The REAL School Garden Experience: Building Sustainable School Gardens through Sustainable Communities

by

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DEDICATION

To my husband, Kory McGaughy, I would like to say “it is done”! Thank you for keeping me motivated to finish and giving me support in fulfilling a childhood dream. You are my rock and I truly appreciate the time and commitment you have made for me to see this through.

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ABSTRACT

This study evaluated the impact of REAL School Gardens (RSG); through their establishment of school gardens and educational opportunities for teachers. RSG Network schools are geographically located in the Dallas Fort Worth Metroplex. The study had a 48% response rate. Results showed schools acquire monetary support for gardens from a large variety of community supports, ranging from $20 to $60,000. In addition, schools also received discounts on supplies and in-kind gifts from community businesses and organization. Schools reported spending a combination of 25 hours a week on planning gardening teaching strategies, garden maintenance, and educating youth in the garden and classroom.

Results showed the primary purpose of the garden was academic and the main subjects taught were science, mathematics and language arts/ English. Schools reported having a school gardening coordinator and using a variety of community volunteers in the garden. Only a limited percentage of schools reported usage of an integrated garden-based curriculum. The schools provided insight on perceived critical factors for a successful school garden. The majority of schools rated their school “needs improvement” on implementation of the critical factors for a successful school garden.

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CHAPTER I

INTRODUCTION

Background of Study

The concept of establishing gardens in schools can be traced historically throughout out the world dating back to the 1600s. In today's urbanized era, countries all over the world are seeking a better understanding how school gardening impacts youth academics, environmental knowledge and attitudes, health, and social well-being. Williams and Dixon (2013) provided a synthesis of research from 1990 to 2010, looking solely at the impact of garden-based learning on academics, which incorporated 48 studies. Additional studies in the U.S. have focused on the role of school gardening in child health and nutrition (Carson, 1999; Davis, Ventura, Cook, Gyllenhammer, & Gatto, 2001; Graham & Zidenberg-Cherr, 2005; Heim, Stang, & Ireland, 2009; Hazzard, 2010; Hermann, Parker, Brown, Siewe, Denney, & Walker, 2006; Koch, Waliczek, & Zajieck, 2006; Lautenschlager & Smith, 2007; Lineberger & Zajicek, 2000; McAleese & Rankin, 2007; Morris, Briggs, & Zidenberg-Cherr, 2000; Morris, Neustadter, & Zidenberg-Cherr, 2001; Nolan, 2005; O'Brien & Shoemaker, 2006; Parmer, Salibury-Glennon, Shannon, & Struempler, 2009; Pothukuchi, 2004; Robinson-O'Brien, Story, & Heim, 2009; Somerset & Markwell, 2008; Twiss, Dickinson, Duma, Kleinman, Paulsen, & Rilveria, 2003).

School gardening studies in Australia have examined the links between gardening and better nutrition; gardening and cooking; and outdoor sustainable education (Gibbs, Staiger, Johnson, Block, Macfarlane, Gold, Kulas, Townsend, Long, & Ukoumunne, 2013; Hill, 2012; Jaenke, Collins, Morgan, Lubans, Saunders, & Warren, 2012; Morgan, Warren, Lubans, Saunders, Quick, & Collins, 2010; Newell, Huddy, Adams, Miller, &

Holder, 2004). Passy (2012) conducted a study in England which investigated how school gardens impacted primary learning and the type of learning pedagogies used in school gardening lessons. In addition, English researchers examined strategies for food sustainability which included growing food at school (Jones, Dailami, Weitkamp, Salmon, Kimberlee, Morley & Orme, 2012). The Food and Agriculture Organizations of the United Nations (FAO) published a guide to school gardening stating:

> Governments and international development partners are increasingly interested in school gardens. These have traditional been used for science education, agricultural training and generating school income. Today, given the urgent need for increased food security, environmental protection, more secure livelihoods, and better nutrition, perceptions of the potential of school gardening are changing. Some roles which are gaining prominence are the promotion of good diet, the development of livelihood skills, and environmental awareness. (2010, p. 2)

School gardening is an educational tool that can be used to reinforce state mandated achievement standards, develop healthy lifestyle habits, and create environmental awareness attitudes. The foundation of using school gardens in the United States stems from the philosophy of developing "students' morals and patriotism, and to cultivate discipline and a strong work ethic" (Klemmer, 2002, p. 5). In 2010, Tom Vilsack, the USDA Agriculture Secretary stated:

> Grass roots community gardens and agriculture programs have great promise for teaching our kids about food production and nutrition at the local level. Learning where food comes from and what fresh foods taste like, and the pride of growing

> and serving vegetables and fruits that grew through your own efforts, are life-changing experiences. (Office of Communications, para. 2)

The National Association of State Boards of Education recognized five states with school gardening policies as part of each states Healthy School Policy including Alaska, California, Hawaii, Oregon and Washington (State School Healthy Policy Database [SSHPD], 2013). Blair (2009) noted Texas and California's development of integrated garden based curriculum and evaluative research; Florida, Louisiana and South Carolina's promotion of school gardening; New York's state gardening curriculum and Vermont's partnership with the National Gardening Association.

Even with the growing support and beneficial evidence for school gardening, finding an organizational leader with a passion for establishing successful and sustainable school gardens can be difficult. School officials and teachers can spend countless hours searching for funding, only to be rejected or to gain partial support for their proposed school gardening project. A 2005 study found the top barriers to creating and using school gardens were a lack of funding, garden supplies, curricula, teacher interest and time constraints (Graham, Beall, Lussier, McLaughlin & Zidenberg-Cherr). Yet even with these barriers, research on school gardening indicates students achieve better academically, socially and personally when integrated into a learning environment (Blair, 2009).

The development of REAL School Gardens (RSG) by Richard Rainwater and Suzy Peacock was to "create safe outdoor spaces to engage young children to use nature to enhance student learning, encourage family and community involvement in schools, and to create vibrant, sharing networks of educators and partners who commit to putting

school gardens at the heart of urban neighborhoods" (Reeves and Emeagwali, 2010, p. 35). RSG is a 501(c)(3) nonprofit organization, which provides assistance to schools for the establishment of a school garden and offers professional development opportunities on school gardening concepts for educators. The acronym REAL stands for Rainwater Environmental Alliance for Learning (Reeves & Emeagwali, 2010).

In 2004, RSG started providing assistance for the development of school gardens at eight schools in Fort Worth, Texas and today the organization supports over 90 schools within the Dallas – Fort Worth Metroplex area. Reeves and Emeagwagi (2010) stated, "The Texas-based REAL School Gardens program provides opportunities for students to participate in service-learning as they build sustainable gardens in their communities" (p. 35). RSG believes in the foundation of community support to strengthen the potential of a school garden. Therefore, all schools must demonstrate their community capacity by hosting a town hall meeting prior to receiving assistance.

Schools are screened based on factors related to successful and sustainable school gardening practices and are required to go through an interview process. Selected schools then enter into a 3-year partnership with RSG, in which; the school and RSG work hand-in-hand to meet the school gardening needs. Year one is devoted to the overall garden design and the garden installation process, with professional development trainings for teachers involved in the new schools. During this time, schools involve the community, students and staff to create a garden matching their educational goals. RSG works with community businesses and organizations to provide the funding and volunteer support each school needs, then in just one day a school yard is transformed into a garden.

In years two and three, RSG completes site visits to the schools multiple times each semester to offer additional training for teachers and educational lessons for students. Each school also has the opportunity to send their garden coordinators to training at RSG's headquarters three times a year. By the end of year three, RSG encourages the partnership schools to develop measures for keeping their garden sustainable by building local community partnerships and by incorporating an integrated a school gardening curriculum.

Statement of Problem

Previous research on school gardening has indicated key barriers to the success of a school's gardening program. These barriers include lack of funding, time, curricula and gardening supplies; need of teacher training in horticultural knowledge and lesson design; and lack of teacher or school administration interest. DeMarco (1997) stated, "the use of school gardening as a teaching strategy meets the criteria and philosophy of education today, but the actual implementation of a school gardening program can be time-consuming and intimidating" (p. 2). As the desire of school gardening continues to grow, it is important to evaluate organizations like the RSG, to examine how their partner schools have moved from the establishment of a school garden to keeping it sustainable and to identify partnerships that have developed within the local community. Through their efforts, schools gain access to a useful educational tools and professional development as it relates to gardening, experiential and inquiry learning, and garden based lesson plans.

Additionally, it is important to examine how the garden is being used at the school, to study the methods schools have used to integrate gardening curriculum in their

classrooms and to look at the perceived critical factors for school gardening. The evaluation of these concepts may provide insight to school administrators, teachers and grant funders on the overall time and effort needed for the establishment of school gardens. Thus allowing schools to plan accordingly and provide a set of working guidelines for establishing school gardening programs. It also may give schools the opportunity to integrate a gardening philosophy as part of the school culture for the prosperity of the school garden.

Purpose of the Study

DeMarco (1997), Gridley (1997), and Hazzard (2010) outline recommendations for successful school gardens. DeMarco (1997) suggested increasing teacher education in gardening practices, environmental education and interdisciplinary use of horticulture in the classroom, provisions for logistical needs, increasing use of volunteers and adopting school-gardening curricula. Gridley (1997) outlined specific principles for teaching gardens; developmentally appropriate, universally accessible, designed through a participatory process, provide community-ownership, integrated in school curriculum, promote environmental stewardship and be adaptable. Additionally, Hazzard (2010) identified five key factors for a successful school gardening program, which include having committed people, finding funding and materials, establishing a garden coordinator, encouraging volunteer assistance, and using the garden academically.

The purpose of this study was to evaluate the implementation of the model RSG has adopted for assisting schools with gardening. The study provided insight on how RSG Network schools have funded and grown community support for their gardening program. It examined how the garden was used during the school day, assess what

subjects were taught with gardening concepts and determine if schools were using integrated garden-based curriculum. Additionally, the study assessed perceived critical factors for a successful school garden. The research objectives for this study include:

1. to provide a description of the RSG Network schools' demographics
2. to measure the amount of monetary and in-kind support for gardens gained for RSG Network schools
3. to identify local community partnerships developed by RSG Network schools
4. to measure usage of school gardens during the school day by RSG Network schools
5. to determine if RSG Network schools have adopted an integrated school gardening curriculum
6. to examine perceived critical factors for successful school gardens by RSG Network schools

Need and Significance of the Study

The model used by RSG to assist schools in the development, installation and training on school garden invokes a new era in school gardening. The implementation of school gardening is not mandated in schools; however, the concept is growing in popularity as a tool for instructing state mandated teaching concepts. Blair (2009) stated, "Gardens can improve the ecological complexity of the schoolyard in ways that promote experiential learning in many subject areas, particularly the areas of science, EE, and food education" (p. 35). "In recent years, with First Lady Michelle Obama (2012) joining children from local public schools in planning and harvesting organic vegetables at the

White House, the school gardens movement in the United States is becoming validated and reenergized" (Williams & Dixon, 2013, p. 211-212). Gaining a better understanding of what makes the RSG partnerships work in relation to school gardening is important, not only for teachers and school administrators, but for potential funders and community volunteers.

Assumptions

The following assumptions were established for the purpose of this study:

1. Schools followed the guidelines and recommendations of RSG.
2. There are identifiable factors which impact a school gardening program's success in sustainability.
3. Schools in the RSG Network are knowledgeable on the issues regarding school gardening.

Delimitation of the Study

The scope of this study is limited to schools which received funding and in-kind support by RSG to establish or enhance a school garden. RSG Network schools are demographically located in an urbanized area in the North Eastern part of Texas. Study results cannot be generalized, however; the knowledge gained from this study may be useful to organizations interested in funding school gardens and to schools seeking funds for school gardening projects. The results of this study provide practical working knowledge of how school gardens are being implemented and sustained within the RSG Network.

Definitions of Terms

Community Partnerships: the development of relationships between groups and individuals that will enable them to act together in creating and maintaining facilities and agencies through which they may realize their highest values in the common welfare of all members of the community (Sanderson & Polson, 1939, as cited by Renquist, 2005)

Experiential Learning: the process of constructing knowledge, skill, and value from direct experiences. (Huckestein, 2008)

Hands-on learning: the process of learning by using tactical teaching strategies

Inquiry-based learning: an educational approach that is driven more by a learner's question than by a teacher's lesson (Huckestein, 2008)

Integrated School Garden Curriculum: curricula providing cross-disciplinary lessons in horticulture and environmental education, which supplement existing science concepts and is aligned with state-mandated educational standards

Garden-based Learning: an instructional strategy that utilizes a garden as a teaching tool (Desmond, Grieshop, & Subramaniam, 2004)

School Garden/ Teaching Garden: outdoor laboratory for direct instruction. It is part of the school equipment as books, blackboards, charts and apparatus are (Bachert, 1979, as cited in Huckestein, 2008)

School Gardening: the use of growing plants and implementing horticulture as an educational strategy and learning tool in an educational setting. The gardening activities can involve growing plants indoors or outdoors in a variety of ways that differ with every learner's circumstances. Plants are grown in such places as windowsills, under grow-

lights, in containers, around flag poles, in terrariums, or in ordinary, plowed garden plots (DeMarco, 1997)

Sustainability: the ability to continue use of a product, service or intervention taking in account changes in personnel, funding, and materials

Chapter Summary

This chapter provides a brief look into the foundations of school gardening and establishes the need to evaluate the schools in the RSG Network. Guiding principles for school gardens have been researched in previous studies, but there is a lack of understanding on the impact external organizations have on creating sustainable school gardens. This study examines schools in the RSG Network by looking at critical factors for the adoption of school gardening, what community partnerships schools have created to increase sustainability, and the implementation of an integrated school gardening curriculum.

CHAPTER II

REVIEW OF LITERATURE

The rejuvenation of placing gardens in schools is creating a new paradigm in the history of school gardening. Through research it has been established that school gardening is not a new concept (Bassett, 1979; Blair, 2009; Desomond, Grieshop, & Subramaniam, 2004; Huckestein, 2008; Klemmer, 2002; Meyer, 1997; Pudup, 2006, Sealy, 2001; Subramaniam, 2002; Waliczeck, 1997). However, the way school gardens are conceptually used in a school setting today is vastly different than in the past. This chapter will provide a historical view of school gardening, as well as, look at current trends in school gardening. In addition, attention will be given to the educational methodologies used in school gardening, the attributes of successful school gardening, types of integrated school gardening curriculum, and current research supporting garden-based learning.

History of School Gardening

The foundations of school gardens can be traced to John Ames Comenius in the early 1600's. He believed "education should be universal, optimistic, practical and innovative, and should focus not only on school and family life but also on general social life" (Desmond et al., 2004, p. 34). Fast forward one hundred years to Jean-Jacques Rousseau, a French philosopher in the 18th century who believed in developing a person's moral character. Rousseau emphasized the importance of nature in education, stating that, "nature was the child's greatest teacher" and that "his knowledge of the natural world serves as a foundation for his later learning" (Sealy, 2001, p. 30). Mahatma Gandhi, like Rousseau, believed that "natural and rural environments are important educative

contexts" and "made a valiant attempt at rescuing education from the confines of the four walls of a classroom" (Subramaniam, 2002, p. 2).

A follower of Rousseau, Heinrich Pestalozzi from Switzerland continued the movement and coined the motto "Learning by head, hand, and heart". "Pestalozzi started his school after working with 25 orphans using gardening, farming, and home skills as practical education" and believed in the "observation and activity in learning rather than learning mere words" (Desmond et al; 2004, p. 34). As the ideals of school gardening moved into the 19th century, Fredrich Froebel, a German pedagogue and a student of Pestalozzi, conceptualized the components of modern education. "Froebel was one of the most effective proponents of school gardens" (Sealy, 2001, p. 32). He "coined the term 'kinder garten', which quite literally meant a 'garden for children'" (Shair, 1999, p. 9). Froebel stated,

> The pupil will get the clearest insight into the character of things, of nature and surroundings, if he sees and studies them in their natural connection…the garden, the farm, the meadow, the field, the forest, the plain…Instruction should proceed from the nearest and known to the less near and less known. (Desmond et al., 2004, p. 27)

The earliest contemporary account of an organized school garden was published by Erasmus Schwabb (1879) in the book *The School Garden* and later revisited by researchers Thomas Bassett (1979), Elizabeth Meyer (1997) and Brian Trelstad (1997). "Bassett analyzes community gardens by periodizing their historical geography into what he calls 'a series of community garden movements'" (Pudup, 2008, p. 1229). "The school

child was no longer an 'administrated unit' or an 'information receptacle', but rather a 'growing flower'" (Robin, 2001, p. 87).

