. Amy said her three year-old students' writing development was promoted by encouraging her students to make simple, yet developmentally appropriate "scribbles" and drawings of plants. Amy routinely displayed the students' writing on the classroom bulletin board so families could observe their child's learning and development.

Mathematics

Participants discussed the impact gardening had on mathematical thinking and expression. Irene felt the school garden was an invaluable context for incorporating many different types of counting activities. Irene recalled her students demonstrating a beginning understanding of numbers and quantities after multiple opportunities to pick beans off the host plants.

Other participants discussed measurement. Marion said her students developed a better understanding of measurement after repeated use of a digital scale to weight foods harvested in the school garden. Marion's students also learned how to measure liquids by adding water and nutrients to the indoor hydroponics gardening systems. Amy recalled her students demonstrated an understanding of measurement through repeated

maintenance tasks in the garden. Amy said her young students routinely used a watering can as an informal measuring tool to water the plants. The students also used buckets to informally measure and replenish soil into the preschool's raised garden beds.

Social Studies

As previously mentioned, Sarah described how she coupled gardening with local food histories to impact her students' learning and development. While this was a unique finding to the study, other participants discussed the impact of garden-based learning on their students' independence in caring for the environment. For example, Sarah and Tammy routinely observed their three and four year-old students complete a series of maintenance tasks including watering the plants, weeding, and composting. Lila discussed how her students constantly want to add container plants and flowers to beautify their school garden. Irene said her students cleaned up toys around their raised planter without being prompted.

While other participants discussed outdoor garden maintenance, Marion focused on how her students cared for an indoor hydroponic gardening system. On a daily basis, Marion observed her students checking the plant food and water levels on the system's digital screen. As they became older, the students learned how to adjust the lights and clean the water tank. According to Marion, these maintenance tasks taught the students many lessons, including the care for plants and their indoor learning environment.

From the teachers' narratives, it was evident the students were provided ample opportunities to learn how to care for the environment. These opportunities were either explicitly taught or embedded into garden-based learning activities. Furthermore, a few

participants, like Amy and Sarah, gave credit to older preschool students for modeling how to perform maintenance tasks to the three year-olds.

Science

Participants described garden-based learning as inquiry, the process of gaining knowledge through questioning and exploring (Kermani & Aldemir, 2015). As scientists, students engaged in the physical world around themselves in the pursuit of knowledge. Participants felt their students began to think like scientists by asking questions about natural phenomena that occurs within their school gardens. For example, Amy and Lila's students questioned whether pumpkin seeds could grow in the winter. During the initial stage of exploration, the two groups of students shared their prior experiences with growing seeds. These conversations helped each class determine how they wanted to plant the pumpkins seeds. Amy recalled her students loosely scattering the seeds along the perimeter of the preschools raised beds. Lila remembered her students planting the seeds deep into the garden soil. After a period of observation, the seeds sprouted in the two gardens. The teachers supported student learning by encouraging students to collect documentation through photographs, drawings, and journaling. The students participated in science talks around their displayed documentation in order to better understand how the seeds grew in such unlikely conditions.

Chapter 5

Discussion

The purpose of this qualitative narrative inquiry was to gain insight into the lived experiences of early childhood teachers who implemented garden-based learning. The study examined how the teachers' lived experiences shaped their decision and efforts to implement gardening within their classroom. Additionally, the study explored how teachers described the impact of garden-based learning on their students' socio-emotional, physical, and cognitive learning and development. This chapter will discuss the findings of this study and the implications on preschool administrators and teachers. The chapter will conclude with a discussion of the limitations of the study, recommendations for future research, and a brief summary.

This chapter contains discussion and future research possibilities to help answer the research questions:

1. How do teachers' experiences shape their decision to implement garden-based learning?
2. What bridges and barriers do teachers describe in their efforts to implement garden-based learning?
3. How do teachers describe the impact of garden-based learning on their students' socio-emotional, physical, and cognitive learning and development?

Summary of Findings

This study sought to build upon preceding research studies of early childhood teachers who have implemented garden-based learning (Davis & Brann, 2017; Murakami et al., 2018; Williams & Brown, 2012). Moreover, the study builds on recent studies that examined factors that enhanced or impeded teachers' implementation of gardening education (Burt et al., 2018; Hazzard et al., 2011; Huys et al., 2017; Murakami et al., 2016). Finally, this study contributes to the emerging body of research that explores the impact of school gardening on young children's learning and development (Blair, 2009; Christian et al., 2014; Murakami, et al., 2016; Murakami et al., 2018; Ohly et al., 2016; Williams & Dixon, 2013). The findings were as follows:

1. Childhood gardening experiences shape teachers' decision to implement
2. Professional experiences shape teachers' decision to implement
3. Family supports enhance implementation efforts
4. Funding, time, space, and teacher knowledge impedes implementation efforts
5. Multiple developmental domains are impacted by garden-based learning

Childhood Gardening Experiences Shape Teachers' Decision to Implement

Childhood gardening experiences were described as a catalyst for implementing garden-based learning into their curriculum. Participants shared a genuine interest in gardening. This lifelong interest was initiated during childhood. As a young child, participants learned foundational gardening skills from significant others in their lives. Participants learned how to germinate seeds, grow plants, and harvest foods before kindergarten. Later in life, participants relied on these skills when implementing garden-based learning into their classroom. Although a number of researchers have investigated

the influence of significant life experiences on teachers' practices (Altan & Lane, 2018; Butt et al., 1990; Goodson & Gill, 2014), this study contributes to literature by identifying childhood gardening experiences as critical, yet subtle events that affected preschool teachers' perspectives and practices.

As previously mentioned, the participants highlighted significant others when describing their childhood gardening experiences. These findings are consistent with research that discusses the influential role families play in fostering children's interest in gardening (Hirschi, 2015; Selmer et al., 2015), yet this study showed that community members may be playing a pivotal role too. For example, participants described neighbors and family friends as gardening mentors who provided a wealth of gardening information. Furthermore, community members shared gardening plots at their homes so children could have the opportunity to apply the learning knowledge. The social and communal aspects of intergenerational gardening remained with the participants when they decided to implement garden-based learning. This was evidenced by several participants recalling their concerted efforts to include family and community members in gardening activities at their preschool.

Professional Experiences Shape Teachers' Decision to Implement

Participants reported their professional work experiences influenced their implementation decision-making. Two themes related to professional work experiences included: (a) working at a school with a gardening space and culture and (b) interacting with young children.

There were differences in the participants' access to a garden space. Five participants did not have an existing space to implement garden-based learning. Other

participants, Fern and Amy, discussed having access to existing gardens. Fern and Amy felt garden accessibility made the implementation more feasible, even though they described the garden spaces as less than ideal. Fern described her raised garden beds as vacant and needing repair. Amy described her garden space as being too far away from the school.

Amy and Fern claimed their decision to implement gardening education was impacted by the presence of a gardening culture at their preschools. Amy was surrounded by a school community that valued gardening. This made Amy's garden implementation less challenging. Fern recalled working alone on revitalize the school gardens.

These findings are similar to other studies that identified space as a barrier to gardening implementation (Burt et al. 2018; Huys et al., 2017), yet the participants in this study described the ways in which they were able to overcome such spatial challenges. For example, the five participants started gardening education initiatives at their preschools, quite literally "from the ground up". Without access to a garden space or school community to lend support, the participants persevered until implementation was complete. Preschool teachers considering implementing garden-based learning would be behooved to assess whether they have the confidence and experience to undertake an initiative of this magnitude.

Participants described their interactions with young children as a catalyst for implementation. Louv (2008) as well as early childhood researchers (Rivkin, 2015; Schutte et al., 2017) have advocated for young children to receive additional time in nature to achieve optimal growth and development, yet there has been a trend towards cutting back or eliminating outdoor play and learning time altogether (Jarrett, 2013).

While participants in this study acknowledged having experienced issues with time, they had administrative support to teach outdoor gardening without time restrictions. Professional credibility and autonomy seemed to have been earned by the teachers' diligent and longstanding commitment to use gardening education as a vehicle to reconnect children to nature.

Participants also described lack of food education as a catalyst for implementation. Participants felt that garden-based learning would improve their students' understanding of the food cycle. Wolsey and Lapp (2014) are supportive of this practice. The researchers propose that educators use school gardens as a vehicle to *repersonalize* food. Wolsey elaborated:

> For many students, the source of their food is obscured from their view. The nutritional value of the food they eat may be unknown, in part because they do not have access to healthy and fresh food in a reliable way … (Through gardening) students learn how food comes to the table, and they learn to have a hand in making that happen. (p. 55)

A noteworthy finding of the study suggests that local food education was a catalyst for implementation. Sarah's recollection of growing rice was analyzed and interpreted as a lack of food education, but that was an incomplete interpretation. Sarah's story included a teaching component that needed to be highlighted in the findings. While previous researchers (Cutter-Mackenzie, 2009; Martinez, 2010; Page, 2012) mention the importance of growing products that mirror those grown in the community, this study highlights multiple advantages of growing local food including social-emotional benefits, healthy eating habits, and cognitive learning and development.

Family Supports Enhance Implementation Efforts

While current research indicates that family support is critical during implementation (Hazzard et al., 2011; Huys et al., 2017), this study found that participants received multiple forms of family support during implementation. For example, participants described family support in two ways. First, the students' families supported gardening implementation efforts through donations and encouragement. Second, the participants' families enhanced implementation through the sharing of gardening supplies and knowledge. In the case of Amy, she received various forms of support from multiple family members that included her sister, husband, and father-in-law. These findings may be beneficial to schools with low family involvement and support. School gardening should be considered by School Improvement Councils or Parent Teacher Organizations to engage families within their school community.

Funding, Time, Space, and Teacher Knowledge Impedes Implementation Efforts

The results of this study are consistent with current research on challenges and barriers to implementing garden-based learning (Burt et al., 2018; Davis & Brann, 2017; Murakami et al., 2016). While this study showed that an overall lack of funding, time, space, and knowledge were factors that impeded implementation, it also highlighted preschool teachers' persistence to overcome such challenges.

Participants described funding as a barrier to school garden implementation. Four participants remembered purchasing their initial gardening supplies with their own funds. For the three participants who received financial support, they recalled it not being enough. Davis and Brann (2017) have advised teachers to seek grant funding for gardening projects. While this may be a worthwhile recommendation as Marion utilized

this form of financial assistance, other participants offset their reoccurring gardening expenditures through gardening donations and volunteerism.

Another barrier was time. Four participants experienced a lack of time when attempting to facilitate gardening lessons. Participants discussed a lack of time in relation to a *crowded schedule* and personal life. These findings build on the survey research that indicated that the most common barrier to working in the garden was lack of time (Burt et al., 2018; Murakami et al., 2016). However, participants in this study were determined to overcome time as a barrier. Two teachers addressed the *crowded schedule* concern by integrated gardening with play experiences. Another participant, Marion, completed online gardening courses so that gardening implementation did not interfere with her home life.

Space was a factor that impeded teachers' implementation efforts. Most participants discussed a general lack of space, while others shared how the physical location of the school garden impeded implementation. These findings are congruent with previous research on the impact of space on gardening effort (Burt et al., 2018; Huys et al., 2011), yet the participants in this study overcame such difficulties through adaptable gardening practices. For example, participants who worked in urban preschools, they adjusted to their congested surroundings by including raised planters (Irene) and container gardening (Lila). These findings are particularly important for urban educators deciding whether to add gardening into their curriculum. Additional support may be needed to provide to these teachers as marginalized students attending urban schools have lacked access to high-quality educational programs such as school gardening.

Several participants discussed how their personal lack of knowledge had impeded their implementation efforts. The participants felt like they needed more information on general aspects of gardening. These findings are consistent with those of Davis and Brann (2017) who examined barriers to implementing instructional gardening programs. However, in contrast to previous literature, participants demonstrated the ability to access gardening information in multiple ways. Some participants referenced library books and social media. Other participants like Sarah and Irene partnering with local gardening experts to improve their gardening knowledge.

Multiple Developmental Domains are Impacted by Garden-Based Learning

One of the primary goals of early childhood education is to support children's learning and development so they will become successful in their academic and social lives. In order to prepare students for success, teachers design and facilitate purposeful learning activities. Emerging research has suggested that outdoor gardening activities have the potential to positively impact children's socio-emotional, physical, and cognitive learning and development (Blair, 2009; Ohyl et al., 2016; Williams & Dixon, 2013).

The current study asked preschool teachers to describe the outcomes of garden-based learning for young children through narratives of past garden experiences. In the narrative interviews and journals, teachers described how and what children were learning in the garden. Four themes were identified: (a) socio-emotional, (b) health, (c) nutrition, and (d) cognitive.

Participants described the impact gardening education had on their preschool students' socio-emotional learning and development. Participants discussed positive sense of self, positive interactions with peers, and meaningful relationships with familiar

adults. These findings are aligned with Ohly and colleagues' (2016) review of the health and wellbeing impacts of school gardening. However, only one of the forty studies reviewed by Ohly and colleagues described how preschool children made social-emotional gains through school gardening (Miller, 2007). The specificity to a preschool setting distinguishes Miller and my study from others. Notwithstanding our similarities in findings and setting, there are methodological differences. Whereas Miller relied on teacher observational notes and focus group interviews, I utilized one-on-one interviews and written journals during data collection.

Previous research has argued that school garden programs typically satisfy adult agendas without consideration to children's interests or abilities (Wake, 2008). The findings from this study are not aligned with Wake's argument. In this study, gardening activities were described as opportunities that foster relationships between children and adults in their lives. For example, Marion discussed school gardening as a safe space where a student with a physical disability felt most comfortable with her teacher. This finding is particularly important as educators are becoming increasingly aware of inclusion. Moreover, this study contributes to a limited body of research that examines the role gardens can play in creating an inclusive educational site for all students (Hussein, 2010; Rye et al., 2012; Scartazza et al., 2020).