School gardening movements began in Australia at the turn of the century with the School Garden Conference in 1903, which started an era of "progressive" thinking and made "stewardship of nature" a central concern of the period (Robin, 2001). Yet school gardening had already arrived in Austria by 1869, when the government mandated school by law to have gardens for children to work in, shortly followed by Hungary, Germany, and many other European cities (Shair, 1999, p. 9). Lawson (2005) writes in the U.S.:

> In the 1890s, social reformers started the trend by promotion vacant-lot cultivation associations to provide land and technical assistance to unemployed laborers in cities…At the same time, education reformers promoted school gardens as an interactive teaching venue that correlated with school subjects and taught civics and good work habits (p. 1).

The establishment of school gardens in America was built on the teaching of John Dewey, the convictions of Hyde Bailey and beliefs in the Nature-Study movement. "The first school garden reflected a dual concern for the environment and education of urban children" (Trelstad, 1997, p. 163). In 1891, Henry Lincoln Clapp installed the first school garden at George Putnam School in Roxbury, Massachusetts (Subramaniam, 2002, p. 3). The garden began as a wildflower garden and later expanded into a vegetable garden (Trelstad, 1997, p. 164). "Before this time, children's garden programs had been individual efforts with a local focus" (Lawson, 2005, p. 51). School gardens in the United

States were initially introduced in urban schools as aesthetic and educational, rather than practical (Sealy, 2001, p. 32). Pudup (2008) wrote,

> School gardens…were organized by upper and middle class reformers to achieve moral, cultural and aesthetic uplift of poor and working class people…who were becoming a ubiquitous presence in urban areas and in the eyes of reformers, a threat to social order and national identity. (p. 1230)

The theme of school gardening soon moved further west to Dayton, Ohio, when the National Cash Register Garden was established in 1897 by J.H. Patterson. He believed the garden would be "a place to foster the physical, mental and moral development of the boys of his employees and of the neighborhood surrounding the factory" (Bassett, 1979, p. 18). Waliczeck (1997) stated "science teachers were impressed with the school gardens of Europe and thought that these would be a good way for children to be able to complete a nature study" (p. 12-13). However, teachers lacked formal education in nature education, so "organizations such as the School Nature Study Union served as advisors to teachers" and "encouraged the setting up of school gardens and organized excursions and rambles into the countryside" (Harlen & Simon, 2001, p. 50).

By the early twentieth century, philosophers Maria Montessori and John Dewey continued building on the value of school gardens. "Montessori believed that a garden could help children in their moral development and appreciation of nature" (Subramaniam, 2002, p. 2). "She was the founder of the Montessori Method of education, which first educates the senses, then educates intellect" (Subramaniam, 2002, p. 2). Waliczeck (1997) notes, "Montessori was one of the first educators to record the benefits

of integrating the garden into the classroom setting" (p. 13). "Dewey was an advocate for the reorganization of rural schools and the utilization of agriculture in education" (Subramaniam, 2002, p. 2). He stated, "When schools are equipped with gardens… opportunities exist for reproducing situations of life, and for acquiring and applying information and ideas in carrying forward of progressive experiences" (Desmond et al., 2004, p. 27).

School gardening had become a national movement, which spurred the need for government support. Starting in 1904, the Bureau of Plant Industry within the Department of Agriculture became a "national clearinghouse for garden information, provided seek packers to teachers, and helped create the school gardens in the District of Columbia" (Trelstad, 1997, p. 169). In 1914 the first public garden for children was established at the Brooklyn Botanic Garden, with the expressed purpose of developing agricultural skills in youth (Maclin & Hyland, 1999). By 1915, additional bureaus of the Federal Government had been sanctioned to endorse school gardening. The Division of home and School Gardening within the Bureau of Education "investigated school and home gardening in cities and manufacturing towns" (Trelstad, 1997, p. 169). "School gardening peaked in 1917 with the formation of the U.S. School Garden Army when 1,500,000 children were busy sowing the seeds of victory in 4,400 cities" (Bassett, 1979, p. 41). By 1918 every state in America and every province in Canada had at least one school garden (Sealy, 2001, p 37).

During World War I, "war gardens", and during War World II, "victory gardens", were a symbol of patriotism and gave Americans a way to show support for military efforts (Bassett, 1981). "School gardens were believed to promote good citizenship, to

teach the value and ultimate rewards gained through discipline and hard work, and to be patriotic" (Klemmer, 2002, p. 32). President Woodrow Wilson supported this idea saying that "movement to establish gardens, and to have the children work in them is just as real and patriotic an effort as the building of ships or firing of the cannons" (Shair, 1999, p. 10). "At the preclusion of World War II, school gardening efforts declined giving rise to playgrounds and athletic fields, while schools became more technology focused" (Sealy, 2001, p. 37).

Major economic hardships in the 1970s brought people back to gardening, but in a community setting with the establishment of "recession gardens". The few school gardens that remained from the early nineteen hundreds, slowly transformed into local community gardens. These gardens still gave children exposure to gardening, but also served to beautify low-income neighborhoods (Lawson, 2005, p. 211). In 1972, Cooperative Extension's establishment of the Master Gardener (M.G.) volunteer programming addressed the "emerging phenomena of too many gardening questions and not enough staff to answer them" (Relf and McDaniel, 1994, p. 181). "Originally M.G. programs were planned only for the larger urban counties, but the concept also proved attractive to smaller counties" (Bobbitt, 1997, p. 346). "The program was based on the concept that most gardening questions can be answered by experienced, trained volunteers and experienced gardeners willing to share the load of the extension office in exchange for specialized training" (Relf & McDaniel, 1994, p. 181). "In 1976, the federal government put its muscle behind urban gardens through the USDA Cooperative Extension Urban Garden Program, which provided gardening education and support in twenty-three major cities (Lawson, 2005, p. 214-215). In the mid 70s, the Public

Broadcasting Station (PBS) hosted the first gardening television show called "The Victory Garden". "The goal was to encourage Americans to fight the recession by growing their own food and by using the name 'Victory Garden', the creators evoked nostalgia for the can-do spirit of wartime gardens" (Zurier, 2009, para. 5).

The 1970s also gave rise to the National Gardening Association (NGA) and the American Community Gardening Association (ACGA). The mission of the NGA is to promote home, school, and community gardening as a means "to renew and sustain the essential connections between people, plants, and the environment" (National Gardening Association, 2013, para. 1). In addition, the ACGA aims to "help community garden programs share often limited resources, and to help keep these same groups from constantly re-inventing the wheel" (American Community Gardening Association, 2013). Lawson stated, "…interest in children's gardens needed time to ferment. While projects did develop in various cities, national promotion was weak…school gardening did not really become a national movement until the 1990s" (2005, p. 234).

Current Trends in School Gardening

Subramaniam (2002) wrote, "The contemporary impetus to the school garden movement in the United States is largely influenced by the thoughts of educators, environmentalist, and agricultural reformists" (p. 4). Huckestein added "School gardens give students an opportunity to learn outside of the traditional classroom setting" and "Gardens are not only useful for teaching plant science, but can be used to teach across the curriculum" (2008, p. 12). "Elementary school teachers may use school gardening to improve student academic and social achievement, to provide hands-on learning

experiences that reaches across the curriculum, and to encourage students to expand their appreciation of the living world around them" (DeMarco, Relf, & McDaniel, 1998, p. 1).

In 1995, the California Department of Education (CDE) established the Garden in Every School Initiative, to increase the use of school gardens in California schools. This initiative received additional support in 2006 when the California Legislature passed a bill to provide $15 million in grant support "to promote, develop and sustain instructional school gardens" (Hazzard, 2010, p. 87). Modern day leaders in school gardening, such as Alice Walters, the founder of "The Edible Schoolyard", Dr. Marianne Krasny founder of Garden Mosaics and New York City Mayor Michael Bloomberg creator of Grow to LEARN NYC, challenge educators to get out of the classroom and use school gardening as a tool to teach state mandated concepts.

In 2009, the U.S. Department of Agriculture (USDA) made a public move toward "The People's Garden", which reclaimed 1,250 sq ft of paved land to promote "going green" concepts (United States Department of Agriculture [USDA], Farm to School, 2012). This initiative expanded into school gardening one year later with the People's Garden School Pilot Program, which authorized $1 million for the development and evaluation of gardens at eligible high-poverty schools and aimed to teach students about agriculture production practices, diet, and nutrition. In addition, the USDA offers up to $5 million in grants through the Farm to School Program each year, which "helps schools connect with local producers and teach kids where their food comes from" and can include the development of school gardens (USDA, Farm to School, 2012).

School Gardening Educational Methodology

Smith and Motsenbocker (2005) stated, "the purpose of a school garden is not to have an elaborate landscape, but to create a 'living laboratory' for student observation of science concepts in an unpredictable environment" (p. 439). Skelly and Bradley (2000) reported the reasons cited most often for incorporating a garden into the curriculum was for "environmental education and for fostering experiential learning" (p. 231). Garden-based learning is built on the framework of students' actively participating in the process of learning. DeMarco (1997) stated, "by their very nature, growing and nurturing plants and using horticultural practices provide real-life, hands on experiences that contribute to the understanding of any chosen topic area" (p. 18).

In the 1920s, psychologist, Jean Piaget researched the cognitive development of children from birth to young adulthood. "Piaget described the process of knowing as occurring in stages" (DeMarco, 1997, p. 9). He made observations by watching his children. Miller (1993) provided a paraphrase of Piaget's observations, "children's knowledge of the world changes as their cognitive system develops. As the knower changes, so does the known…experience is always filtered through the child's current ways of understanding" (p. 36). "Piaget observed that children have a natural need to explore, hypothesize, test and evaluate" (DeMarco, 1997, p. 9). Klemmer (2002) outlines four sequential phases of development; sensorimotor, pre-operational, concrete operational and formal operation. Each phase in the developmental process identifies with a child's specific capabilities and needs and changes with the child's "physical maturation, experience with physical objects, social experiences, and equilibration" (DeMarco, 1997). Piaget's findings were contrary to popular learning theory of the time,

but through his observations he examined learning as a process, in which the learner is an active participant. “The hands-on aspect of gardening makes them especially suited to active learners, who need tactile stimulus and experiential activities to keep them engaged” (Klemmer, 2002, p. 29). During the concrete operational stage, which occurs between age seven to eleven, children are developing the ability to think logically about “concrete” events.

Involving children in the growing process of plants can enhance their ability to think logically about the process of photosynthesis, metamorphosis, and other science based concepts. Gardens give children the opportunity to see things happen first hand, from which they can personally draw conclusions and formulate ideas around their experience. Actively engaging students to become a part of the scientific process, rather than taking a passive stance helps cultivate positive attitudes toward science (Klemmer, 2002).

The work of Lev Vygotsky, in the 1930s, examined the context of a child’s environment on learning. “Vygotsky observed that it is the child within the social, cultural, and historical context that defines learning” (DeMarco, 1997, p. 9). The “zone of proximal development” recognized not all children learned at the same rate, therefore each child should be looked at as an independent learner. Vygotsky stated, “the learner actively constructs new knowledge based on previous knowledge and life experiences” (1978, p. 30). The teacher is purely a vessel that helps direct the learner from one point of the zone of proximal development to another point, while the learner actively constructs meaning based on personal experiences and previous knowledge. Shapiro (1994) added,

> Valuing the idea that knowledge is constructed by the learner guides educators in the development of resources and in the presentation of experience for learning that take into account the learner's role in make knowledge his or her own. (p. 5)

Moll (2014) deducted, "Contrasting what children can do independently with what they can accomplish with assistance not only provides a dynamic perspective on their capabilities but also can serve to guide teaching" (p. 34). Using the garden to stimulate a child's social development offers a connection between the concepts a child knows and the construction of new knowledge. In school garden children learn about their environment through each other and a guided by learning experiences designed to challenged what they know and do not know. The transference of knowledge from one child to the next can be in a constant state of fluctuation. Vygotsky (1978) stated, "The path from object to child and from child to object, passes through another person" (p. 30). "The learner becomes personally involved as her or she moves through this distance with the aid of qualified person" (DeMarco, 1997, p. 10).

In 1983, Howard Gardner proposed the theory of Multiple Intelligences challenging the idea of a "solo" intelligence, which is measured by "smart tests" or IQ tests. The theory of Multiple Intelligences brought forth the conceptualization that a multitude of intelligences exist which are independent in nature. In addition, Gardner wrote, "each intelligence has its own strengths and constraints" (1993, xxiii). Gardner and Hatch (1989) noted the definition of intelligence, "as the capacity to solve problems or to fashion products that are valued in one or more cultural settings" (p. 5). The theory of Multiple Intelligences encompasses seven original and three subsequent uniquely

defined intelligences: spatial, linguistic, logical-mathematical, bodily-kinesthetic, musical, interpersonal, intrapersonal, naturalistic, spiritual, and existential.

The conceptualization of multiple intelligence versus the traditional single intelligence is a radical change in ideology. “Intelligence is presumed to be a universal, probably innate, capacity” (Gardner & Hatch, 1989, p. 5). The construct of a “naturalist intelligence” can be adapted for garden-based learning, as it “characterizes a person’s ability to recognize and classify his/her natural environment” (Desmond et al., 2004, p. 21).

Attributes of School Gardening

> Elementary school teachers may use school gardening to improve student academic and social achievement, to provide a hands on learning experience that reaches across the curriculum, to furnish a forum that provides opportunities to learn such positive social qualities as nurturing life and responsibility, and to encourage students to expand their appreciation of the living world around them. (DeMarco, Relf, & McDaniel, 1998, p.1)

However before many of these items can take place, school “teaching” gardens need to be nurtured and considered a priority of the school’s learning environment.

Gridley (1997) outlines seven guiding principles to consider when designing a teaching garden, including developmentally appropriate; universally accessible; designed through a participatory process; promote a sense of community-ownership; broadly integrated into the program or curriculum of its host; promote a sense of stewardship; and adaptable/changeable (p. 30). According to Gridley, “the teaching garden should strive to provide experiences which are appropriate to the developmental needs and abilities of its

target group of children" (p. 30). During the design stage, child developmental characteristics like age, size and mental capabilities need to be taken under consideration. Building accessible gardens, "insure that children won't be frustrated by obstacles" and children can "enjoy the garden in a safe, comfortable manner" (Gridley, p. 31). Teaching gardens designed by a participatory process "develop a sense of ownership in the project" (Hart, 1997, p. 231). Community-ownership of the teaching garden should be considered during the planning process because they have "the potential to employ many of the success strategies of community-developed and controlled open space" (Gridley, p. 32). The integration of teaching gardens should take "careful consideration of the curricular and program goals of the particular entity, with the objective of designing the teaching garden to contribute to these goals" (Gridley, p.33). The adding of stewardship to teaching gardens can show children, they "have a positive impact on the environment" (Gridley, p. 34). Finally, Gridley stated, "it is not appropriate to view the teaching garden as a finished product" and "control of the development of the garden needs to rest with the community which supports it, especially the children who are the prime users" (p. 34).

A study completed by Hazzard (2010) found instructional school gardens needed committed people for the garden to be impactful over a long period of time. "Key school members reported that there were a variety of people and groups committed to sustained, instruction school gardens, including: principals, teachers, parent volunteers, community volunteers, garden coordinators, PTA/PTO, district staff and school staff" (Hazzard, 2010, p. 94). In addition, Hazzard (2010) pinpoints a need for gardening funds and

materials, a garden coordinator, using Master Gardeners as a volunteer and educational source, and implementing academic instruction for multiple subject matters.

DeMarco (1997) encourages teachers to pull teaching aids from a "multitude of sources on gardening with children provided by the professional horticultural community" (pp. 34-35), including but not limited to: Cooperative Extension and 4-H programs, Master Gardeners, private education companies, garden clubs, garden centers, arboretums and botanical gardens, and horticulture associations and societies. A study by Skelly and Bradley (2000) cited, "the reason most often reported by teachers for incorporating a garden into the curriculum was for environmental education and for fostering experiential learning" (p. 231). In addition, Subramaniam (2004) outlined eight reasons for the purpose of school gardens: to support core academic training, to add a sense of excitement, adventure, emotional impact and aesthetic appreciation to learning, to teach basic skills and vocation competencies, to teach about food and fiber production, to teach ecological literacy and environmental education, to teach sustainable development, to produce food for consumption or trade, and to improve nutrition, diet and health.

Integrated School Gardening Curriculum

Finding school gardening curriculum is just a click a way for teachers, but taking the step to integrate gardening lessons into the educational philosophy of the school is a bit of an undertaking. "An integrated curriculum is often associated with real-life problems in contrast with a traditional subject-based curriculum" (Subramaniam, 2002, p. 4). Dirks and Orvis (2005) stated, "Teachers may facilitate gardening activities without the ability to integrate them into existing curriculum, academic standards, and an already

busy schedule. These situations often lead to frustration and ultimately the demise of school gardening" (p. 443). Recent studies have identified the lack of curricula as one of the main barriers to sustaining a school gardening program (Graham, Beall, Lussier, McLaughlin and Zidenberg-Cherr, 2005; Hazzard, Moreno, Beall, and Zidenberg-Cherr, 2012). Hazzard (2010) noted, "implementing and sustaining a garden while lacking standards-based garden curricula may diminish the functionality of the school garden" (p. 95). DeMarco (1997) pointed out "garden-based curricula have been successfully developed as interdisciplinary thematic unites based on constructivist theory" (p. 18). Thus, "using a garden-based curriculum aids in meeting many of the academic requirements of the students, and it also offers the opportunity for students to participate, through hands-on gardening activities, in their own learning" (DeMarco, 1997, p. 1). The availability of integrated gardening curriculum for school to access and adopt has become increasing easier in the last twenty years. Curriculum specially designed for working in tandem with school gardening can be found all across the country. Some of the more common curricula like Life Lab, Kids Gardening, Garden Mosaics, Nutrition to Grow On, Project Learning Tree, Ag in the Classroom and the Junior Master Gardener Program address TEKS and can assist teachers in designing an integrated gardening program.

Life Lab

The California based nonprofit organization, *Life Lab*, was established in 1979 and has become a national leader in farm and garden based curriculum. *Life Lab* aims to promote experiential learning for children of all ages through camps, field trips, internships and teacher workshops. Their integrated garden based curriculum is aligned to

the California State Science Standards, which focuses on children in pre-kindergarten to the fifth grade.

The *Life Lab* Science Series for K-5 has individual curricula guides for each grade, which cover different aspects of gardening. Additionally, *Lab Life* has The Growing Classroom curricula focusing on activities in science, math and language arts; The book of Gardening Projects encourage outdoor activities for kids; Kids Garden Activity Cards engaging kids in interactive games and activities and Sowing the Seeds of Wonder a curriculum for preschool children.

Kids Gardening

The National Gardening Association first published the Guide to Kids' Gardening in 1983, with the purpose of "providing practical and creative ways for educators to incorporate gardening and plant based activities into the curriculum" (Gardening with Kids, 2012, pp. 5). Additionally in 2011, the NGA developed the *Kids Gardening* website as a resource where educators can download individual style gardening lesson at no charge. The NGA also has established *Gardening with Kids,* a clearing house where educators can find and purchase a gardening based curriculum to fit their needs and *GrowLab,* a curriculum designed to help kids learn science and environmental concepts (Gardening with Kids, 2012). Proceeds from curriculum purchases are used to fund education and grant programs hosted through the National Gardening Association.

Garden Mosaics

Garden Mosaics aims to build connections within communities by "connecting youth and elders to explore the mosaics of plants, people, and cultures in gardens, to learn about science, and to act together to enhance their community" (Kennedy and Kransy,

2005, p. 45). The program was originally funded by the National Science Foundation in 2001 and adopted by the American Community Garden Association in 2006. It combines "science learning with intergenerational mentoring, multicultural understanding, and community service" (Kennedy and Kransy, 2005, p. 45). Garden Mosaics' resource library includes an interactive Digital Learning Tool (iDLT) called Agricultural Biodiversity and a Garden Mosaics starter kit with an interactive DVD, program manual, poster, and bonus materials. Educators have the option to purchase items in the starter kit separately. Garden Mosaics offers educators the opportunity to learn about projects that have taken place around the world through their "action project database", which is found on their website under action projects. Additionally, Garden Mosaics has downloadable files on biodiversity, conducting research, gardening, genetic engineering, insects and other organisms, land use, plants, soils, and weeds.

Nutrition to Grow On

Developed in 2001 by the California Department of Education, Nutrition to Grown On is a free downloadable file for educators. Delaine Eastin, the California State Superintendent of Public Instruction, described Nutrition to Grow On as an "innovative curriculum for grades four through six that offers teachers a direct link between the garden and nutrition education. The curriculum uses the garden to integrate disciplines, including science, mathematics, language arts, history, environmental studies, nutrition and health". (California Department of Education, 2001, p. iv). Nutrition to Grown On guides teachers through garden development and provides nine lessons for classroom instruction. It is linked to California Academic Content Standards, however; it does need updating as the U.S.D.A.'s MyPyramid is now MyPlate.

Project Learning Tree

Founded in 1976 by the American Forest Foundation and the Council of Environmental Education, Project Learning Tree's (PLT) mission is to,

> use the forest as a 'window' on the world to increase students' understanding of our environment, stimulate students' critical and creative thinking; develop students' ability to make informed decision on environmental issue and instill in students the commitment to take responsible action on behalf of the environment. (Project Learning Tree, Mission, pp. 1)

Curriculum provided through PLT has been correlated to address the National Science Standards, National Social Studies Standards, Excellence in Environmental Education Guidelines, and Girl Scout (badge) program activities. Educators have the option to attend in-class workshops to obtain the complete curriculum for Early Childhood through twelfth grade or can download a limited number of lessons through the PLT website.

Ag in the Classroom

Established in 1981 by the United State Department of Agriculture (USDA), Ag in the Classroom (AITC) aims to assist students in understanding the role of agriculture in their daily lives. AITC programs vary in each state, but the USDA serves as a clearinghouse for materials and curriculum. Educators can download free lessons from the AITC national website or contact their local AITC support team for curriculum developed in their state. Students can also benefit from the national AITC website by taking a virtual tour, completing WebQuests, and learning agricultural facts about their state.

Junior Master Gardener

The Junior Master Gardener (JMG) program found its beginnings in the mid-1990s as a joint youth gardening program developed through the University Cooperative Extension network. JMG's national roots are in Texas, but the curriculum meets state testing standards across the nation and is used internationally as a primer garden-based curriculum. Klemmer, Waliczeck, and Zajieck (2005) stated, "The JMG curriculum offers a "hands-on" approach to learning horticulture and environmental education while also cultivating community service, leadership, and life skills" (p. 449). Fundamental topics addressed in the curriculum such as plant growth and developments are integrated within teaching disciplines such as math, science and language arts. "The JMG program is flexible and can be used in public schools, home schools, after school programs, or youth clubs" (Huckestein, 2008, p. 18).

Educators can order books through the Junior Master Gardener Website, which includes JMG Level One for third through fifth grades and the Golden Rays Series that focuses on health and nutrition, literacy, and wildlife gardening. In addition, JMG Level Two is designed for sixth through eighth grades called Operation Thistle and Operation W.A.T.E.R. Youth can earn completion certificates and pins as part of the JMG club experience, which educators can register for at no charge.

Research Supporting Garden-based Learning

Gaining a greater understanding on the impact garden-based learning has on students is important for continued support in local school systems. In reviewing countless published studies, four areas of garden-based learning research emerge: *impacts on physical health, academics, ecological and environmental attitude, and social*

behaviors. "Gardens provide a link between concepts learned in the classroom and real life application" (Smith & Motsenbocker, 2005, p.1). Alexander, North and Hendren (1995) found moral benefits of school gardening as well, delayed gratification, independence, cooperation, self-esteem, enthusiasm and anticipation, nurturing living things, and exposure to role models from different walks of life.

Impact on Physical Heath

Prior to 2000 there is limited research regarding the benefits of school gardening as it relates to nutritional and physical health of children. However, since 2000 over twenty studies have been conducted connecting school gardening and child nutrition in at least ten important areas. Students' have shown to increased their knowledge and ability to identify fruits and vegetables, taste rating of fruits and vegetables, consumption of fruit and vegetables, and physical activity. They have also shown improvement in their preference for fruit and vegetables, eating fruit and vegetables as a snack, positive attitude and self efficacy for fruit and vegetables, willingness to try fruits and vegetables, and confidence in preparing or cooking fruits and vegetables.

With the prevalence of obesity and high rates of Type 2 Diabetes in youth increasing over the last 30 years, there is a resurgence to establish interventions which lower childhood body mass index (BMI) and encourage youth to consume fewer processed foods. Hazzard, Moreno, Beall, and Zidenberg-Cherr (2011) noted less than 10% of adolescents currently meet the *Healthy People 2010* recommendations for fruit and vegetable consumption (p. 409). Roseman, Riddell, and Haynes (2011) cited "the probability that childhood weight problems will continue into adulthood increases from approximately 20% at age 4 year to between 40% to 80% by adolescence" (p. 2).

> Concerns for the health and nutritional intake of youth in the United States remains a national priority, and food and nutrition professionals and nutrition educators continue to seek innovative and effective approaches to improving dietary intake among children and adolescents. (Robinson-O'Brien et al., 2009, p. 273)

Applying principles of school gardening with a nutrition education programs have established preliminary results on how garden-based learning can positively impact the physical health of children.

Impact on Academics

"Horticulture and plants are found in history, geography, science, music, art, nutrition, literature, writing, physical education, social studies, and mathematics" (DeMarco, 1997, p.18). Bartosh (2006) warned as "schools struggle to meet accountability requirements, many teachers are reluctant to introduce new environmental topics or units to an already overloaded curriculum as it would take the precious time needed to ensure students' success on the standardize test" (p. 161). However, Huckestein (2008) pointed out in the school garden, "children learn firsthand the seed-to-seed cycle, the rhythm and traditions of harvest, and the taste touch, and smell of fruits, vegetables and flowers" (p. 13). Shapiro (2006) pointed out "several recent studies indicate that school gardening program not only increase students' interest in science, but also boost students' scores on science achievement tests" (p.1).

Liberman & Hoody (1998) documented an impact of experiential education in school gardening showing better performance on standardized achievement tests of reading, writing, math, social student and science. Studies using the Junior Master

Gardener curriculum (JMG) developed through Texas A&M AgriLife Extension showed significant gains in science knowledge (Dirks & Orvis, 2005; Karsh, Bush, Hinson, & Blanchard, 2009) and higher scores on science achievement tests (Klemmer et al., 2005; Smith & Motsenbocker, 2005). A study using the National Wildlife Federation's Schoolyard Habitat Program showed significant increases in math scores (Danforth et al., 2008). Morgan et al. (2009) identified students in Brooklyn Botanic Garden's Project Green Reach "developed science and reasoning skills…and developed skills related to writing, public speaking, geography, art, and cooking" (p. 42). Bartosh et al. (2006) reported "schools in Washington which used systemic environmental education programs consistently outperformed traditional school on the state standardized tests, of which 73 out of 77 environmental schools had higher scores in at least one subject" (p. 165). Skelly and Bradley (2007) found improvement in students' attitudes toward science and attitude toward the usefulness of science study in conjunction with school gardening. A study in Alabama working with youth after school reported "increased grades in science, reading, language and math" (McArthur et al., 2010, p. 311).

Impacts on Ecological and Environmental Attitude

"It has been stated that environmental knowledge and attitudes would lead to a person being knowledgeable about environmental facts and issues and have a respect for nature" (Aguilar, Waliczek & Zajicek, 2008, p. 243). "A childhood experience in nature is a key factor in adult attitudes toward the environment" (Milton & Cleveland, 1995, p. 3). Scientific and environmental attitudes are usually well established and extremely resistant to change by the age of 12 (Cronin-Jones, 2000). Skelly and Zajicek (1998) stated, "Youth of today will become the future voice in environmental preservation and

policies. It is, therefore, important to educate today's youth about the environment and help them form positive environmental attitudes" (p. 582).

A study involving 845 children at 21 junior schools in England, demonstrated experiences in naturalized school grounds boost the botanical knowledge and environmental attitudes of school children (Harvey, 1989). Aguilar, Waliczek, and Zajieck (2008) determined that exposure to hands-on gardening in any type of situation seemed to influence children in a positive way when considering the environmental variables of interest. Capra (2001) found developing and using a school garden is an ideal way of helping children to understand the natural world and the principles of ecology in action leading children to becoming 'ecoliterate'. A study of Project Green found children involved in a garden program had more positive environmental attitudes and that the more out-door related activities a child experienced, the more positive environmental score (Skelly & Zajieck, 1998). Morgan et al. (2009) depicted an "increased environmental awareness in the memories of students through vivid descriptions of experiences they recalled working in the garden" (p. 44-45). Furthermore, Mayer-Smith, Bartosh, and Peterat (2007) found "after being involved in a gardening program youth shifted from seeing the environment as an object or a place, to a view characterized by the interconnectedness of humans and environment" (p. 82).

Impacts on Social Behaviors

Among the benefits found in using school gardens is recognition on how social behaviors are enhanced in children. Studies have reported an increase in student self esteem and responsibility, better communication skills, improved behavior and self discipline, an increase care for other people, higher levels of satisfaction and pride,

increased sense of ownership and belonging, and an increased resistance to peer pressure (Barker, 1992; Driskell, 2002; Hart, 1997; Lieberman & Hoody, 1998; McArthur et al, 2010; Passy, 2012; Pothukuchi, 2004; Robinson & Zajicek, 2005; Sheffield, 1992; Skelly & Bradley, 2007). "The importance of garden skills in contributing to gardening interests illustrates the connection between mastery of particular competencies and a willingness to try new endeavors" (Lekies & Sheavly, 2007, p.73).

Chapter Summary

The garden was a powerful force in reshaping the school's culture, providing an important set of experiences for students who had not had enough of these experiences, and serving as an important place for creativity and self-expression (Thorp, 2001). While the decision to implement garden-based learning in school setting is daunting for teachers and school administrators, the rewards from garden-based learning play a crucial role in preparing youth for tomorrow's challenges. Historically gardening in schools was strictly focused on the production of plants for food in the community. However, school gardens in the 21st century are living laboratories for learning, while the harvest is a secondary benefit.

Using a hands-on approach to learning opens children up to new experiences and an opportunity for new discovery. Schools that adopt the recommended practices for establishing school gardens have a great probability in sustaining the garden for future generations. The physical, academic, environmental and social benefit the garden brings to a school can assist teachers in meeting many of the state and school district mandated standards of learning.

CHAPTER III

PROCEDURES AND METHODOLOGY

This chapter highlights procedures used in research design, instrumentation and the data collection process and data analysis. The purpose of this study was to evaluate the implementation of the model REAL School Gardens (RSG) has adopted for assisting schools with gardening. The study provided insight on how RSG Network schools have funded and grown community support for their gardening program. It examined how the garden was used during the school day, assess what subjects were taught with gardening concepts and determine if schools were using integrated garden-based curriculum. Additionally, the study assessed perceived critical factors for a successful school garden. The questionnaire was created by drawing upon previously tested questions from three studies (DeMarco, 1997, Gridley, 1997, and Huckestein, 2008). The research objectives for this study include:

1. to provide a description of the RSG Network schools' demographics
2. to measure the amount of monetary and in-kind support for gardens gained for RSG Network schools
3. to identify local community partnerships developed by RSG Network schools
4. to measure usage of school gardens during the school day by RSG Network schools
5. to determine if RSG Network schools have adopted an integrated school gardening curriculum
6. to examine perceived critical factors for successful school gardens by RSG Network schools

Research Design

This study followed descriptive research design to gain understanding on the model RSG has adopted for assisting schools with gardening programs. Stangor (2011) defined descriptive research as "Research designed to answer questions about the current state of affairs", which provides "a snapshot of thoughts, feelings, or behaviors at a given place and time" (p. 14). Schools in the RSG network served as the unit of analysis for the study.