The impact of gardening education on student nutrition was described by the participants. Participants felt responsible to make a positive impact on their students' healthy eating habits. Two participants recalled their students trying and liking the fruits and vegetables grown at school. One participant Sarah said her students preferred eating healthy snacks from the garden. While other researchers have examined the impact of

gardening education on student fruit and vegetable consumption at preschools (Brouwer & Neelon, 2013; Davis & Brann, 2017), this study suggests that school gardens may have an impact on fruit and vegetable availability at children's homes. For example, Fern invited families to participate in gardening events. She also shared harvested produce with her students' families. Fern said the students reported their mom cooked the food at home. Additionally, participants used online social media platforms to inform families about their students' experiences with gardening education.

Finally, participants described the impact of garden-based learning on their preschool students' cognitive learning and development. Participants discussed English Language Arts, math, science, and social studies. These findings add to the current research in two ways. First, they contribute to our understanding of how preschool children's academic learning can be supported by gardening education. Williams and Dixon's (2013) synthesis found there were a limited number of studies that investigated the impact of garden-based learning on academic outcomes in preschools. Of the 48 studies reviewed, only 2 were conducted in preschool settings. Second, they suggest that school gardens is a setting that provides benefits related to multiple learning and developmental domains. This is a noteworthy findings considering preschool teachers are facing increased pressure to promote children's healthy eating and academic school readiness skills. Participants in this study portrayed the garden as the only learning space at their school where socio-emotional, health, and cognitive learning and development goals can be actualized.

Implications and Recommendations: Childcare Administration

The results of this study provide implications and recommendations for childcare administrators. The experiences of preschool teachers should be considered by the childcare administrators who have the potential to exert support for garden-based learning at their facility. This may be accomplished by mediating the factors that impede garden-based learning implementation. As evidenced from the findings of this study, preschool teachers are willing to work through issues concerning funding, time, space, and knowledge.

Childcare administrators are in a position to elevate some of the financial challenges associated with gardening implementation and sustainability. For example, administrators can provide grant-funding information to teachers. The USDA farm to school grants should be shared alongside those from local gardening clubs. Further, administrators can arrange seasonal planting events where families and school community members are encouraged to donate gardening supplies like soil and plants. Financial and workload stress associated with gardening could be mitigated through these social events. Finally, administrators should review their annual budgets. An analysis of expenditures may necessitate a reallocation of funds from a program that does not support student learning and development as effectively as gardening.

Other factors that administrators need to mediate relate to the spatial and temporal challenges associated with school gardening. It is recommended that preschool administration spend more time in the gardens to observe how space impacts student learning and development. This recommendation does not imply that additional gardening plots would suddenly improve teaching and learning. Quite the opposite could

occur. New challenges related to funding and storage may develop if a surplus of school grounds were allocated for garden-based learning. In order to avoid such issues, it is advised that a school gardening committee be formed to ensure proper spending and land management.

Lastly, childcare administrators need to provide research-based gardening resources and professional development. The participants in the study demonstrated creative methods to increase their understanding of gardening. For example, Marion completed an online gardening training course. Other participants said they would prefer informal online professional development because they have family and personal life commitments. Further, administrators should connect Master Gardeners with preschool teachers. This tandem would bring their own unique strengths and experiences to the design and facilitation of garden-based learning activities.

Implications and Recommendations: Preschool Teachers

The results of this study suggest several key implications and recommendations for preschool teachers' practice. First, children have significant learning experiences in contexts outside of school. Moll and colleagues' (1992) foundational research on families' "funds of knowledge" illustrated the importance of teachers honoring the wealth of knowledge within students' homes and communities. The results of this study imply that children are having gardening experiences before they enter formal schooling. Learning about these early learning experiences should be a priority for early childhood teachers who have a professional and moral responsibility to support student learning and family engagement.

Second, it is clear that "teachers are the key actors in shaping school gardens and must particular attention to building support for their implementation and to translating policy into pedagogical practice" (Bucher, 2017, p.13). Given the magnitude and difficulty in accomplishing such tasks, preschool gardening teachers need long-term commitment and support from their preschool administration and community. In this study, participants received direct and indirect supports that enhanced implementation. While direct support through financial and material donations were appreciated, the professional autonomy to implement and practice garden-based learning was invaluable. From these findings, we can infer that preschool teachers attempting to implement and sustain a garden without adequate supports may experience frustration; thus, feeling a need to abandon the gardening initiative.

Third, there is a need for increased awareness amongst preschool teachers regarding the importance of gardening education on the young children's learning and development. Providing teachers with the results of this study and previous research studies may be the data and documentation needed to effectively argue for the inclusion of gardens and garden-based learning at their preschool. Other teachers will hopefully use these research findings to request gardening resources and professional development.

Implications and Recommendations: Families

The results of this study provide implications and recommendations for families. First, the research highlighted that families play a critical role in a student's learning and development. For instance, participants in the current study described the impact of parents, grandparents, and sibling on their childhood and future career choices. This emphasizes the need for additional research on how families have impacted gardening

educators working in K-12 settings. Routes for gathering this data may include annual conferences such as the National Children & Youth Garden Symposium hosted by The American Horticultural Society.

Second, families are encouraged to engage their children in the benefits of gardening. However, families may not have access to gardening information. Preschool teachers who work closely with families and their young children should locate and disseminate pamphlets and manuals from state and national gardening organizations. Moreover, families should be provided information regarding gardening opportunities in their local community. A few participants in this study hosted family-friendly gardening events in their classroom. Fern's "Tasting Tuesday" and Tammy's Earth Day planting are events that other gardening educators should consider implementing as garden-based learning activities.

Future Research

Many studies have been conducted on garden-based learning, but few have specifically addressed the experiences of teachers who have implemented gardening into their preschool classrooms (Murakami et al., 2018). In this study, preschool teachers described how gardening experiences had impacted themselves and their students. More research is needed to continue the dialogue regarding early childhood gardening education and how teachers can support young children's learning and development in the garden.

Several areas for future research can focus on demographic information of gardening preschool teachers. A quantitative study could be developed to understand what role income plays in gardening implementation, since most participants described

funding as a factor that impeded implementation. Another demographic to study differences would be an investigation of motivation to sustain gardening efforts throughout the career journey, potentially have participants complete a survey over a 5- to 10-year period to assess whether individual and group motivations for gardening change over time.

A final research consideration would include a study with a more diverse population. From a race perspective, there is a need to hear from preschool teachers of color who have implemented garden-based learning. According to the Center for the Study of Child Care Employment, 17% of center-based teachers are African American, 14% are Hispanic, and the remaining 5% were classified as "Other" (Whitebook et al., 2018). Another population to consider for a future study would be male early childhood teachers. Since few men are employed as preschool teachers, a qualitative case study design may be appropriate.