Population

The target population for this study was a census of schools in the RSG Network. RSG provides assistance for the development of school gardens and supports over ninety schools within the Dallas – Fort Worth Metroplex area. The accessible population consisted of ninety-two schools found on the RSG website. Schools are located within five school districts, forty-one from Fort Worth ISD elementary schools, twenty-two from Dallas ISD elementary schools, nineteen from Grand Prairie ISD elementary schools, five from Arlington ISD elementary schools, and five from Birdville ISD elementary schools.

Schools were verbally asked to submit the name and e-mail address of a local contact overseeing school gardening activities; the majority of contact names given were elementary school teachers. However, a few schools provided contact information for afterschool program coordinators, PTO members, school counselors, school nurses, and Master Gardeners. The questionnaire was sent to the school principal for school that did not have or did not know the person in charge of the school garden program. The accepting sample was forty-four schools, giving an overall response of 48%. It is the

opinion of the researcher; schools opting not to respond to the questionnaire may have different views than responding schools. Therefore, the results of this study should only be applied to responding schools.

Instrumentation

The instrument used for this study aligned with previous research. The questionnaire was designed building upon components from Laurie DeMarco's (1997) dissertation, *The factors affecting elementary school teachers' integration of school gardening into the curriculum* and Eric Hazzard's (2010) dissertation, *Utilization of Garden-Based Education to Positively Impact Children's Nutrition Knowledge and Behaviors*. The questionnaire was delivered using the web-based survey development tool, Qualtrics, provided by Texas Tech University. The factors for using this method of measurement included; limited amount of time for response collection, economical cost, convenience to participants, and analysis readiness. The complete questionnaire is in Appendix A. Schools were asked to provide information regarding the following key areas:

School Demographics

This section was comprised of four questions to study trends within school populations. Participants were asked to select their school district, identify school demographics by ethnicity/race, list the total number of students in the school and select their schools' geographic density based on overall community population.

Partnership with RSG

Participants were asked to report on their school's relationship with RSG to establish what type of support the school received and to measure the overall garden cost.

This section provided insight to when the school first received assistance from RSG, what type of funding was received, if additional assistance had been provided since the original proposal, and what the status was of the school garden prior to assistance from RSG.

Additional Partnerships

To establish a picture of total support of the school's gardening program, participants also reported on additional partnerships their school had with the community. Questions examined if schools received funds/grants or in-kind donations for school gardening prior to or after working with RSG and monetary amounts and other items received.

School Garden Management

This section provided insight on who was working in the garden and what their primary role was in the garden. Participants specified if their school has a garden coordinator, then selected from a list of provided choices: who was in charge of the garden and what the person's job assignments included. Participants also specified if the school used parent or community volunteers to assist in the garden, then selected what type of volunteers and the volunteer's job assignments. Participants were given an option to write additional duties not include on the provided list.

Usage of School Garden

In looking at overall impact of the school garden, questions were assembled to build a profile on how schools' were using their gardens. Participants confirmed the use of a school garden during the 2012-2013 school year and identified if the school had plans to use a school garden during the 2013-2014 school year. A sliding scale question was used to determine how many hours were spent each week on garden-based learning.

The scale started at zero hours and stopped at forty hours for each factor. Participants were asked to critically think about time spent on planning garden based teaching strategies, garden maintenance, educating youth using the garden and educating youth on gardening concepts in the classroom.

Participants were asked to select what type of school gardening activities had been used with students from a provided list; they could select more than one answer and write in their own response. A ranked question was used to determine the main purpose of the school garden. The questionnaire requested information on the grade level of students using the school garden, how many classes and total number of students and on how often classes used the garden. Respondents that replied " no" to the use of a school garden were asked to identify reasons it was not being used from a list of predetermined answers; however; they were given an option to write in their own answer.

Integrated School Gardening Curriculum

There are numerous garden-based learning curriculums available for schools to use, so this section aims to identify methods school are using for bringing gardening into the classroom and taking the classroom to the garden. Participants are asked to provide the name of any gardening curriculum used by the school, list the developer, the cost, identify if the curriculum addresses state mandated objectives, and select what classroom subjects use the curriculum. Schools that have not adopted an integrated school gardening curriculum are asked to select inhibitors from a predetermined list of factors or to write in their own inhibitors.

Factors for Successful School Gardens

In developing sustainable school gardening programs it is important to identity the critical factors for maintaining its success. Built on factors established by DeMarco, participants were asked to select which factors were important to the success of school gardening. A role down question was created to pull in the participants selected answers, where they could categories their factors as 1) CRITICAL for successful school gardens, 2) Factors that help school garden success, but are not CRITICIAL or 3) Factors do not keep school from having a successful school garden. Then participants were asked to rate their school's implementation of the CRITICAL factors as successful, adequate or needs improvement.

Validity of Research Instrument

Face and content validity were established by using a panel of research experts and through gardening experts. Prior to dissemination of the questionnaire, the researcher solicited feedback from a panel of researcher to examine the questionnaire's flow and readability. In addition, the research also sought input from school garden experts to examine terminology and question clarity.

Research Instrument Approval

Appropriate measures were taken to receive approval by the Texas Tech Institutional Review Board, since this study involved human subjects. The IRB research proposal included the rationale for the study, method of choosing research participants, methodology and data collection procedures, and methods for ensuring confidentiality of respondents. Participant consent was established by their acceptance to complete the

questionnaire. Finally approval was obtained after a few minor revisions in the proposal were corrected. Appendix B contains the IRB approval letter.

Data Collection Procedures

A list of schools was compiled using the RSG website, of which ninety-three schools were identified. One school was omitted, since it was the only school in the district and may limit confidentiality. After receiving approval notice from the IRB, ninety-two recognized RSG locations were selected to be surveyed, which are located in Fort Worth ISD *(41school),* Dallas ISD (*22 schools*), Grand Prairie ISD *(19 schools),* Arlington ISD (*5 schools*), and Birdville ISD (*5 schools*). Each school was contacted by telephone to request the name and e-mail address of the school garden coordinator. Contact information was established for eight-four schools; for the remaining eight schools the principle was used as the contact.

Dillman, Smith, and Christian (2009) provided nine ways to increase the benefits of participation in surveys. All schools in the study were contacted through an initial e-mail, which provided information about the survey, requested the assistance from the contact, identified how the research could impact their values, established the importance of the study, and offered appreciation for their help. Dillman, Smith, and Christian (2009) stated, "potential respondents are more likely to complete the survey when they trust that the sponsor will provide the rewards as promised" (p. 27-28). Trust for the research study was established by using Qualtrics provided by Texas Tech University to send all communications, providing information on the researcher and research project and notifying participants that the study was voluntary in nature and all responses would be kept confidential. In addition, participants were given the researcher's contact

information incase assistance was needed in accessing the survey. The contact list was broken into ten e-mail groups of ten or less participants, to decrease the chance of the survey being flagged for spam mail. For the purpose of this study, three reminder e-mails were administered in five day intervals, increasing responses.

> Because sending additional e-mail contacts is relatively inexpensive, one can often leave the final decision on the number of follow-ups to send until well in the fielding process. If both the first and second follow-ups yield significant gains, a third follow-up may be useful as well. (Dillman, Smith, & Christian, 2009, p. 275)

Each reminder e-mail was slightly varied to increase respondent interest. The final reminder e-mail also included a small incentive for survey completion, if responses were completed by a specific date. Prior to sending each reminder e-mail the contact list was updated to exclude participants who had already responded to the survey.

The first reminder e-mail yielded 19 responses, which increased to 41 after the second reminder e-mail. Therefore, a third request was made, but the response on increased to 43. One school contact did not use any form of technology, so the researcher took the survey to the school to be completed, increasing the total number of responses to 44. The overall response rate was 48%. See Appendix C for initial and reminder e-mails.

Data Analysis Procedures

Results of the survey were made available through Qualtrics supported by Texas Tech University and were downloaded into SPSS Statistic Data Editor. Survey questions were analyzed using descriptive statistics of frequency, percentages and central

tendencies of measures. Questions were also sorted and formulated using Microsoft Excel and some calculations were completed by hand.

CHAPTER IV

RESULTS AND DISCUSSION

The purpose of this study was to evaluate the implementation of the model REAL School Gardens (RSG) has adopted for assisting schools with gardening This chapter contains descriptive statistics, which provides insight on how schools have expanded their gardening program. Results assess how gardens are used during the school day and what subjects are taught using integrated garden-based lessons. Additionally, the study demonstrates how schools within the RSG Network continue to grow their school gardening program through community partnership. The research objectives for this study include:

1. to provide a description of the RSG Network schools' demographics
2. to measure the amount of monetary and in-kind support for gardens gained for RSG Network schools
3. to identify local community partnerships developed by RSG Network schools
4. to measure usage of school gardens during the school day by RSG Network schools
5. to determine if RSG Network schools have adopted an integrated school gardening curriculum
6. to examine perceived critical factors for successful school gardens by RSG Network schools

The survey was e-mailed to ninety-two recognized RSG Network, which are located in Fort Worth ISD *(41 school),* Dallas ISD (*22 schools*), Grand Prairie ISD *(19 schools),* Arlington ISD (*5 schools*), and Birdville ISD (*5 schools*). The questionnaire

was delivered using the web-based survey development tool, Qualtrics, provided by Texas Tech University. Forty-four responses were obtained giving a response rating of 48%. Of the forty-four responses, twenty-two (50%) were from Forth Worth ISD, ten (22%) were from Grand Prairie ISD, eight (18%) were from Dallas ISD, and five (9%) were from Birdville ISD.

Descriptive Statistics of Sample Demographics

The RSG Network currently provides assistance for the development of school gardens within the Dallas – Fort Worth Metroplex area. It is important to understand the demographic make-up of responding school to determine any comparative measures. Schools were asked to provide information on the students' ethnicity by percentage, total number of students enrolled at the school and demographic density of the community within which the school is located. Overall, responding schools reported a majority of their students were Hispanic (55.92%), followed by African American (21.70%) and Caucasian (19.15%) and limited number of students that are Asian (2.27%) or a part of other ethnicities (.97%) (see Table 1). The range of students per school is from 275 to 845, with a mean of 550.32, median of 547.50 and mode of 500. Approximately 60% of responding schools have between 400 and 699 students (see Table 2). The majority of schools are located in a community that is considered a Metropolis (72.72%), leaving ten in a Suburban community (25%) and one in a rural community (2.27%) (see Table 3).

Table 1

Ethnicity Percentages by School District (N=44)

School District	Hispanic %	Caucasian %	African American %	Asian %	Other %
Birdville ISD	45.65	39.08	10.33	3.48	1.48
Dallas ISD	61.19	8.48	29.74	.48	.13
Forth Worth ISD	57.94	11.24	28.53	1.22	1.08
Grand Prairie ISD	58.90	17.80	18.20	3.90	1.20
Total	55.92	19.15	21.70	2.27	.97

Table 2

Distribution of Student Populations (N=44)

School District	Mean	Median	Range
Birdville ISD	568.75	590	350 - 745
Dallas ISD	531.13	531	360 - 845
Forth Worth ISD	532.82	506	275 - 790
Grand Prairie ISD	596.80	573	474 - 800

Table 3

Demographic Density of Schools by Frequency (N=44)

School District	Rural (< 10,000)	Suburban (< 50,000)	Metropolis (> 50,000)
Birdville ISD	0	1	3
Dallas ISD	1	1	6
Forth Worth ISD	0	4	18
Grand Prairie ISD	0	5	5
Total	1	11	32

Assistance received from REAL School Garden Network

Table 4 outlines the years in which responding participants reported initially receiving assistance from RSG. Nineteen schools (43.18%) first received help between 2005 and 2009; fourteen schools (31.81%) joined the network between 2010 and 2012 and nine schools (20.45%) started having assistance between 2000 and 2004. Two schools (4.54%) did not know when the school first received assistance from RSG.

Table 4

Year Schools First Received Assistance from RSG (N=44)

Year Range	Frequency	%
Unknown	2	4.54
2000 -2004	9	20.45
2005 -2009	19	43.18
2010 -2012	14	31.81

Respondents identified ten types of assistance provided by the RSG Network within the initial year of assistance (see Table 5). Twenty-two schools (51%) reported receiving help with the planning and designing of their school garden and nineteen people (44%) included that they had help with the garden installation. In addition, eighteen people (42%) were provided supplies for their garden and provided examples of stones, soil, seeds, dirt, mulch, trees, plants, tools, equipment, flowerbeds, greenhouse, a covered area, rock garden with flowerbeds, compost bins and water barrels. Sixteen people (37%) acknowledged receiving training on establishing a gardening and using a garden in a school environment, while nine people (21%) reported receiving assistance in the form of monetary support, ranging from $1,000 to $50,000. Fewer responses were given for garden lessons for students (9%), volunteers (9%), grants (2%), and awards (2%).

Table 5

Type of Reported Assistance Received from RSG (N=43)

Type of Assistance	Frequency	%
Support in planning/ designing gardening	22	51.16
Garden Installations	19	44.18
Supplies	18	41.86
Education/ Training	16	37.02
Monetary Support	9	20.93
Garden Lessons	4	9.30
Volunteers*	4	9.30
Grants	1	2.32
Awards	1	2.32

Note: Multiple types of assistance reported by respondents

*Examples given: Chase bank, Mercedes-Benz, parents

To better understand the impact RSG is having in partnership schools it is important to include respondent comments as provided below:

Respondent S10

During the early Fall semester, RSG helped our campus design the garden. Once the design was finalized, they helped plan the installation scheduled for December 2011 and helped secure volunteers to work on the installation. In the spring of 2012, RSG provided seeds and seedlings for our school to plant in the garden. Lastly, during the summer of the first year, RSG provided staff development on how to implement the garden within our curriculum.

Respondent S37

RSG help with the design and actual construction of the garden. They provided seeds, seedlings and plants to establish garden, training for school staff on how to incorporate the garden into lessons, seeds and seedlings for each planting season ,

additional training three times per year for four years on how to incorporate the garden into lessons, and Garden Coordinator training for all five years.

The survey supplied a follow up question to establish a lasting partnership between RSG and the schools within the network. Table 6 reflects that 41 of 43 (95.34%) of respondents claimed receiving additional help with their school gardening program.

Table 6

Additional Assistance Received from RSG after Initial Assistance (N=43)

Item	Type of Assistance *N=39*	Frequency	%
Yes		41	95.34
	Professional Development/ Teacher Training	26	66.66
	Supplies	19	48.71
	Garden Lessons	14	35.89
	Help Desk / Support	7	17.94
	Garden expansion/ rejuvenation days	7	17.94
	Grant/ Monetary Support	6	15.38
	Person to Person update/debrief meetings	5	12.82
	Obtaining grant funding	3	7.69
	Building partnerships	3	7.69
	Discounts	2	5.12
	Volunteers	2	5.12
	Stipend for Garden Coordinator	1	2.56
	Travel to see other gardens	1	2.56
No		2	4.65

Eighty nine percent (39 of 44) of respondents provided thirteen ways in which their school had received additional assistance from RSG (see Table 6). Twenty-six people (67%) stated receiving professional development and teacher training. Forty-nine percent of schools (19 of 39) also stated they were provided additional supplies, such as organic fertilizer, potato plants, seed packets, cabbage plants, lesson plans for different grade levels, planting guides and 39% of schools (14 of 39) received garden-based

lessons to use with students. Seven people (18%) reported having help in answering questions, ordering supplies and getting resources and seven people (18%) stated their garden was either expanded or experienced a garden rejuvenation day.

Additional ways schools received assistance included grants and monetary support (15%) ranging from $250 to $1,500; person to person update or debriefing meetings (13%); help getting grants from other community business (8%) such as Lowe's, Kohl's, and Home Depot; building partnerships (8%). Only 5% (2 of 39) people claimed receiving discounts for gardening products from companies such as Lowe's, Kohl's, and Home Depot and help getting volunteers. Respondents provided the following examples:

Respondent S13

We have had someone come to our school to train our teachers 3 times a year for two years. They teach a lesson that ties in with the TEKs that are being taught in the classroom that time. A lesson is taught for grades K-5 in any subject the teacher chooses. This shows the teacher and the students how the garden can be used as a classroom and not just for gardening.

Respondent S24

For three years, RSG has sent an educator to deliver lessons to students in every grade level 3 times a year.

Respondent S25

We continue to receive educator training on and off campus and supplies for the garden (seeds, transplants, fertilizer). REAL School Gardens has recognized efforts at our campus and the staff I have spoken to are always approachable, knowledgeable, and

helpful. This May our campus is receiving a rain barrel and water conservation training thanks to REAL School Gardens.

Assistance received from other Organizations

This study aimed to examine the effort school made to secure funds outside of the RSG Network, therefore, it was important to determine what the status of the school garden was prior to working with RSG, if the school had previously received funds for a gardening program and what time of monetary and in-kind support the school had acquired after joining the RSG Network. Table 7 shows that a majority of schools 66% (29 of 44) did not have a school garden before applying for RSG assistance, while ten schools (23%) did have a garden that was been used for academic instruction.

Table 7

Status of School's Garden Prior to Receiving Assistance by RSG (N=44)

Garden Status	Frequency	%
School did not have a garden	29	65.90
School had a garden being used for academic instruction	10	22.72
School had a garden, but it was not used for academic instruction	2	4.50
Other	2	4.50
Not Sure	1	2.27

Respondent comments included:

Respondent S5

Certain teachers had a grade level garden that was used for academic instruction.

Respondent S7

There was a garden, but used by science teachers only. Now it is used for all subject areas.

Respondent S16

We were just starting our school garden funded by Thriving Minds, Capital One, and Home Depot.

Respondent S26

We had a very small garden which was destroyed due to bond work.

Only fifteen schools (34%) had applied for any gardening assistance prior to working with RSG (see Table 8). Table 9 displays companies that respondents requested funds from, including the local ISD and PTA or PTO, Lowes's, Capital One, Thriving Minds, Sam's, Target, Kohl's, VIVA, Dallas Association of Young Lawyers and the Rainwater Foundation. The range of funds varied greatly amounts ranged from $25 to $10,000.

Table 8

School Acquired Funding to Support a Garden, before Working with RSG (N=44)

Item	Frequency	%
Yes	15	34.09
No	29	65.90

Table 9

Type of Reported Funding Received Prior to Working with RSG (N=15)

Provider	Frequency	%	Amounts
ISD Foundation / District grant	4	26.66	$1,000 to $4,000
PTA/PTO	4	26.66	$4,00 to $2,000
Unknown Provider	3	20.00	$200 to $10,000
Garden Supplies *	3	20.00	
Lowe's	2	13.33	$5,000
Capital One	1	6.66	$500
Thriving Minds	1	6.66	$1,000
Sam's	1	6.66	$25
Target	1	6.66	$25
Kohl's	1	6.66	$1,500
VIVA	1	6.66	$200
Dallas Association of Young Lawyers	1	6.66	
Rainwater Foundation	1	6.66	
Recycling Funds - ongoing	1	6.66	

*Examples given: Wal-Mart, parents, local garden centers

Table 10 shows an increased number of respondent's secured additional monetary and in-kind gifts after beginning a partnership with RSG. Twenty-three (52.27%) of schools identified they had acquired additional monetary funding for their gardening program and thirty-two (72.72%) reported additional in-kind support for their garden.

Table 10

School Acquired Monetary and In-kind Support for a Garden, after Working with RSG (N=44)

Support Type	Frequency	%
Monetary		
Yes	23	52.27
No	21	47.72
In-kind		
Yes	32	72.72
No	12	27.27

Respondents identified a wide range of monetary support acquired ranging from $132 to $40,000 (see Table 11). Twenty-two percent (5 of 23) reported the school garden having been a line item in the school's budget and 17.39% (4 of 23) stated the PTA or PTO provided funding for the gardening program. In addition, respondents acknowledged receiving funds from Home Depot, city award programs, grants, the school district, Chase Bank, Whole Kids Foundation, Channel NBC 5, Helping Friends, school fundraisers, the 21st Century Afterschool Program and Whole Foods.

Table 11

Type of School Acquired Funding after Working with RSG (N=23)

Provider	Frequency	%	Amounts
School Line Item	5	21.73	$200 to $6,950
PTA Budget	4	17.39	$200 to $5,000
Home Depot	4	17.39	$100 to $5,000
Private Donors	3	13.04	$20 to $40,000
City Award Contest	2	8.69	$200 to $650
Grants*	2	8.69	$132 to $1,250
ISD Foundation/ District grant	2	8.69	$1,000
Chase Bank	1	4.34	$1,000
Whole Kids Foundation	1	4.34	$2,000
Channel 5 NBC	1	4.34	
Helping Friends	1	4.34	$300
R.E.A.L. Award	1	4.34	$300
Recycling funds	1	4.34	$500
School Fundraiser	1	4.34	$1200 to $2,000
21st Century Afterschool Program	1	4.34	$200
Whole Foods	1	4.34	$500

*Example given: Bring Back the Monarchs to Texas Grant

The type of in-kind support was assembled into three categories: supplies, volunteers and beautification (see Table 12). Ninety four percent (30 of 32) of respondents claimed receiving materials such as seed, rain barrels, shovels, trowels,

plants, mulch, vegetables and compost from RSG, NBC 5, PTA, Home Depot, Dollar General, Wal-Mart, City Services, Farmers Market, Sid Parker, local community, and the afterschool program. Twenty-five people (78.12%) retained the use of volunteers from Tarrant County Community College, Churches, Master Gardeners, Boy Scouts, parents, teachers, Bank of America, Home Depot, City Services, PTA, Mercedes-Benz, Aspire, and local community members. Finally, nine schools (28.12%) noted the in-kind donations for garden beautification from Wal-Mart, private donations, school projects, Subway, Aspire, and Home Depot. Two examples of in-kind support are given below:

Respondent S42

We had a group of volunteers during Earth Day last year install a garden that was better suited for our school. They gave us an arbor, plants, pathways, and boxes to grow vegetables in that are in direct light for a longer period of time. Real Gardens helped.

Respondent S29

We have received a host of assistance from Lowe's Kohl's, Home Depot and local plant stores. These companies' provide plants at a discount and money to purchase a greenhouse. However we lost the greenhouse in a storm. A local pet store provided fish for our pond. A local company provides the soil and mulch. The city sends the community services out a couple times a year to assist us in fertilizing and spreading the soil and mulch out into the garden.

Table 12

Type of In-Kind Assistance Received after Working with RSG (N=32)

In-Kind Support	Frequency	%
Supplies	30	93.75
Volunteers	25	78.12
Beautification	9	28.12

Usage of Garden during School

DeMarco (1997), Gridley (1997), and Hazzard (2010) outline helpful recommendations for successful school gardens, therefore; it is important to measure how schools in the RSG Network are implementing principles for success. The survey asked respondents to provide insight on the involvement of a school garden coordinator and volunteers. Respondents were also asked to report on how many hours were spent on planning, maintaining and educating in and outside of the garden. There were questions related to how the garden is being used and the grade level and number of students using the garden. In addition, questions inferred on the school's usage of a gardening program in 2012-2013 school year and plans for usage in the 2013-2014 school year. Schools were also asked to select inhibitors for using their garden, if it was not being implemented during the 2012-2013 school year.

School Garden Coordinator

Forty-one respondents (93%) claimed their school had a person acting as the School Garden Coordinator (see Table 13). Eighty-six percent (35 of 41) reported a teacher or staff person was placed in this role; only 10% (4 of 41) of responses stated that an administrator, school counselor, school nurse, afterschool personnel or librarian assumed the role.

Table 13

School has a Designated Garden Coordinator(GC) (N=43)

Item	Person assigned role as GC	Frequency	%
Yes		41	95.34
	Teacher/Staff	35	85.36
	Administrator/School Counselor/School Nurse	2	4.87
	Other: *Afterschool program coordinator, Librarian*	2	4.87
	Parent/Volunteer	1	2.43
	Part-time garden coordinator position	1	2.43
No		2	4.65

Table 14 notes the selected job assignments for the School Garden Coordinator as perceived by respondents. The top five responsibilities included garden maintenance (87.80%), recruiting parents and volunteers to help with the garden (85.36%), inventorying gardening supplies (73.17%), coordinating student garden times (70.73%), and teaching in the garden (65.85%).

Table 14

Perceived School Garden Coordinator Job Assignments (N=41)

Job Assignments	Frequency	%
Garden Maintenance	36	87.80
Recruiting parents/volunteers to help with the garden	35	85.36
Inventorying gardening supplies	30	73.17
Coordinating student garden times	29	70.73
Teaching in the garden	27	65.85
Seeking additional funding	19	46.34
Establishing community/ business support	18	43.90
Creating gardening lesson plans	15	36.58
Other	11	26.82
Sponsoring a Garden Club	*3*	
Data Collection (teaching time in garden)	*2*	
Picking up Supplies	*1*	
Going to garden meetings	*1*	
Working with Junior Master Gardeners	*1*	
Encouraging gardening usage (as learning tool)	*1*	
Coordinating/ Bringing speakers to teach in the garden	*1*	
Supporting teaches that use the garden	*1*	

Usage of Volunteers

On the question relating to the use of parents or community volunteers in the garden, thirty respondents (69.76%) stated they did incorporate parents and volunteers in their gardening program (See Table 15). Twenty-eight respondents (93.33%) selected parents and seventeen respondents (56.66%) selected community members as volunteers. In addition, church members (33.33%), experts (30%) such as landscapers, horticulturist and Master Gardeners, and business employees (23.33%) were also chosen. Table 16 reflects the top three job assignments for volunteers included garden maintenance (96.66%), recruiting parents and volunteers (30%), and teaching in the garden (16.66%).

Table 15

School has Parents or Community Volunteers Assisting with the Garden (N=43)

Item	Type of Volunteer	Frequency	%
Yes		30	69.76
	Parents	28	93.33
	Community	17	56.66
	Church	10	33.33
	Experts *(landscapers, horticulturist, Master Gardeners)*	9	30.00
	Business	7	23.33
	Other *	3	10.00
No		13	30.23

* Dubiski, Boy Scouts, Student volunteers, City & District Volunteers

Table 16

Perceived Volunteer Job Assignments (N=30)

Job Assignments	Frequency	%
Garden Maintenance	29	96.66
Recruiting parents/ volunteers	9	30.00
Teaching in the garden	5	16.66
Coordinating student garden times	4	13.33
Seeking additional funding	4	13.33
Establishing community/ business support	4	13.33
Teaching garden concepts in the classroom	2	6.66
Inventorying gardening	2	6.66
Other: *Maintaining Website, Helping with Garden Club*	2	6.66

Usage of school garden

Respondents were asked to report the usage of a garden during the 2012-2013 school year and their intent to use a garden during the 2013-2014 school year (see Table 17). Eighty-eight percent (38 of 43) schools reported using the garden during the 2012 to 2013 school year and 100% (42 of 42) of the schools planned to have a school garden during the 2013-2014 school year.

Table 17

School is Actively Using the Garden

School Year	Use of School Garden	Frequency	%
2012-2013 *(N=43)*	Yes	38	88.37
	No	5	11.62
2013-2014 *(N= 42)*	Yes	42	100
	No		

The top four inhibiting factors selected for using a school garden shown in Table 18. These factors are low level of classroom teacher interest or support (100%), low level of administrative interest or support (80%), not enough time (60%), and time spent on standardized testing (60%).

Table 18

Reasoning for not Using School Garden (N=5)

Reasons Selected	Frequency	%
Low level of classroom teacher interest/ support	5	100
Low level of administrative interest/ support	4	80
Not enough time	3	60
Time spent on standardized testing	3	60
Low level of volunteer interest/ support	2	40
Low level of parent interest/ support	2	40
Low priority relative to other academic subjects	2	40
Inadequate teacher training	2	40
Risk of vandalism	1	20
Low level of student interest/ support	1	20

The questionnaire supplied a question on four aspects of the school gardening program to establish the amount of time (in hours) spent weekly on gardening (see Table 19). These factors included planning gardening based teaching strategies (N =35),

gardening maintenance (N=39), educating youth using the garden (N=39) and educating youth on gardening concepts in the classroom (N=37). The first factor, planning garden based teaching strategies, had a range of 0 to 31 hours, with a mean of 4.54, a median of 3, and a standard deviation of 6.13. The second factor, gardening maintenance, had a range of 1 to 37 hours with a mean of 6.43, a median of 4, and a stand deviation of 7.38. The third factor, educating youth in the garden, had a range from 1 to 40 hours, with a mean of 8.28, a median of 4, and a standard deviation of 9.77. The fourth factor, educating youth on gardening concepts in the classroom, had a range of 0 to 38 hours, with a mean of 6.32, a median of 3, and a standard deviation of 8.68. The total mean of all four factors is 25.57 hours per week and a total median of 14 hours per week.

Table 19

Perceived Hours Spent on Gardening at Schools

Activity	Mean	Median	SD	Range
Planning garden based teaching strategies (N=35)	4.54	3	6.13	0-31
Garden maintenance (N=39)	6.43	4	7.38	1-37
Educating youth using the garden (N=39)	8.28	4	9.77	1-40
Educating youth on gardening concepts in the classroom (N=37)	6.32	3	8.68	0-38

Also in relationship to time, respondents were asked to select how often they use the garden. They were given the preset options; never, at least once a day, at least once a week, 2 to 3 times a week, at least once a month, and 2 to 3 times a month or other. Thirty-six people responded to the question, of which 58.33% (21 of 36) selected at least once a week, 19.44% (7 of 36) selected 2 to3 times a week, 8.33% (3 of 36) selected at least once a day, 8.33% (3 of 36) selected at least once a month and 5.55% (2 of 36) selected 2 to 3 times a month (see Table 20).

Table 20

Amount of Time Students are in the Garden (N=36)

Garden Times	Frequency	%
At least once a week	21	58.33
2-3 Times a Week	7	19.44
At least once a day	3	8.33
At least once a month	3	8.33
2-3 Times a Month	2	5.55

Respondents were asked to rank how the garden was been using at the school, their options included academic, social development, campus beautification, therapeutic, and recreation (see Table 21). Academic was overall first with a frequency of 31 and a mean rank of 1.3, social development was second with a frequency of 15 and a mean rank of 2.8. The third was campus beautification with a mean rank of 3. Therapeutic usage came in forth with a mean rank of 3.7, which was close to the fifth placed rank of recreational with a mean rank of 3.8.

Table 21

Ranking of How Gardens are Being Used in Schools

	Rank 1		Rank 2		Rank 3		Rank 4		Rank 5		Mean	
Purpose	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%	Rank	S.D.
Academic *N=36*	**31**	86			3	8			5	14	1.3	.95
Social Development *N= 33*			**15**	45	10	30	5	15	3	9	2.8	.99
Campus Beautification *N= 35*		6	**11**	31	**11**	31	6	17	5	14	3	1.15
Therapeutic *N = 32*	1	3	3	9	8	25	**10**	31	**10**	31	3.7	1.09
Recreational *N = 33*	4	12	1	3	4	12	**12**	36	**12**	36	3.8	1.3

Table 22 shows the top ten responses on the school subjects most used in school gardening. Eighty percent (8 of 10) select science, 50% (5 of 10) mathematics, 40% (4 of

10) language arts/ English, 30% (3 of 10) art, 20 % (2 of 10) selected environmental education, health/nutrition, or social studies/history, and only 10% (1 of 10) chose music, library and physical education .