Conclusion

For those us in education, we often look to the newest trends and tools to support our students' learning and development. Normally, this search leads us to the latest technological device or program. But all the while, we just needed to look out of our classroom window to find what we had been looking for. In the school garden, children can make *real* connections with *real* things like their peers, teachers, and floral friends. This is where young children can blossom and bloom.

References

Ahmed, A. T., Oshiro, C. E., Loharuka, S., & Novotny, R. (2011). Perceptions of middle school educators in Hawai'i about school-based gardening and child health. *Hawaii Medical Journal, 70*(7), 11–15.

Altan, S., & Lane, J. F. (2018). Teachers' narratives: A source for exploring the influences of teachers' significant life experiences on their dispositions and teaching practices. *Teaching and Teacher Education*, *74*, 238–242.

Anney, V. (2014). Ensuring the quality of the findings of qualitative research: Looking at trustworthiness criteria. *Journal of Emerging Trends in Educational Research and Policy Studies, 5*(2), 272–281.

Ardoin, N. M., Bowers, A. W., Roth, N. W., & Holthuis, N. (2018) Environmental education and K–12 student outcomes: A review and analysis of research, *The Journal of Environmental Education, 49*(1), 1–17.

Babcock, E. B., & Stebbins, C. A. (1911). *Elementary school agriculture: A teacher's manual to accompany Hilgard and Osterhout's "Agriculture for Schools of the Pacific Slope."* The MacMillan Company.

Baker, M. A., Robinson, J. S., & Kolb, D. (2012). Aligning Kolb's experiential learning theory with a comprehensive agricultural education model. *Journal of Agricultural Education, 53*(4), 1–16.

Bassok, D., Fitzpatrick, M., Greenberg, E., & Loeb, S. (2016). Within-and between-sector quality differences in early childhood education and care. *Child Development*, *87*(5), 1627–1645.

Berezowitz, C. L., Bontrager Yoder, A., & Schoeller, D. (2015). School gardens enhance academic performance and dietary outcomes in children. *Journal of School Health, 85*(5), 508–515.

Berlage, N. (2016). *Farmers helping farmers: The rise of the farm and home bureaus, 1914–1935*. Louisiana State University Press.

Bitsch, V. (2005). Qualitative research: A grounded theory example and evaluation criteria. *Journal of Agribusiness, 23*(1), 75–91.

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

Bleich, S. N., Segal, J., Wu, Y., Wilson, R., & Wang, Y. (2013). Systematic review of community-based childhood obesity prevention studies. *Pediatrics*, *132*(1), e201–e210.

Block, K., & Johnson, B. (2009). *Evaluation of the Stephanie Alexander Kitchen Garden Program: Final report to the Stephanie Alexander Kitchen Garden Foundation.* Stephanie Alexander Kitchen Garden Foundation.

Block, K., Gibbs, L., Staiger P. K., Gold, L., Johnson, B., Macfarlane, S., Long, C., & Townsend, M. (2012). Growing community: The impact of the Stephanie Alexander Kitchen Garden Program on the social and learning environment in primary schools. *Health Education & Behavior, 39*(4), 419–432.

Bochner, A. P., & Riggs, N. A. (2014). Practicing narrative inquiry. In P. Leavy (Ed.), *The Oxford handbook of qualitative research* (pp. 195–222). Oxford University Press.

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.

Brouwer, R. J. N., & Neelon, S. E. B. (2013). Watch Me Grow: A garden-based pilot intervention to increase vegetable and fruit intake in preschoolers. *BMC Public Health*, *13*(1), 363.

Brown, C. P., & Weber, N. B. (2016). Struggling to overcome the state's prescription for practice: A study of a sample of early educators' professional development and action research projects in a high-stakes teaching context. *Journal of Teacher Education*, *67*(3), 183–202.

Bucher, K. (2016). Opening garden gates: Teachers making meaning of school gardens in Havana and Philadelphia. *Teaching and Teacher Education, 6*3, 12–21.

Butt, R., Townsend, D., & Raymond, D. (1990). Bringing reform to life: Teachers' stories and professional development. *Cambridge Journal of Education*, *20*(3), 255–268.

Burt, K. G. (2016). A complete history of the social, health, and political context of the school gardening movement in the United States: 1840–2014. *Journal of Hunger & Environmental Nutrition, 11*(3), 297–316.

Burt, K. G., Koch, P., & Contento, I. (2017). Implementing and sustaining school gardens by integrating the curriculum. *Health Behavior and Policy Review*, *4*(5), 427–435.

Burt, K. G., Luesse, H. B., Rakoff, J., Ventura, A., & Burgermaster, M. (2018). School gardens in the United States: Current barriers to integration and sustainability. *American Journal of Public Health*, *108(*11), 1543–1549.

Carbone, E., DiFulvio, G., Susi, T., Nelson-Peterman, J., Lowbridge-Sisley J., & Collins, J. (2016). Evaluation of an urban farm-to-school and families' program. *Applied Research and Evaluation. 36(*3), 177–187.

Carle, E. (1987). *The tiny seed*. Picture Book Studio.

Chase, S. (2011). Narrative inquiry: Still a field in the making. In N. K. Denzin & Y. S. Lincoln (Eds.), *The SAGE handbook of qualitative research* (pp. 421–434). SAGE.

Chawla, L. (1998). Significant life experiences revisited: A review of research on sources of environmental sensitivity. *Environmental Education Research, 4*(4), 369–382,

Chawla, L., Keena, K., Pevec, I., & Stanley, E. (2014). Green schoolyards as havens from stress and resources for resilience in childhood and adolescence. *Health Place, 28*, 1–13.

Chawla, L. (2015). Benefits of nature contact for children. *Journal of Planning Literature, 30*(4), 433–452.

Child Care Aware of America (2016). *Types of child care businesses*. http://childcareaware.org/providers/opening-a-new-child-care-program/types-of-child-carebusinesses/.

Christian, M., Evans, C., Nykjaer C., Hancock, N., & Cade, J. (2014). Evaluation of the impact of a school gardening intervention on children: A randomised controlled

trial. *International Journal of Behavioral Nutrition and Physical Activity, 11*(1), 99.

Clandinin, D. J., & Connelly, F. M. (2000). *Narrative inquiry experience and story in qualitative research*. Jossey-Bass.

Clandinin, D. J. (2013). *Engaging in narrative inquiry*. West Coast Press.

Clapp, H. L. (1898). School gardens. *Popular Science Monthly, 52*, 445–456.

Comstock, A. (1923). American nature-study society. *Science, 57*, 184.

Connelly, F. M., & Clandinin, D. J. (2006). Narrative inquiry. *Handbook of complementary methods in education research*, *3*, 477–487.

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed method approaches*. SAGE.

Creswell, J., & Poth, C. (2018). *Qualitative inquiry & research design. Choosing among five approaches.* SAGE.