Table 22

Subjects where School Gardening is Implemented (N=10)

Subjects	Frequency	%
Science	8	80
Mathematics	5	50
Language Arts/ English	4	40
Art	3	30
Environmental Education	2	20
Health/Nutrition	2	20
Social Studies/ History	2	20
Music	1	10
Library	1	10
Physical Education	1	10
None	1	10
Other: *Afterschool Garden Club*	1	10

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Reflection was also given for the type of school gardening activities that are happening at the school. Eight-six percent (38 of 44) of respondents selected how they are incorporating gardening at their school, shown in Table 23. The top six types of school gardening activities included outdoor gardening (94.73%), vegetable gardening (94.73%), raised bed gardening (76.31%), perennial gardening (76.31%), windowsill gardening (55.26%) and butterfly gardening (55.26%). Respondents also wrote in their own responses which include composting, growing potatoes for food pantry, themed beds, herbal gardens, and measuring activities.

Table 23

Types of School Gardening Activities Being Implemented (N=38)

Gardening Activities	Frequency	%
Outdoor gardening	36	94.73
Vegetable Gardening	36	94.73
Raised bed	29	76.31
Perennial Gardening	29	76.31
Windowsill	21	55.26
Butterfly Gardening	21	55.26
Container	15	39.47
Indoor "grow" light	13	34.21
Square Foot	7	18.42
Other	9	23.68
Composting	*3*	
Growing potatoes for food pantry	*2*	
Themed beds	*2*	
Herbal Garden	*1*	
Measurement activities	*1*	
Greenhouse	2	5.26

The study examined total campus usage of the school garden by examining the number of classes and total number of students using the garden by grade level. Table 24 displays the number of classes per grade level that use the school garden. The pre-kindergarten total number of classes equaled 60 with a range of 1 to 6 classes, a mean of 2.14 and median of 2 classes. The total number of kindergarten classes equaled 127 with a range from 1 to 11 classes, a mean 3.72 and median of 4 classes. First graders' provided the highest total number of classrooms at 130 and had a range from 1 to 11, with a mean of 3.82 and media of 4. The total number of classes reported for second grade equaled 109, with a range from 1 to 6, a mean of 3.50 and median of 3 classrooms. The third grade total number of classrooms equaled 117 and ranged from 1 to 7, with a mean of

3.53 and median of 4 classrooms. The fourth grade classroom usage totaled 115, with a range from 1 to 6, a mean of 3.37 and a median of 4 classrooms. Fifth grade total classes equaled 84 and range from 1 to 5, with a mean of 2.80 and median of 3 classrooms.

Table 24

Classes per Grade Using the School Garden

Grade Levels	Total # of Classes	Mean	Median	Range
Pre-Kindergarten *(N = 28)*	60	2.14	2	1-6
Kindergarten *(N = 34)*	127	3.72	4	1-11
1st Grade *(N = 34)*	130	3.82	4	1-11
2nd Grade *(N = 31)*	109	3.50	3	1-6
3rd Grade *(N = 33)*	117	3.53	4	1-7
4th Grade *(N = 34)*	115	3.37	4	1-6
5th Grade *(N = 30)*	84	2.80	3	1-5
Other Classes *(N =4)*	2	1.00	1	

Table 25 reflects the number of students by grade using the school garden. In pre-kindergarten the total number of students reported equaled 1,130, with a range of 5 to 120, mean of 43.45 and median of 43 students. The total number of reported students for kindergarten equaled 2,401, with a range of 15 to 242, a mean of 77.45, and a median of 75 students. The highest number of total students is represented by first grade with 2,436 students using the garden, having a range of 15 to 242, a mean of 76.13, and a median of 70 students. The second grade the total number of students equaled 2,024 having a range of 15 to 120, a mean of 69.79 and median of 70 students. The total number of students for third grade equaled 2,026, with a range of 20 to 140, a mean of 69.86, and a median of 73 students. The total fourth grade number of students equaled 2,030, with a range of 20 to 140, a mean of 67.67, and a median of 69 students. The total student count for fifth grade

equaled 1,670, having a range from 20 to 110, with a mean of 64.23, and a median of 70 students.

Table 25

Students per Grade Using the School Garden

Grade Levels	Total # of Students	Mean	Median	Range
Pre-Kindergarten *(N = 26)*	1,130	43.46	43	5-120
Kindergarten *(N = 31)*	2,401	77.45	75	15-242
1st Grade *(N = 32)*	2,436	76.13	70	15-242
2nd Grade *(N = 29)*	2,024	69.79	70	15-120
3rd Grade *(N = 29)*	2,026	69.86	73	20-140
4th Grade *(N = 30)*	2,030	67.67	69	20-140
5th Grade *(N = 26)*	1,670	64.23	70	20-110
Other Classes *(N =3)*	53	17.67	15	12-26

Integration of School Garden Curriculum

Table 26 reflects a small number of respondents which have implemented an integrated school gardening curriculum, only 7 of 41 (17.07%) of respondents stated "yes".

Table 26

School has an Integrated School Gardening Curriculum (N=41)

Item	Frequency	%
Yes	7	17.07
No	34	82.92

Seventy-five percent of respondents reported the integrated school gardening curriculum being used was through RSG, which did not cost anything and met TEKS. One school reported using Life Lab, which cost $5,000 and met TEKS (see Table 27).

Table 27

Type of School Gardening Curriculum Being Used in Schools (N=4)

Name of Curriculum	Developer	Cost	Does it meet TEKS?
Curriculum Frameworks	FWISD and RSG	$0	yes
Life Lab	Life Lab Inc. in California	$5,000	yes
Science	RSG, various teachers	$0	yes
No Name Given	RSG	$0	yes

The perceived inhibitors to adding an integrated school gardening curriculum was answered by 34 of 44 (77%) of respondents (see Table 28). The top four inhibitors were not enough time (64.70%), low priority relative to other academic subjects (55.88%), time spent on standardize testing (47.05%), and low level of classroom teacher interest/ support (35.29%). Responses are not cumulative as respondents were able to select multiple factors.

Table 28

Perceived Inhibitors for Adoption of an Integrated School Gardening Curriculum

Inhibitors Selected (*N=34)*	Frequency	%
Not enough time	22	64.70
Low priority relative to other academic subjects	19	55.88
Time spent on standardized testing	16	47.05
Low level of classroom teacher interest/ support	12	35.29
Inadequate financial resources	7	20.58
Have not found one that addresses the school's needs	6	17.64
Low level of volunteer interest/ support	6	17.64
Inadequate teacher training	6	17.64
Low level of parent interest/ support	5	14.70
Low level of administrative interest/ support	5	14.70
Insufficient material resources	4	11.76
Class size to large	4	11.76
Other	4	11.76
Low level of student interest/ support	1	2.94

Perceived Critical Factors in Successful School Gardens

The survey provided a list of twenty factors that might be considered important to the success of a school garden, which included support from administration (*N*=32), support from teachers *(N*=32), adequate amount of instructional time (*N*=29), availability of funding for supplies (*N*=27), teachers' gardening knowledge (*N*=26), teacher trainings (*N*=25), adequate amount of preparation time (*N*=22), availability of gardening equipment (*N*=22), availability of a person over garden activities (*N*=22), managing student behavior (*N*=21), availability of garden-based curricula (*N*=20), availability of volunteer help (*N*=20), availability of summer maintenance assistance (*N*=20), support from parents (*N*=19), safe environment (*N*=18), support from the community (*N*=18), availability of storage for supplies (*N*=16), small class size (*N*=15), teachers' knowledge of science (*N*=14) and expert assistance with garden concerns (*N*=14). Percentages are not cumulative as respondents could select multiple factors from the list.

For the purpose of this study, critical factors for successful gardening were determined by using a frequency of fifty percent or higher. Table 29 shows the critical factors being support from administration (94%), support from teachers (91%), safe environment (89%), availability of funding for supplies (74%), adequate amount of instructional time (66%), availability of gardening equipment (64%), availability of a person over garden activities (64%), teacher trainings (56%), adequate amount of preparation time (55%), teachers' gardening knowledge (54%), managing student behavior (52%) and availability of volunteer help (50%).

Table 29

Perceived Factors Impacting Success of School Gardens

School Garden Factors	Critical Factors		Helpful Factors		Factors not impact success	
	f	%	*f*	%	*f*	%
Support from Administration (N=32)	30	**94**	2	6	0	0
Support from Teachers (N=32)	29	**91**	3	9	0	0
Adequate amount of instructional time (N=29)	19	**66**	7	24	2	6
Availability of funding for supplies (N=27)	20	**74**	4	15	3	11
Teachers' gardening knowledge (N=26)	14	**54**	11	42	1	4
Teacher trainings (N=25)	14	**56**	9	36	2	8
Adequate amount of preparation time (N=22)	12	**55**	8	36	2	9
Availability of gardening equipment (N=22)	14	**64**	8	36	0	0
Availability of a person over garden activities (N=22)	14	**64**	8	36	0	0
Managing student behavior (N=21)	11	**52**	8	38	2	10
Availability of garden-based curricula (N=20)	5	25	9	**45**	6	30
Availability of volunteer help (N=20)	10	**50**	4	20	6	30
Availability of summer maintenance assistance (N=20)	9	45	9	**45**	2	10
Support from parents (N=19)	5	26	7	37	7	**37**
Safe environment (N=18)	16	**89**	1	6	0	0
Support from the community (N=18)	5	28	8	**44**	4	22
Availability of storage for supplies (N=16)	4	25	10	**63**	2	12
Small class size (N=15)	6	40	6	**40**	3	20
Teachers' knowledge of science (N=14)	6	43	8	**57**	0	0
Expert assistance with garden concerns (N=14)	4	29	8	**57**	2	14

Factors perceived as “helpful” for successful school gardens include availability of storage for supplies (63%), teachers' knowledge of science (57%), expert assistance with garden concerns (57%), availability of garden-based curricula (45%), availability of summer maintenance assistance (45%), support from the community (44%), and small class size (40%). Only one factor split between “helpful” factors and “factors not impacting success” support from parents with 37% (7 of 19) in both categories.

Respondents were asked to measure their perception of the school's successful implementation of the critical factors; options were successful, adequate and needs improvement (see Table 30). Thirty-four respondents (77%) answered reporting needs improvement (50%), adequate (26.47%) and successful (23.52%).

Table 30

School's Rating of their Implementation of the Critical Factors on Success of School Gardening (N=34)

Implementation Rating	Frequency	%
Successful	8	23.52
Adequate	9	26.47
Needs Improvement	17	50.00

Chapter Summary

This chapter reviewed descriptive statistics, which provided insight on how schools have established and grown their gardening program. Schools provided information on the students' ethnicity by percentage, total number of students enrolled at the school and demographic density of the community. Schools reported when they initially started working with RSG, what the initial assistance included, if the school received any additional assistance from RSG and on other monetary and in-kind assistance they acquired. The study also focused on multiple factors which inquired when and how school gardens are used by respondents. Finally, a list of perceived factors were supplied for schools to identify which were critical, helpful or not important to successful school gardening.

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

This study evaluated the impact of REAL School Gardens (RSG); through their establishment of school gardens and educational opportunities for teachers. Schools within the RSG Network were asked to provide data on garden funding and community supporters; how the garden is used during the school day; what subjects are taught using gardening concepts; on school usage of an integrated garden-based curriculum; and perceived critical factors for a successful school garden. An examination of past research offered insight to the history and current trends in school gardening; the educational methodologies used in school gardening; the attributes of successful school gardening; types of integrated school gardening curriculum; and current research supporting garden-based learning. Research methodologies for this study were compiled using the recommendations of previous research on school gardening (DeMarco, 1997; Gridley, 1997; Hazzard, 2010). An e-mail based survey through Qualtrics was used to collect responses, of which; forty-four responses were obtained giving a response rating of 48%. The results of this study provide an understanding of how gardens in the RSG Network can be used to enhance teaching in schools.

Purpose of the Study

The study provides insight on how RSG Network schools have funded and grown community support for their gardening program. The purpose of this study was to evaluate the implementation of the model RSG has adopted for assisting schools with gardening. It examined how the garden is used during the school day, assess what

subjects are taught with gardening concepts and determine if schools are using integrated garden-based curriculum. Additionally, the study assessed perceived critical factors for a success school garden. This chapter provides a summary of the previous chapters and offers concluding implications on result findings for the guiding research objectives:

1. to provide a description of the RSG Network schools' demographics
2. to measure the amount of monetary and in-kind support for gardens gained for RSG Network schools
3. to identify local community partnerships developed by RSG Network schools
4. to measure usage of school gardens during the school day by RSG Network schools
5. to determine if RSG Network schools have adopted an integrated school gardening curriculum
6. to examine perceived critical factors for successful school gardens by RSG Network schools

Finally, recommendations for additional research on the topic of school gardening are given to enhance the body of literary work in the field.

Limitations

Participation in this study was limited to schools in the RSG Network. Survey respondents are demographically located in an urbanized area in the North Eastern part of Texas. Study results cannot be generalized, however; the knowledge gained from this study may be useful to organizations interested in funding school gardens and to schools seeking funds for school gardening projects. The results of this study provide practical

working knowledge of how school gardens are being implemented and sustained within the RSG Network.

Design of the Study

This study was quantitative and all data was collected using a web-based approach. Research methods for this study followed DeMarco's (1997) dissertation, which examined logistical, conceptual, educational and attitudinal factors that impacted a school's use of school gardening. In addition, research concepts were also derived from Hazzard's (2010) dissertation, which evaluated factors contributing to the participation in the California Instructional School Garden Program and established a best practices model for implanting, sustaining and utilizing Instructional School Gardens in California. Schools in the RSG Network were selected to participate in the study. Schools were verbally asked to submit the name and e-mail address of a local contact overseeing school gardening activities; the majority of contact names given were elementary school teachers. However, a few schools provided contact information for afterschool program coordinators, PTO members, school counselors, school nurses, and Master Gardeners. The questionnaire was sent to the school principal for school that did not have or did not know the person in charge of the school garden program.

Population and Sample

The target population for this study was a census of schools in the RSG Network. RSG provides assistance for the development of school gardens and supports over ninety schools within the Dallas – Fort Worth Metroplex area. The accessible population consisted of ninety-two schools found on the RSG website. Schools are located within five school districts, forty-one from Fort Worth ISD elementary schools, twenty-two

from Dallas ISD elementary schools, nineteen from Grand Prairie ISD elementary schools, five from Arlington ISD elementary schools, and five from Birdville ISD elementary schools. The accepting sample was forty-four schools, giving an overall response of 48%. It is the opinion of the researcher; schools opting not to respond to the questionnaire may have different views than responding schools. Therefore, the results of this study should only be applied to responding schools.

Instrumentation

The questionnaire for this study was delivered using the web-based survey development tool, Qualtrics, provided by Texas Tech University. This method was chosen due to a limited amount of time for response collection, the low economical cost, the convenience to participants, and analysis readiness. Schools were asked to provide information regarding school demographics, their partnership with RSG, additional school gardening partnerships, school garden management, usage of school garden, usage of an integrated school gardening curriculum, and factors for successful school gardens.

Data Collection

Data collection from the first e-mail reminder began on the last week of April 2013, with follow-up e-mails sent at the end of the first week of May 2013 and the first week of June 2013. One survey was personally delivered to the school and collected, as the web-based delivery method was prohibitive to the respondent. Once contacts responded to the survey, their contact information was deselected from the contact list, to avoid replication of survey results from subsequent e-mail reminders. All responses were coded for analysis to keep data confidential.

Data Analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS). Questions were also sorted and formulated using Microsoft Excel and some calculations were completed by hand. Survey questions were analyzed using descriptive statistics of frequency, percentages and central tendencies of measures. All questions in the study were included in the data analysis phase and results described in the Results and Findings Chapter.

Conclusions

This section will cover the amount and types of assistance schools within the RSG Network have obtained, how schools use gardening, the integration of school gardening curriculum and outline the perceived critical factors for a successful school gardening program.

Objective 1

The first objective of this study was to provide a description of the RSG Network schools' demographics. Schools in the RSG Network are located within five school districts in the Dallas-Fort Worth Metroplex of Texas. RSG partners with forty-one Fort Worth ISD elementary schools, twenty-two Dallas ISD elementary schools, nineteen Grand Prairie ISD elementary schools, five Arlington ISD elementary schools, and five Birdville ISD elementary schools. Overall, responding schools reported a majority of their students having a Hispanic ethnicity, followed by African American, Caucasian, Asian and Other, respectively. The average number of students per school 551 and the majority of schools are located in a community that is considered a Metropolis.

Objective 2

The second objective of this study was to measure the amount of monetary and in-kind support for gardens. An analysis of results revealed a majority of respondents did not have a school garden prior to receiving assistance from RSG, however; over one third of respondents claimed to have received support for school gardening before working with RSG. The most common types of support acquired were monetary funding and gardening supplies from within the school district, PTA and from unknown providers, which ranged from $25 to $10,000 dollars.

The majority of respondents reported their school began working with RSG between 2005 and 2012. The top five reported types of assistance respondents received from RSG included support in planning and designing the garden; garden installations; gardening supplies; education and training; and monetary support ranging from $1,000 to $50,000 dollars. In addition to the initial assistance from RSG, a majority of respondents reported receiving further assistance from RSG. The top three types of support included professional development and teacher trainings; gardening supplies; and garden lessons.

The majority of respondents also claimed gaining additional monetary support and receiving additional in-kind donations from the local community. The top four responses for funding included being a school budget line item; the PTA/PTO; the Home Depot; and private donations, which ranged from $20 to $40,000 dollars. The type of in-kind support was assembled into three categories: supplies, volunteers and beautification.

Based on these results, the pursuit for garden funding and supplies for schools within the RSG Network is a continual process. While some schools have been able to establish the gardening program as a line item in the school budget or PTA, other schools

continue to seek funding through grants and local businesses. The amount of funding received greatly varies between schools based on their specific needs. Schools working with RSG gain assistance in the planning, designing and implementation of the school garden. In addition, they receive opportunities for subject matter training, educational lessons at the school and are provided gardening supplies.

Objective 3

The third objective of this study was to identify local community partnerships developed through the RSG Network. A majority of schools responded positively to using parents or community volunteers in the garden. Community volunteers came from local churches, experts in the field such as landscapers, horticulturist and Master Gardeners, and business employees. Respondents stated the following businesses and organizations provided volunteers to assist in the garden; Tarrant County Community College, Master Gardeners, Boy Scouts, Bank of America, Home Depot, City Services, PTA, Mercedes-Benz, and Aspire. The main responsibilities of volunteers were garden maintenance, recruiting parents and volunteers to help in the garden and to teach in the garden.

In addition, respondents provided insight to how community partnerships are helping with gardening needs. The top businesses that provided funding included Lowe's, Kohl's, Home Depot, Capital One, Thriving Minds, Sam's, Target, VIVA, Dallas Association of Young Lawyers, the Rainwater Foundation, Whole Kids Foundation, Channel NBC 5, Helping Friends, local after school program, local PTA or PTO, local school districts and city programs. Respondents also reported businesses offering discounts or in-kind donation for garden supplies and garden beautification products,

which included REAL School Gardens, Lowe's, Kohl's, Home Depot, Wal-Mart, Channel NBC 5, Dollar General, Farmer's Market, Subway, Aspire, city programs and private donors.

Objective 4

The fourth objective of this study was to measure usage of school gardens during the school day. This study provided insight on how schools within the RSG Network uses gardens as an educational tool. The majority of respondents reported actively using the garden during the 2012 to 2013 school year while all the respondents planned to use the school garden during the 2013-2014 school year. Respondents reported spending approximately 25 hours on gardening components each week: planning teaching strategies (4.54 hours), garden maintenance (6.43 hours), educating youth in the garden (8.28 hours) and educating youth in the classroom using gardening concepts (6.32 hours). Responses showed the primary use for school gardens being academic, followed by social development, campus beautification, therapeutic, and recreational uses in a ranked order. The top six types of school gardening activities selected include: outdoor gardening, vegetable gardening, raised bed gardening, perennial gardening, windowsill gardening, and butterfly gardening.

A majority of completed surveys reported having a garden coordinator at the school, which was primarily either a teacher or staff person. The top five job assignments of the school garden coordinator were garden maintenance, recruiting parents or volunteers to help with the garden, inventorying garden supplies, coordination of student gardening times, and teaching in the garden. In addition, a majority of respondents

reported using volunteers for gardening, which were parents or community members. The main reported role of volunteers was garden maintenance.

The majority of respondents reported youth in the garden at least once a week, which included grades pre-kindergarten through fifth. Respondents reported a total of 744 classrooms using the school garden with first grade and kindergarten having the highest number of classes participating in gardening activities. In addition, respondents estimated over 13,000 students used the school garden with first grade and kindergarten having the most students, followed closely by forth, third and second grades respectively. There is reason to speculate that more students used the garden than were reported, because four respondents reported classroom usage but omitted information on the number of students using the garden.

Objective 5

The fifth objective of this study was to determine if schools had adopted an integrated gardening curriculum and if so, what curriculum were they using, how much did it cost and did it meet TEKS. Surprisingly, only seven respondents reported having an integrated gardening curriculum used at their school. A majority of these respondents claimed to be using RSG curriculum, which was free and met TEKS. One school reported using Life Lab, which cost $5,000 and met TEKS. The top five perceived inhibitors selected for not adopting an integrated school gardening curriculum included lack of time, low priority relative to other academic subjects, the amount of time spent on standardized testing, a low level of classroom teacher interest or support, and inadequate financial resources for purchasing curriculum.

The lack of adoption by schools of an integrated school garden curriculum is alarming. Previous studies deemed the integration of a school gardening curriculum as a key factor for sustainable school gardening programs (DeMarco, 1997; Dirks and Orvis, 2005; Graham et al., 2005; Hazzard, 2010; Moreno et al., 2012). Therefore, future research should address the direct impact an integrated school gardening curriculum has on long term sustainability of school gardens. Additional questions should be asked on the overall awareness of available curriculums for school gardening programs.

Objective 6

The sixth objective of this study was to examine perceived critical factors for successful school gardens in the RSG Network. Respondents were given an option of twenty factors to select if they perceived them as important for a successful school garden. Then respondents were asked to assign each of the factors they selected to one of three categories: critical, helpful, or does not impact success of the school garden.

For the purpose of this study, critical factors for a successful school garden were determined if at least fifty percent of respondents choose the factor. The perceived critical factors shown in highest to lowest response order included: support from administration, support from teachers, having a safe environment, availability of funding for supplies, having adequate amount of instructional time, the availability of gardening equipment, the availability of a person overseeing garden activities, teacher trainings, having adequate amount of preparation time, teachers' gardening knowledge, managing student behavior, and availability of volunteer help.

Factors in the "helpful" category for successful school gardens would included availability of storage for supplies, teachers' knowledge of science, expert assistance with

garden concerns, availability of garden-based curricula, availability of summer maintenance assistance, support from the community, and small class size, Only one factor split between “helpful” and “does not impacting success” which was support from parents.

In addition to outlining perceived critical factors for successful school gardens, respondents were asked to rate how successful their school has been in implementing the critical factors. Respondents were given three options: successful, adequate and needs improvement. A majority of respondents reported their school needs improvement on implementing the critical factors, followed by a rating of adequate. Successful implementation the critical factors received the lowest number of responses.

Recommendations to Responding RSG Schools

The results of this study indicated responding schools in the RSG Network are a step ahead of schools taking the do-it-yourself it approach to school gardening. However, it is evident that being in the RSG Network does not automatically ensure schools will have a long term sustainable gardening program. RSG partner schools receive the added benefit of working with trained professional on the planning and design phase of building a school garden. In addition, RSG assists in the implementation stage and offers educational training to the teachers and students. The fact that schools reported to have a school gardening coordinator and volunteers meets recommendations set forth by previous research (DeMarco, 1997; Hazzard, 2010). In addition, schools are actively using the garden during the school day for academic purposes, which is most commonly used in science, math and language arts. However, there are areas where schools may stumble once the initial three year partnership is completed.

Adoption of an Integrated School Gardening Curriculum

This study found that a limited number of schools in the RSG Network reported using an integrated school gardening curriculum. It is unclear if there is a lack of knowledge about the availability of curriculum or if respondents needed more explanation on what was meant by the term "integrated school gardening curriculum". The top inhibitors to using an integrated school gardening curriculum were not enough time, low priority relative to other academic subjects, time spent on standardized testing, and low level of classroom teacher interest or support. Thus, gardening curriculums that are integrated across subject matter enhance the gardening program and can create a cross-curriculum approach to teaching. In addition, the more common curriculums like Life Lab, Junior Master Gardener Program and Ag in the Classroom all meet state mandated teaching objectives.

Recommendations to non-RSG Schools

Schools that are considering establishing a gardening program can pull from the results in this study. The responding schools from the RSG Network reported spending 25 hours on gardening components each week, such as planning teaching strategies, garden maintenance, educating youth in the garden, and educating youth in the classroom using gardening concepts. Therefore, starting a gardening program should include some careful analysis prior to diving in the project.

Consider Administration and Teacher Commitment

It is no surprise that schools can be a revolving door for principals and teachers. The top two factors given for "not using the school garden" were low level of classroom teacher interest or support and low level of administrative interest or support. Focus

should be given to receive complete "buy-in" from school administration and teachers. For administrators, it is important to show them the facts about school gardening, by providing documented research on how school gardening can increase academic performance, increase child health and nutrition, improve social behaviors and improve attitudes toward science and environmental education. For teachers, it is important to provide hands-on demonstrations on how to use the garden with multiple subject matters.

Adoption of an Integrated School Gardening Curriculum

This study found that a limited number of schools in the RSG Network reported using an integrated school gardening curriculum. The top inhibitors to using an integrated school gardening curriculum were not enough time, low priority relative to other academic subjects, time spent on standardized testing, and low level of classroom teacher interest or support. Gardening curriculums that are integrated across subject matter enhance the gardening program and can create a cross-curriculum approach to teaching. In addition, the more common curriculums like Life Lab, Junior Master Gardener Program and Ag in the Classroom all meet TEKS.

Seeking Funds and In-Kind Support

The responding schools from the RSG Network are continually seeking funds to further the development of their garden. They have established a wide variety of funders to support their gardening program outside of monetary support given by RSG. Schools can use the list of providers in this study to seek funding for their own school garden project. In addition, the results of this study provided a list of companies that support school gardening programs with in-kind donations. Schools should not limit their needs

based solo on monetary support, but should also consider opportunities for free or discounted products and services.

Recommendations for RSG

The majority of RSG Network schools rated their school as "needs improvement" on the implementation the critical factors needed for a success garden. Factors perceived as critical included: support from administration, support from teachers, having a safe environment, availability of funding for supplies, having adequate amount of instructional time, the availability of gardening equipment, the availability of a person overseeing garden activities, teacher trainings, having adequate amount of preparation time, teachers' gardening knowledge, managing student behavior, and availability of volunteer help. As a leading organization on school garden programs there are recommendations to strengthen assistance to schools.

Limit Scope and Size of Gardens

Results of this study suggested the school garden coordinators and volunteers at responding schools are spending the majority of their time on garden maintenance. It may be helpful to schools if gardens are smaller at first and grow in size over time. Reducing the size of the garden can also increase the number of schools RSG can assist each year.

Develop or Adopt a formal Integrated Gardening Curriculum

Schools with an integrated approach to gardening are far more successful than schools without an integrated system. The purpose of adopting a gardening curriculum is actually to save time, so teachers do not have to research activities related to school garden to incorporate in their lesson plans. DeMarco (1997) stated, "A structured curriculum is also a method to reach and support teachers who are interested in school

gardening but do not feel adequately prepared to use this teaching strategy" (p. 143). It is recommended for RSG to develop their own formal integrated gardening curriculum or adopt a curriculum that is already available to help schools reach their gardens full potential.

Recommendations for Research

The following recommendations for additional research are offered, based on the finding and conclusions of this study.

1. There would be value in replicating this study with similar organizations with the mission to assist and educate schools on gardening, to gain further insight on how these partnerships enhance the overall gardening program.
2. A formal study that focuses on schools outside of the RSG Network or similar programs would help identify additional barriers schools have in sustaining school gardens
3. Conducting a case study on schools that perceive they are "successful" in implementing critical factors associated with school gardening should prove beneficial to how schools implement critical factors
4. Looking more closely at how teachers define an integrated school gardening curriculum and their knowledge base of existing curriculum
5. Examining the factors that make school administrators value the use and implementation of school gardening as a teaching strategy, as well as, looking a perceived barriers for school administrators

6. An assessment of what is being taught in the garden verses what is being taught in the classroom in relation to gardening concepts and the differences between grade levels.

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APPENDIX A

INSTRUMENT

Thank you for your time and volunteer participation of this research request. The purpose of this research project is to gain understanding on school gardening sustainability and success factors.

Your school was identified for this study through it's current or prior involvement with R.E.A.L. School Garden's. Any input you can provide on school gardening will directly benefit future schools seeking to start a school gardening program, even if your school is no longer actively using school gardening at this time.

All completed surveys will be kept confidential and your school will not be identifiable in the final publication. The survey should take 15 minutes or less to complete. This research is being conducted independently of R.E.A.L. School Gardens, but the information collected will assist in making school garden programming stronger for future generations.

Please know that by completing they survey you are giving consent for me to use your responses from survey in my dissertation and published documents. You may skip any question or withdraw from the survey at any time by closing your browser.

Sincerely,

Tamra McGaughy, Doctoral Student via Texas Tech University and Texas A&M University
Dr. Jonathan Ulmer, Assistant Professor via Texas Tech University

The following section will provide knowledge about your school.

In which of the following school districts is your school located?

- Arlington ISD
- Birdville ISD
- Dallas ISD
- Forth Worth ISD
- Grand Prairie ISD
- Other

What is the demographic make-up of your school?
(Provide percentages, must equal 100).

Hispanic
White
African American
Asian
Other
Total

What is the approximate number of students attending your school?

What is the demographic density of your school's location?

- Farm Community
- Rural (Under 10,000)
- Suburban (less than 50,000)
- Metropolis (greater than 50,000)

The following questions directly relate to the school's relationship with R.E.A.L. School Gardens. Please include as much information as possible on gardening materials and supplies, teacher trainings, etc.

In what year did your school first receive assistance from R.E.A.L. School Gardens?

What assistance did your school receive? (Best guess is fine.)

Has your school received additional assistance from R.E.A.L. School Gardens since the initial application process?

- Yes
- No

If yes, what type of additional assistance did your school receive? (Best guess is fine.)

What was the status of your school garden prior to receiving assistance by R.E.A.L. School Gardens?

- The school did not have a garden
- The school had a garden, but it was not used for academic instruction
- The school had a garden and it was used for academic instruction
- Other

The following questions relate to funding and/or donations your school has received for school gardening from community partners or that is part of the school's budget, not linked to R.E.A.L. School Gardens.

Did your school receive any funds/grants to support school gardening, prior to working with R.E.A.L. School Gardens?

- Yes
- No

If yes, provide the funder(s) and approximate amount of funding. Example: The Home Depot, $500; PTA, $200

Since receiving assistance from R.E.A.L. School Gardens, has your school appropriated or received additional funds to support the school garden? (Actual monetary support only)

- Yes
- No

If yes, please list the funder(s) and approximate amount of funding. Example: School Line Item Budget, $200 or The Home Depot, $500

Since receiving assistance from R.E.A.L. School Gardens, has your school received any in-kind donations to support the school garden? (Examples: supplies, personnel, plant materials, etc)

- Yes
- No

If yes, please list the provider and what type of items were donated. Example: Wal-mart, lumber, seeds, volunteers

The following questions relate to roles and responsibilities for the school garden.

Does your school have a designated school garden coordinator?