Cutter-Mackenzie, A. (2009). Multicultural school gardens: Creating engaging garden spaces in learning about language, culture, and environment. *Canadian Journal of Environmental Education, 14*(1), 122–135.

Davis, J. (2010). *Young children and the environment: Early childhood for sustainability*. Cambridge University Press.

Davis, K. L., & Brann, L. S. (2017). Examining the benefits and barriers of instructional gardening programs to increase fruit and vegetable intake among preschool-age children. *Journal of Environmental and Public Health, 2017*, 1–7.

Denzin, N. (2006). *Sociological methods: A sourcebook.* Aldine Transaction.

Desmond, D., Grieshop, J., & Subramaniam, A. (2004). *Revisiting garden-based learning in basic education*. Food and Agriculture Organization of the United Nations.

Dewey, J. (1938). *Education and experience*. Simon and Schuster.

Dorf, P. (1956). *Liberty Hyde Bailey*. Cornell University Press.

Dyment, J. E., & O'Connell, T. S. (2011). Assessing the quality of reflection in student journals: A review of the research. *Teaching in Higher Education, 16*, 81–97.

Edible Schoolyard Project. (2020). *Mapping the movement.* https://edibleschoolyard.org/network.

Emery, S., Davis, J., Sageidet, B., Hirst, N., Boyd, D., & Browder, J. (2017). Transnational dialogues for sustainability research in early childhood education: A model for building capacity for ESD in universities? In W. Leal Filho, C. Skanavis, A. do Paco, J. Rogers, O. Kuznetsova, & P. Castro (Eds.), *Handbook of theory and practice of sustainable development in higher education, World Sustainability Series* (pp. 143–156). Springer International Publishing AG.

Engdahl, I. (2015). Early childhood education for sustainability: The OMEP world project. *International Journal of Early Childhood, 47*(3), 347–366.

Every Student Succeeds Act , Pub. L. No. 114-95 (2015).

Feille, K. (2013). Getting outside: Three teachers' stories of using the schoolyard as an integrated tool for elementary teaching. *Electronic Journal of Science Education, 17*(3), 1–17.

Fisher-Maltese, C., & Zimmerman, T. D. (2015). A garden-based approach to teaching life science produces shifts in students' attitudes toward the environment. *International Journal of Environmental and Science Education*, *10*(1), 51–66.

Fligstein, N. (2013). *Going north: Migration of Blacks and Whites from the South, 1900–1950*. Academic Press, Inc.

Freeman, M. (2016). Why narrative matters. Philosophy, method, theory. *Storyworlds: A Journal of Narrative Studies, 8*(1), 137–152.

Fuller, B., Bein, E., Bridges, M., Kim, Y., & Rabe-Hesketh, S. (2017). Do academic preschools yield stronger benefits? Cognitive emphasis, dosage, and early learning. *Journal of Applied Developmental Psychology, 50*, 1–11.

Gaylie, V. (2011). *Roots and research in urban school gardens*. Peter Lang Publishing.

Gibson, C. A., Harvey, S. P., Spaeth, K., Sullivan, D. K., Lambourne, K., & Kunkel, G. H. (2014). Farm to school, school to home: an evaluation of a farm to school program at an urban core head start preschool program. *Journal of Hunger & Environmental Nutrition*, *9*(3), 334–349.

Glesne, C. (2016). *Becoming qualitative researchers: An introduction*. Pearson.

Goodson, I., & Gill, S. (2014). *Critical narrative as pedagogy*. Bloomsbury Publishing.

Gourevitch, V. (2019). *Rousseau: The social contract and other later political writings*. Cambridge University Press.

Guba, E. G. (1981). Criteria for assessing the trustworthiness of naturalistic inquiries. *Educational Communication and Technology Journal, 29*(2), 75–91.

Hayden-Smith, R. (2006). Soldiers of the soil: A historical review of the United States School Garden Army. *Monograph*, 1–19.

Hayden-Smith, R. (2014). *Sowing the seeds of victory: American gardening programs of World War I*. McFarland Books.

Hazzard, E., Moreno, E., Beall, D., & Zidenberg-Cherr, S. (2011). Best practices models for implementing, sustaining, and using instructional school gardens in California. *Journal of Nutrition, Education and Behavior, 43*(5), 409–413.

Henryks, J. (2011). Changing the menu: Rediscovering ingredients for a successful volunteer experience in school garden kitchens. *Local Environment, 16*(6), 569–583.

Hirschi, J.S. (2015). *Ripe for change: Garden-based learning in schools.* Harvard Education Press.

Hoffman, J. A., Schmidt, E. M., Wirth, C., Johnson, S., Sobell, S. A., Pelissier, K., Harris, D. M., & Izumi, B. T. (2017). Farm to preschool: The state of the research literature and a snapshot of national practice. *Journal of Hunger & Environmental Nutrition*, *12*(4), 443–465.

Howard, T. (2003). Culturally relevant pedagogy: Ingredients for critical teacher reflection. *Theory Into Practice, 43*(3), 195–202.

Hussein, H. (2012). The influence of sensory gardens on the behaviour of children with special educational needs. *Procedia-Social and Behavioral Sciences*, *38*, 343–354.

Huys, N., De Cocker, K., De Craemer, M., Roesbeke, M., Cardon, G., & De Lepeleere, S. (2017). School gardens: A qualitative study on implementation practices. *International Journal of Environmental Research and Public Health*, *14*(12), 14–54.

Izumi, B., Eckhardt, C., Hallman, J., Herro, K., & Barberis, D. (2015). Harvest for Healthy Kids pilot study: Associations between exposure to a farm-to-preschool

intervention and willingness to try and liking of target fruits and vegetables in Head Start. *Journal of the Academy of Nutrition and Dietrics, 115*(12), 2003–2013.

Jackman, W. (1891). *Nature study for the common schools*. Henry Holt Company.

Jarrett, O. (2013). *A research-based case for recess*. Clemson, SC: US Play Coalition. Retrieved from http://usplaycoalition.org/wp-content/uploads/2015/08/13.11.5_Recess_final_online.pdf.

Jewell, J. (1907). *Agricultural education including nature study and school gardens*. Department of Interior, Bureau of Education. Government Printing Office.

Johnson, R. (1912). *Nature-Study Review, 8*(61), 54– 61.

Jones, S., Childers, C., Weaver, A., & Ball, J. (2015). SC farm-to-school program encourages children to consume vegetables. *Journal of Hunger & Environmental Nutrition, 10*(4), 511–525.

Jorgenson, S. (2013). The logic of school gardens: A phenomenological study of teacher rationales. *Australian Journal of Environmental Education, 29*(2), 121–135.

Kermani, H., & Aldemir, J. (2015). Preparing children for success: integrating science, math, and technology in early childhood classroom. *Early Child Development and Care*, *185*(9), 1504–1527.

Kingsley, J., Foenander, E., & Bailey, A. (2019). "You feel like you're part of something bigger": exploring motivations for community garden participation in Melbourne, Australia. *BMC Health, 19*(1), 745–757.