- Yes
- No

Select which of the following best applies to your school.

- Full time garden position
- Part-time garden position
- Teacher/Staff staff person serves as lead for garden
- Parent/Volunteer serves as lead for garden
- Administrator/School Counselor/School Nurse serves as lead for garden
- Other

What are the school garden coordinator's job assignments? Check all that apply.

- ☐ Seeking additional funding
- ☐ Teaching in the garden
- ☐ Coordinating student garden times
- ☐ Creating gardening lesson plans
- ☐ Inventorying gardening supplies
- ☐ Garden Maintenance
- ☐ Recruiting parents/volunteers to help with the garden
- ☐ Establishing community/ business support
- ☐ Other

Does your school have parents or community volunteers assisting with the garden?

- ● Yes
- ● No

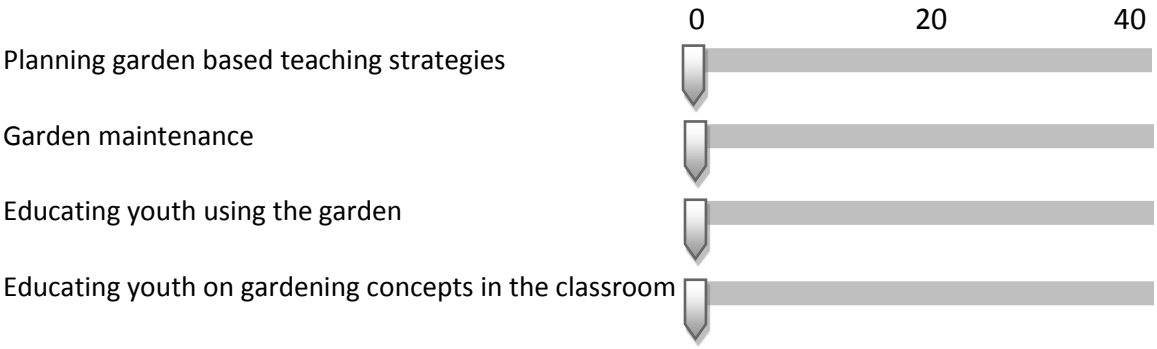
Select all of the following that apply

- ☐ Parents
- ☐ Church Volunteers
- ☐ Business Volunteers
- ☐ Community Volunteers
- ☐ Experts such as landscapers, horticulturist, Master Gardeners
- ☐ Other

What are the main job assignments of parent/volunteers that assist with the garden? Check all that apply.

- ☐ Seeking additional funding
- ☐ Coordinating student garden times
- ☐ Teaching in the garden
- ☐ Teaching garden concepts in the classroom
- ☐ Creating gardening lesson plans
- ☐ Inventorying gardening supplies
- ☐ Garden Maintenance
- ☐ Recruiting parents/ volunteers
- ☐ Establishing community/ business support
- ☐ Other

How much time (in hours) is spent on the following school garden factors each week?



The following questions look at how active the school garden was during the 2012-2013 school year.

In the 2012-2013 school year, has your school actively used the school garden?

- ● Yes
- ● No

Why is the school garden not being used? Check all that apply.

- ☐ Not enough time
- ☐ Insufficient equipment/materials/resources
- ☐ Low level of student interest/ support
- ☐ Low level of parent interest/ support
- ☐ Low level of volunteer interest/ support
- ☐ Low level of classroom teacher interest/ support
- ☐ Low level of administrative interest/ support
- ☐ Inadequate teacher training
- ☐ Risk of vandalism
- ☐ Low priority relative to other academic subjects
- ☐ Lack of space
- ☐ Inadequate financial resources
- ☐ Time spent on standardized testing
- ☐ Other

What type of school gardening activities have been used with the students, this school year. Check all that apply.

- ☐ Outdoor gardening
- ☐ Indoor "grow" light
- ☐ Windowsill
- ☐ Greenhouse
- ☐ Raised bed
- ☐ Container
- ☐ Square Foot
- ☐ Vegetable Gardening
- ☐ Perennial Gardening
- ☐ Butterfly Gardening
- ☐ Other

What is the purpose of your school's garden? Place in ranked order: 1 (main purpose) to 5 (least likely purpose)

- Please rank this from 1 to 6 _____ Recreational
- Please rank this from 1 to 6 _____ Academic
- Please rank this from 1 to 6 _____ Social Development
- Please rank this from 1 to 6 _____ Therapeutic
- Please rank this from 1 to 6 _____ Campus Beautification
- Please rank this from 1 to 6 _____ Other _____

What are the grade level(s), number of classes(es), and number of students that used/use the school garden?

	Number of Classes	Total number of Students
Pre-Kindergarten	_____ Pre-Kindergarten Number of Classes	_____ Pre-Kindergarten Total number of Students
Kindergarten	_____ Kindergarten Number of Classes	_____ Kindergarten Total number of Students
1st Grade	_____ 1st Grade Number of Classes	_____ 1st Grade Total number of Students
2nd Grade	_____ 2nd Grade Number of Classes	_____ 2nd Grade Total number of Students
3rd Grade	_____ 3rd Grade Number of Classes	_____ 3rd Grade Total number of Students
4th Grade	_____ 4th Grade Number of Classes	_____ 4th Grade Total number of Students
5th Grade	_____ 5th Grade Number of Classes	_____ 5th Grade Total number of Students
6th Grade	_____ 6th Grade Number of Classes	_____ 6th Grade Total number of Students
Other	_____ Other Number of Classes	_____ Other Total number of Students

How often do the classes use the school garden?

- Never
- At least once a day
- At least once a week
- 2-3 Times a Week
- At least once a month
- 2-3 Times a Month
- Other

Are there plans to use the school garden during the 2013-2014 school year?

- Yes
- No

The following questions assess the schools use of an integrated school gardening program.

Does your school have an integrated school gardening curriculum?

- Yes
- No

Please provide the following information about your school's gardening curriculum.

Curriculum Name
Developed By
Cost
Does it address TEKS objectives

Which of the following classes use the curriculum? Check all that apply.

- Art
- Environmental Education
- Health/Nutrition
- Language Arts/ English
- Mathematics
- Music
- Library
- Physical Education
- Science
- Social Studies/ History
- None
- Other

What inhibitors keep your school from adopting an integrated school gardening curriculum? Check all that apply.

- ☐ Have not found one that addresses the school's needs
- ☐ Not enough time
- ☐ Insufficient material resources
- ☐ Low level of student interest/ support
- ☐ Low level of parent interest/ support
- ☐ Low level of volunteer interest/ support
- ☐ Low level of classroom teacher interest/ support
- ☐ Low level of administrative interest/ support
- ☐ Inadequate teacher training
- ☐ Low priority relative to other academic subjects
- ☐ Inadequate financial resources
- ☐ Time spent on standardized testing
- ☐ Class size to large
- ☐ Other

The following questions will evaluate factors that are important for school gardens.

Based on your knowledge of working with school gardens, which of the following factors are important to the success of school gardening? Check all that apply.

- ☐ Small class size
- ☐ Availability of funding for supplies
- ☐ Teachers' gardening knowledge
- ☐ Safe environment
- ☐ Teachers' knowledge of science
- ☐ Support from Administration
- ☐ Support from the community
- ☐ Support from parents
- ☐ Support from Teachers
- ☐ Adequate amount of instructional time
- ☐ Adequate amount of preparation time
- ☐ Availability of garden-based curricula
- ☐ Availability of gardening equipment
- ☐ Availability of volunteer help
- ☐ Managing student behavior
- ☐ Expert assistance with garden concerns
- ☐ Availability of storage for supplies
- ☐ Availability of summer maintenance assistance
- ☐ Availability of a person overseeing garden activities
- ☐ Teacher trainings
- ☐ Other

Place the following school gardening factors in the appropriate groups.

Items	**Factors are CRITICAL for successful school gardens**
(Items selected in the above questions are available for selection)	Response are moved here if they are considered critical
	Factors that help school garden success, but are not CRITICIAL
	Responses are moved here if they are considered helpful
	Factors do not keep school from having a successful school garden
	Responses are moved here if they do not prevent success

How would you rate your school's implementation of the above CRITICAL factors?

- Successful Implementation
- Adequate Implementation
- Implementation Needs Improvement

Thank you for completing this survey! The information you provided will assist in developing stronger gardening programs in the future.

APPENDIX B

PROPTECTION OF HUMAN SUBJECTS APPROVAL LETTER

TEXAS TECH UNIVERSITY
Vice President *for* Research

April 15, 2013

Dr. Jonathan Ulmer
Ag Ed & Communications
Mail Stop: 2131

Regarding: 503914 The R.E.A.L. School Garden Experience: Building Sustainable School Gardens through Sustainable Communities

Dr. Jonathan Ulmer:

The Texas Tech University Protection of Human Subjects Committee approved your claim for an exemption for the protocol referenced above on April 15, 2013.

Exempt research is not subject to continuing review. However, any modifications that (a) change the research in a substantial way, (b) might change the basis for exemption, or (c) might introduce any additional risk to subjects must be reported to the Human Research Protection Program (HRPP) before they are implemented.

To report such changes, you must send a new claim for exemption or a proposal for expedited or full board review to the HRPP. Extension of exempt status for exempt protocols that have not changed is automatic.

The HRPP staff will send annual reminders that ask you to update the status of your research protocol. Once you have completed your research, you must inform the HRPP office by responding to the annual reminder so that the protocol file can be closed.

Sincerely,

Rosemary Cogan

Rosemary Cogan, Ph.D., ABPP
Protection of Human Subjects Committee

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An EEO/Affirmative Action Institution

APPENDIX C

INFORMATIONAL E-MAIL

Dear School Garden Coordinator or School Administrator:

As you know, school gardening is a great way for educators to provide experiential based learning for their students through both indoor and outdoor educational experiences. As a past recipient of the R.E.A.L School Gardens grantee program, your school has been selected to provide valuable insight as to how school gardens are used as an educational tool. I hope that you will be open to providing expertise for directing further outreach efforts.

My name is Tamra McGaughy and I am a doctoral student in the Joint Agricultural Doctoral Program from Texas Tech University and Texas A&M University, under the leadership of Dr. Jonathan Ulmer. Within the next week, you will receive another e-mail from me for a research project on school gardening sustainability and success factors. I would like to gain a greater understanding on the R.E.A.L. School Garden's experience and how it has assisted you school with its gardening program. My next e-mail will include the link to a survey, which should only take 15 minutes of your time.

This research is being conducted independently of R.E.A.L. School Gardens, but it is my hope that you will want to assist in making school garden programming stronger for future generations. All completed surveys will be kept confidential and your school will not be identifiable in the final publication.

Please know that by completing they survey you are giving consent for me to use your responses from survey in my dissertation and published documents. If there is a better contact person for this survey, e-mail me at tdmcgaughy@ag.tamu.edu . Thank you for your time and consideration of my request.

Respectfully

Tamra Mc Gaughy

Tamra McGaughy
Doctoral Student Assistant
Texas Tech University
Texas A&M University

Dr. Jonathan Ulmer

Jonathan Ulmer, Ph.D
Professor Texas Tech University

APPENDIX D

FOLLOW-UP E-MAIL, WITH SURVEY LINK

Dear School Garden Coordinator or School Administrator:

Hi! My name is Tamra McGaughy and I am a doctoral student pursing my Ed.D. from Texas Tech University and Texas A&M University, under the leadership of Dr. Jonathan Ulmer. Last week, I sent you an acknowledgement e-mail about the research study I am conducting for my dissertation.

As a current or past recipient of a R.E.A.L. School Gardens, I hope that you will be open to providing expertise for directing further outreach efforts. The purpose of my research project is to gain understanding on school gardening sustainability and success factors, using the R.E.A.L. School Garden's experience as a model program. Neither, I or R.E.A.L. School Gardens is requiring schools to respond, but is my hope that you will want to assist in making school garden programming stronger for future generations. Your input is valuable, even if your school is no longer using school gardening as a teaching component.

All completed surveys will be kept confidential and your school will not be identifiable in the final publication. The survey should take 15 minutes or less to complete.

Thank you for your time and consideration of my request. This research is being conducted independently of R.E.A.L. School Gardens, but it is my hope that you will want to assist in making school garden programming stronger for future generations. Please know that by completing they survey you are giving consent for me to use your responses from survey in my dissertation and published documents. You may skip any question or withdraw from the survey at any time.

If you are willing to participate in the study, click on the link:
${l://SurveyLink?d=Take%20the%20Survey}

If you have question I can be reached at tdmcgaughy@ag.tamu.edu or (214)-529-3190. You can also contact my advisor, Dr. Jon Ulmer at Texas Tech University, jon.ulmer@ttu.edu .

Respectfully,

Tamra McGaughy,, Doctoral Student
Jonathan Ulmer, Assistant Professor

APPENDIX E

SECOND FOLOW-UP EMAIL, WITH SURVEY LINK

Dear School Garden Coordinator or School Administrator:

Within the last week, your school was contacted to participate in a research study to collect important information on how school gardens are used as a teaching tool. As of today, I am still waiting on your response. Your history with the R.E.A.L. School Gardens' program is valuable and will help future gardening initiates reach their fullest potential. Even if your school is no longer using school gardening as a teaching tool, your insight is valuable to this study.

The purpose of my research project is to gain understanding on school gardening sustainability and success factors, using the R.E.A.L. School Garden's experience as a model program. Neither, I or R.E.A.L. School Gardens is requiring schools to respond, but is my hope that you will want to assist in making school garden programming stronger for future generations. All completed surveys will be kept confidential and your school will not be identifiable in the final publication. The survey should take 15 minutes or less to complete.

Thank you for your time and consideration of my request. This research is being conducted independently of R.E.A.L. School Gardens, but it is my hope that you will want to assist in making school garden programming stronger for future generations. Please know that by completing they survey you are giving consent for me to use your responses from survey in my dissertation and published documents. You may skip any question or withdraw from the survey at any time. If you are willing to participate in the study, click on the link below:

${l://SurveyLink?d=Take%20the%20Survey}

If you have question I can be reached at tdmcgaughy@ag.tamu.edu or (214)-529-3190. You can also contact my advisor, Dr. Jonathan Ulmer at Texas Tech University, jon.ulmer@ttu.edu .

Respectfully,

Tamra McGaughy, Doctoral Student
Dr, Jonathan Ulmer, Assistant Professor

APPENDIX F

FINAL FOLLOW-UP E-MAIL, WITH SURVEY LINK

Dear School Garden Coordinator or School Administrator:

In April and May you received a few e-mails from me about participating in a research study on school gardening. I appreciate your time and understand due to a conflict in schedules you were unable to complete the survey. To increase the validity of my study I need at least 10 more responses, therefore I am offering schools a chance to win a **$50 gift card to The Home Depot** if they complete the survey by **Friday, June 14th**.

The purpose of my research project is to gain understanding on school gardening sustainability and success factors, using the R.E.A.L. School Garden's experience as a model program. Neither, I or R.E.A.L. School Gardens is requiring schools to respond, but is my hope that you will want to assist in making school garden programming stronger for future generations. All completed surveys will be kept confidential and your school will not be identifiable in the final publication. Your history with the R.E.A.L. School Gardens' program is valuable and will help future gardening initiates reach their fullest potential. Even if your school is no longer using school gardening as a teaching tool, your insight is valuable to this study.

Thank you for your time and consideration of my request. This research is being conducted independently of R.E.A.L. School Gardens, but it is my hope that you will want to assist in making school garden programming stronger for future generations. Please know that by completing they survey you are giving consent for me to use your responses from survey in my dissertation and published documents. You may skip any question or withdraw from the survey at any time. If you are willing to participate in the study, click on the link below:

${l://SurveyLink?d=Take%20the%20Survey}

If you have question I can be reached at tdmcgaughy@ag.tamu.edu or (214)-529-3190. You can also contact my advisor, Dr. Jonathan Ulmer at Texas Tech University, jon.ulmer@ttu.edu .

Respectfully,

Tamra McGaughy, Doctoral Student
Dr, Jonathan Ulmer, Assistant Professor