Kohlstedt, S. (2008). "A better crop of boys and girls": The school gardening movement, 1890–1920. *History of Education Quarterly, 48*(1), 58–93.

Kohlstedt, S. (2010). *Teaching children science: Hands-on nature study in North America, 1890–1930*. University of Chicago Press

Korstjens, I. & Moser, A. (2018) Series: Practical guidance to qualitative research. Part 4: Trustworthiness and publishing. *European Journal of General Practice, 24*(1), 120–124.

Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Prentice Hall.

Ladson-Billings, G. (1995). Towards a theory of culturally relevant pedagogy. *American Education Research Journal, 32*(3), 465–491.

Langellotto, G., & Gupta, A. (2012). Gardening increases vegetable consumption in school-aged children: A meta-analysis synthesis. *HortTechnology, 22*(4), 430–445.

Levin, D. (2013). *Beyond remote- controlled childhood: Teaching young children in the media age.* The National Association for the Education of Young Children.

Life Lab. (2020, February 29). We're changing the nature of education. Life Lab. https://www.lifelab.org/2014/06/changing-education/

Lindroth, J. T. (2015). Reflective journals. *Update: Applications of Research In Music Education*, *34*, 66–72.

Loftus, L., Spaulding, A. D., Steffen, R., Kopsell, D., & Nnakwe, N. (2017). Determining barriers to use of edible school gardens in Illinois. *Journal of the American College of Nutrition*, *36*(7), 507–513.

Louv, R. (2008). *Last child in the woods: Saving our children from nature-deficit disorder*. Algonquin Books of Chapel Hill.

Macià, M., & García, I. (2016). Informal online communities and networks as a source of teacher professional development: A review. *Teaching and Teacher Education*, *55*, 291–307.

Macnee, L. C., & McCabe, S. (2008). *Understanding nursing research: Using research evidence-based practice*. Lippincott Williams & Wilkins.

Manning, J. (2017). In vivo coding. In J. Matthes (Ed.), *The international encyclopedia of communication research methods*. Wiley-Blackwell.

Martinez, S. (2010). *Local food systems; concepts, impacts, and issues.* Diane Publishing.

Marturano, A. (1990). The educational roots of a garden-based instruction and contemporary gateways to gardening with children. *Kindergarten Education: Theory, Research, & Practise, 4*(1), 55–70.

Miller, D. L. (2007). The seeds of learning: Young children develop important skills through their gardening activities at a midwestern early education program. *Applied Environmental Education and Communication*, *6*(1), 49–66.

Moll, L. C., Amanti, C., Neff, D., & Gonzalez, N. (1992). Funds of knowledge for teaching: Using a qualitative approach to connect homes and classrooms. *Theory into Practice*, *31*(2), 132–141.

Murakami, T., Pharr, J., & Bungum, T. (2016). Educators' perceptions associated with school garden programs in Clark County, Nevada: Practices, resources, benefits, and barriers. *Journal of Nutrition & Food Sciences, 6*(2), 1–7.

Murakami, C. D., Su-Russell, C., & Manfra, L. (2018). Analyzing teacher narratives in early childhood garden-based education. *The Journal of Environmental Education, 49*(1), 18–29.

National Association for the Education of Young Children (NAEYC). (2008). *Overview of the NAEYC early childhood program standards.* https://www.naeyc.org/files/academy/file/OverviewStandards.pdf.

National Association for the Education of Young Children (NAEYC). (2016). *About NAEYC.* http://www.naeyc.org/content/about-naeyc.

National Gardening Association. (2010). *Garden in every school registry*. http://kidsgardening.com.

National Science Teachers Association. (2014). NSTA position statement: Early childhood science education. *Science and Children*, *51*(7), 10-12.

Neumeyer, E. M. (1947). The landscape garden as a symbol in Rousseau, Goethe, and Flaubert. *Journal of the History of Ideas, 8*(2), 187–212.

No Child Left Behind (NCLB) Act of 2001, Pub. L. No. 107-110, § 115, Stat. 1425 (2002). Retrieved from http://www.ed.gov/nclb/landing.jhtml

North American Association for Environmental Education (NAAEE). (2010). *Excellence in environmental education: Guidelines for learning (K–12)*. Washington, DC: NAAEE.

North American Association for Environmental Education (NAAEE). (2020). *About EE and why it matters*. https://naaee.org/about-us/about-ee-and-why-it-matters.

Nowatschin, E., Landman, K., & Nelson, E. (2017). Nourishing learning environments: School food gardens and sustainable food systems. In I. Knezevic, A. Blay-Palmer, C. Z. Levkoe, P. Mount, & E. Nelson (Eds.), *Nourishing communities: From fractured food systems to transformative pathways* (pp. 95–112). Springer Nature.

Ohly, H., Gentry, S., Wigglesworth, R., Bethel, A., Lovell, R., & Garside, R. (2016). A systematic review of the health and well-being impacts of school gardening: synthesis of quantitative and qualitative evidence. *BMC Public Health*, *16*(1), 286–322.

Osman, A., Ladhani, S., Emma Findlater, E., & McKay, V. (2017). *A curriculum framework for the sustainable development goals* first edition. https://www.thecommonwealth-educationhub.net/wp-content/uploads/2017/01/Curriculum_Framework_for_SDGs_July_2017.pdf.

Ozer, E. J. (2007). The effects of school gardens on students and schools: Conceptualization and considerations for maximizing healthy development. *Health Education & Behavior*, *34*(6), 846–863.

Page, J. R. (2012). Slow food revisited. *Journal of Agricultural & Food Information*, *13*(1), 2–6.

Passy, R., Morris, M., & Reed, F. (2010). *Impact of school gardening on learning: Final report submitted to the Royal Horticultural Society*. RHS National Foundation for Educational Research.

Passy, R. (2014). School gardens: teaching and learning outside the front door. *Education 3-13, 42*(1), 23–38.

Patton, M. Q. (1980). *Qualitative evaluation methods*. Sage.

Payne, P. (2014). Children's conceptions of nature. *Australian Journal of Environmental Education, 30*(1), 68–75.

Pillow, W. S. (2003). Confession, catharsis, or cure: The use of reflexivity as methodological power in qualitative research. *International Journal of Qualitative Studies in Education, 16*(2), 175–196.

Potapchuk, W. (2013). *The role of community schools in place-based initiatives: Collaborating for student success.* Coalition for Community Schools, Institute for Educational Leadership.

Ratcliffe, M., Merrigan, K., Rogers, B., & Goldberg, J. (2011). The effects of school garden experiences on middle school-aged students' knowledge, attitudes, and behaviors associated with vegetable consumption. *Health Promotion Practice, 12*(1), 36–43.

Ray, R., Fisher, D. R., & Fisher-Maltese, C. (2016). School gardens in the city. Does environmental equity help close the achievement gap?. *Du Bois Review: Social Science Research on Race, 13*(2), 379–395.

Rivkin, M. (2015). Children's outdoor play: An endangered activity. In D. Fromberg & D. Bergen (Eds.), *Play from birth to twelve* (pp. 329–336). Routledge.

Rezneck, S. (1953). Unemployment, unrest, and relief in the United States during the Depression of 1893–97. *Journal of Political Economy, 61*(4), 324–345.

Rye, J. A., Selmer, S. J., Penington, 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.

Saldaña, J. (2015). *The coding manual for qualitative researchers*. Sage.

Salter, C. (2010). What's cooking in America's schoolyard gardens? *The Geography Teacher, 7*(2), 56–64.

Scartazza, A., Mancini, M.L., Proietti, S., Moscatello, S., Mattioni, C., Costantini, F., Di Baccio, D., Villani, F. and Massacci, A. (2020). Caring local biodiversity in a healing garden: Therapeutic benefits in young subjects with autism. *Urban Forestry & Urban Greening*, *47*(1), 1–9.

Schutte, A. R., Torquati, J. C., & Beattie, H. L. (2017). Impact of urban nature on executive functioning in early and middle childhood. *Environment and Behavior*, *49*(1), 3–30.

Schwab, E. & Mann. M. T. P. (1879). *The school garden: Being a practical contribution to the subject of education.* M. L. Holbrook & Co.

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.

Selmer, S., Luna, M. J., & Rye, J.A. (2015). Insights into teachers' experiences implementing garden-based learning: Characterizing the relationship between the teacher and the curriculum. *Teachers College Record, 117*(9), 1–36.

Sharma S., Hedberg, A., Skala, K., Chuang R., & Lewis, T. (2015). Feasibility and acceptability of a gardening-based nutrition education program in preschoolers from low-income, minority populations. *Journal of Early Childhood Research, 13*(1), 93–110.

Sobel, D. (2014). Place-based education: Connecting classrooms and communities. Closing the achievement gap: The SEER Report. *NAMTA Journal, 39*(1), 61–78.

South Carolina Early Learning Standards Interagency Stakeholder Group. (2017). *South Carolina early learning standards*. Author.

Smith, T. E., Knapp, C. E., Seaman, J., & Pace, S. (2011). Experiential education and learning by experience. In T. E. Smith & C. E. Knapp (Eds.), *Sourcebook of experiential education* (pp. 1–12). Routledge.

Srivastava, P. & Hopwood, N. (2009). A practical iterative framework for qualitative data analysis. *International Journal of Qualitative Methods, 8*(1), 76–84.

Stephens, L., & Oberholtzer, L. (2020). Opportunities and challenges for farm to early care and education in settings serving low-income children. *Journal of Hunger & Environmental Nutrition, 15*(1), 93–106.

Subramaniam, A. (2002). Garden-based learning in basic education: A historical review. *Monograph,* Summer*,* 1–12.

Swiderski, M. J. (2011). Maria Montessori: Founding mother of experiential education? In T. E. Smith & C. E. Knapp (Eds.), *Sourcebook of experiential education: Key thinkers and their contributions* (pp. 197–207). Routledge.

Taylor, C., Symon, E. B., Dabbs, A., Way, A., & Thompson, O. M. (2017). Assessing a school gardening program as an integrated component of a pilot farm-to-school initiative based in South Carolina. *HortTechnology, 27*(2), 228–234.

Trelstad, B. (1997). Little machines in their garden: A history of school gardens in America, 1891 to 1920. *Landscape Journal, 16*(2), 161–173.

UN General Assembly (2015, Oct.). *Transforming our world: The 2030 Agenda for Sustainable Development*, A/RES/70/1. https://www.refworld.org/docid/57b6e3e44.html.

United States Department of Agriculture. (2015). *2015 Farm to School Census*. https://farmtoschoolcensus.fns.usda.gov/about

United States National Commission on Excellence in Education. (1983). *A nation at risk: the imperative for educational reform.* A report to the Nation and the Secretary of Education, United States Department of Education, The Commission.

Wake, S. (2008). "In the best interests of the child": Juggling the geography of children's gardens (between adult agendas and children's needs). *Children's Geographies, 6*(4), 423–435.

Wake, S., & Birdsall, S. (2015). Can school gardens deepen children's connection to nature?. In K. Naim, P. Kraftl, & T. Skelton (Eds.), *Space, place, and environmental geographies of children and young people* (vol. 3, pp. 1–25), Springer.

Waller, T., Ärlemalm-Hagsér, E., Sandseter, E. B. H., Lee-Hammond, L., Lekies, K., & Wyver, S. (Eds.). (2017). *The SAGE handbook of outdoor play and learning*. SAGE.

Weldemariam, K., Boyd, D., Hirst, N., Sageidet, B., Browder, J., Grogan, L., & Hughes, F. (2017). A critical analysis of concepts associated with sustainability in early childhood curriculum frameworks across five national contexts. *International Journal of Early Childhood, 49*(3), 333–351.

Weed, C. M., & Emerson, P. (1909). *The school garden book*. C. Scribner's Sons.

Wells, N. M., & Lekies, K. S. (2006). Nature and the life course: Pathways from childhood nature experiences to adult environmentalism. *Children Youth and Environments*, *16*(1), 1–24.

Wells, N. M., Myers, B. M., & Henderson, C. R. (2014). Study protocol: Effects of school gardens on children's physical activity. *Archives of Public Health*, *72*(1), 43.

Wells, N. M., Myers, B. M., Todd, L. E., Barale, K., Gaolach, B., Ferenz, G., Aitken, M., Henderson, C. R., Tse, C., Pattison, K. O., & Franz, N. K. (2015). The effects of school gardens on children's science knowledge: A randomized controlled trial of low-income elementary schools. *International Journal of Science Education, 37*(17), 2858–2878.

Wells, N. M., Meyers, B. M., Todd, L. E., Henderson, C. R., Barale, K., Gaolach, B., Franz, N. K., Aitken, M., Caroline, C. T., Pattison, K. O., & Hendrix, L. (2018). The carry-over effects of school gardens on fruit and vegetable availability at home: A randomized controlled trial with low-income elementary schools. *Preventive Medicine, 112*, 152–159.

Whitebook, M., McLean, C., Austin, L. J. E., & Edwards, B. (2018*). Early childhood workforce Index – 2018.* Center for the Study of Child Care Employment, University of California, Berkeley. http://cscce.berkeley.edu/topic/early-childhood-workforce-index/2018/.

Williams, D., & Brown, J. (2013). *Learning gardens and sustainability education: Bringing life to schools and schools to life*. Routledge.

Williams, D., & 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.

Wolsey, T. D., & Lapp, D. (2014). School gardens: Situating students within a global context. *Journal of education*, *194*(3), 53–60.

Appendix A

Interview Protocol

Participant:

Date:

Setting:

1. Tell me about some of your earliest garden memories.

   Probe: So I'm hearing that ____ taught you how to garden. Was there anyone else?

2. Did any of the schools you attended growing up have a garden? If so, tell me how you participated in gardening activities at those schools.
3. How did the garden program at your workplace get started?

   Probe: Did you teach children about gardening before working here?

4. What resources and supports have been helpful to you as you implement garden-based learning?

   Probe: Professional development; administrative support; donations; parent volunteers

5. How do you hope for the garden to grow in the next few years?
6. What challenges or problems did you encounter when started teaching children in the garden?

7. What challenges or problems have you encountered over the last year?
8. How have you been able to overcome these challenges?
9. How has gardening affected your students?
10. Is there anything else you would like to share about your experiences with gardening?

Appendix B

Journal Entries

Entry 1: Please share one of your earliest memories of gardening.

Entry 2: Please share how your earliest experiences with gardening impacted you.

Entry 3: Please share a story when you first considered adding gardening to your teaching.

Entry 4: Please share a story about how gardening has benefited your students.

Appendix C

Post-Interview Demographic Form

1. What is your name? _____
2. What pseudonym would you like for yourself? _____
3. What pseudonym would you like for your worksite? _____
4. What is your age? _____
5. What is your gender? _____
6. What race/ethnicity do you identify with? _____
7. What is your highest educational degree? _____
8. Do you possess a teaching certificate? _____
9. Where are you presently employed? _____
10. How long have you been teaching at your present worksite? _____
11. How long have you been teaching overall? _____
12. What are your students' ages? _____
13. How long have you been teaching children gardening? _____

Appendix D

Invitation to Participate

Dear Participant,

My name is Jamison Browder. I am a doctoral candidate in the College of Education at the University of South Carolina. I am conducting a research study as part of the requirements of my degree in Teaching & Learning, and I would like to invite you to participate.

I am studying the experiences of early childhood teachers who have implemented garden-based learning. If you decide to participate, you will be asked to meet with me for one interview and complete four journal entries within a week of the interview.

In particular, you will be asked questions about implementing garden-based learning and how your students' learning and development was impacted by gardening. You do not have to answer any questions that you do not wish to answer. The interview will take place at a mutually agreed upon time and place, and should last about one hour. The interview will be audio recorded so that I can accurately transcribe what is discussed. The tapes will only be reviewed by members of the research team and destroyed upon completion of the study. The four journal entries will prompt you to share stories about your personal and professional experiences with gardening. The journal entries should be no more than one page in length.

Participation is confidential. Study information will be kept in a secure location at the University of South Carolina. The results of the study may be published or presented at professional meetings, but your identity will not be revealed. So, please do not write your name or other identifying information on any of the study materials.

We will be happy to answer any questions you have about the study. You may contact me at (843-367-4754 or Jamison.Browder@richlandone.org) or my faculty advisor, (Dr. Meir Muller, 803-782-1831, and MEIR@mailbox.sc.edu).

Thank you for your consideration. If you would like to participate, please contact me at the number listed below to discuss participating.

With kind regards,

Jamison Browder

6549 Queens Way Drive

Columbia, SC, 29209

843-367-4754

Jamison.Browder@richlandone.org

Appendix E

Journal Entry Letter

Dear Participant,

Thank you agreeing to participate in my study. This investigation will attempt to better understand the experiences of early childhood teachers who have implemented garden-based learning into their curriculum. I am also interested in learning more about how gardening impacts young children's development and learning.

By agreeing to participate in the study, I am asking you to complete four journal entries. You do not have to complete all of the journal entries, but it would be greatly appreciated. I would recommend writing between a ½ to 1 page per journal entry.

Before you begin writing, please make a decision regarding how you would like to complete and submit your journal responses. Here are your two options:

1. Handwrite your responses on provided forms and send them to me in the mail. A stamped envelope for journal entries will be provided. The home address of the researcher is 6549 Queens Way Drive, Columbia, SC 29209.
2. Complete and submit your responses digitally to Jamison.Browder@richlandone.org.

Please submit the journal entries to me within a week of your completed interview. I will send an email or text message to remind you to submit the journals five days after the interview.

Many thanks,

Jamie Browder

843-367-4754

Entry 1: Please share one of your earliest memories of gardening.

Entry 2: Please share how your earliest experiences with gardening impacted you.

Entry 3: Please share a story when you first considered adding gardening to your teaching.

Entry 4: Please share a story about how gardening has benefited your students.

Appendix F

Definition of the Terms

Cognitive Developmental Domain: "Focuses on children's ability to acquire, organize, and use information in increasingly complex ways" (South Carolina Early Learning Standards Interagency Stakeholder Group, 2017, p. 117).

Early childhood education: Any part- or full-day group program in a center, school, or home that serves children from birth through age eight, including children with special developmental and learning needs (NAEYC, 1993).

Early childhood teacher: In this study, early childhood teachers are professionals working in preschool settings. Early childhood teachers also include professional working in Early Learning and Development Programs, including but not limited to center-based and family child care providers, infant and toddler specialists, early intervention specialists and early childhood special educators, home visitors, related service providers, administrators, Head Start teachers, Early Head Start teachers, preschool and other teachers, teacher assistants, family service staff, and health coordinators (Child Care Aware, 2016).

Emotional and Social Developmental Domain: "How children feel about themselves and how they develop relationships with others, as well as how they learn to express and manage their emotions" (South Carolina Early Learning Standards Interagency Stakeholder Group, 2017, p. 35).

Environmental education: A multi-faceted curricular approach defined as "a process that helps individuals, communities, and organizations learn more about the environment, and develop skills and understanding about how to address global challenges" (North American Association for Environmental Education, 2020).

Experiential education: The process of learning through experience, and more specifically, it has been defined as "learning through reflection on doing" (Felicia, 2011, p. 1003).

Garden-based learning: An instructional strategy that utilizes a garden as an instructional resource, a teaching tool (Williams & Dixon, 2013, p. 213). Historically, the term has also been applied to educational and social reform movements, including Nature-Study, Progressive reform, Victory Gardening, Civil Rights, Back-to-the-Land, War on Poverty, and Farm-to-School Programs.

Gardening teachers: Educators who implement or integrate garden-based learning into their curriculum for more than one year.

Health and Physical Developmental Domain: "Focuses on the physical growth and motor development, nutrition, self-care, and health/safety practices" (South Carolina Early Learning Standards Interagency Stakeholder Group, 2017, p. 53).

Narrative inquiry: A specific type of qualitative design in which stories are understood as spoken or written text given accounts of an event/action or series of chronically connected events/actions (Creswell & Poth, 2018).

Preschool: An early childhood program that focuses on children's learning and development. Children ages five years and younger attend preschool.

School gardens: Cultivated areas on school grounds or near school buildings, tended by teachers, students, parents, and volunteers. Size, crops, and purposes vary, but most exist to encourage healthy eating, academic and social outcomes, development of life skills, and opportunities for experiential learning (Food and Agriculture Organization of the United Nations, 2010).