

Cultivating Life: A Study of a School Landscape Project

by

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A dissertation submitted to the Graduate Faculty of
Auburn University
in partial fulfillment of the
requirements for the Degree of
Doctor of Philosophy

Auburn, Alabama
August 3, 2013

Keywords: Horticulture; Socio-horticulture; Mixed-methods;
School Gardens; Case Study

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Abstract

This study was conducted in three parts. Parts one and two compared students at Fayetteville School (FHS), Drew Middle School (DMS), and Lincoln High School (LHS). FHS comprised the experimental group, whereas DMS and LHS served as the control group. FHS participated in a landscape project prior to this study that involved planting over 400 trees and shrubs, and installing a children's garden. Many FHS students were involved in planting exercises, with each of the 650 students having the opportunity to be a part of planting.

In part one, both the experimental and control groups completed the Children's Environmental Response Inventory (CERI) Survey, which assessed the students' environmental attitudes. The CERI Survey examined two internal scales, environmental adaptation (EA) and pastoralism (PA). A lower EA score and higher PA score indicate a positive environmental attitude. When examining all study participants, the experimental group exhibited more positive attitudes than the control group in both internal scales, with the experimental group scoring lower in EA and higher in PA. Many other studies reported similar findings when children participate in gardening programs (Bowker and Tearle, 2008; Cammack et al., 2002; Dirks and Orvis, 2005; Lohr and Pearson-Mims, 2005; Waliczek and Zajicek, 1999).

In part two, FHS faculty, parent, and student perceptions were compared pre-and post-project. FHS faculty, parent, and student school perceptions were also compared to

the perceptions of faculty, parents, and students at DMS and LHS.

Both the experimental and control groups completed the School Grounds Inventory (SGI) Survey, which assessed perceptions of the school grounds. Five internal scales were utilized for both faculty and students: pride, needs met, benefits, use, and total. For the parents' survey, four internal scales were used: pride, needs met, benefits, and total.

When examining the faculty experimental group, their post-test scores were higher than their pre-test scores in four of the five constructs: pride, needs met, use, and total. The experimental and control faculty groups were then compared, and the experimental group scored higher than the control group in pride and total. Next, parents SGI scores were examined, with four increases from pre-to-post-test in the areas of pride, needs met, benefits, and total. When comparing the experimental and control parent groups, the experimental group scored higher than the control group in three of the constructs: needs met, benefits, and total score. Finally, student SGI scores were examined. When comparing the experimental group pre-and post-tests, there were four increases in pride, needs met, benefits, and total. The experimental and control student groups were then compared and the experimental group scored higher than the control group in the same four areas.

The results of this study support previous literature reporting that plants on a school campus improve perceptions of school grounds, as well as students' attitudes toward school (Waliczek et al., 2001). These results indicate that the experimental group experienced the benefits of being around plants and nature in an improved school

grounds environment. They may have benefitted from not only their involvement in the landscape project, but also their improved view out their classroom window.

The purpose of the third part of this study was to examine the landscape project at (FHS) and to answer the question of how the faculty, staff, and students experienced the landscape project. Another purpose was to garner advice for other schools interested in implementing a similar project. An intrinsic case study method was utilized and 13 semi-structured interviews were conducted with faculty and staff at FHS who'd been involved in the project to varying degrees. All interviews were recorded and then transcribed for analyses.

The data were reviewed for emerging themes and several preliminary categories were formed. After further review, the themes were combined to create seven categories. The most valuable information came from two of those categories, benefits and challenges. While the project offered many benefits, the most significant were the increase in pride and ownership experienced by all the stakeholders and the increased use of the outdoor spaces to offer active learning opportunities. Of the challenges from this project, maintenance, time to utilize the garden for education, and ideas for incorporating lessons into the garden were the greatest challenges.

Acknowledgments

First, I must say, I can't believe that I'm here, finishing my PhD. In high school I considered going to medical school and decided against it because it took twelve years and here I am, after almost eleven years of higher education, becoming a doctor. I would not be here if it weren't for The Lord, who has been so gracious to me and who has led me each step of the way. I am so thankful for the people He's put in my life who've made getting to this point possible. More importantly, I'm thankful for God's grace towards me because of His son, Jesus. His continual grace is truly the best thing in my life.

I'm incredibly thankful to have two parents who love and support me. Mom, you are so wonderful with your wake-up calls, encouragement, and interest in my life. I love you. Dad, you'll always be my daddy and I'll always be your little girl. I love you. Doug and Adam, you two are the best brothers a sister could ask for and I love you both!

During my Doctoral studies, I've been blessed to be surrounded by amazing and supportive people. First, Mr. Jimmy Pursell and his spunky wife, Chris who've been like adopted grandparents to me since the moment we met five years ago. I would not be completing this degree if it weren't for you two. I love you both. My two major professors, Carolyn Robinson and Joe Eakes have also been a huge support these past years. Thank you both for all the support, advice, encouragement, patience, and willingness to listen, no matter the topic. You both are amazing and I wouldn't be becoming a doctor if it weren't for you.

To the rest of my committee, Dave Williams, Bob Lyons, and Jeff Sibley, thank you for everything you've done. For being willing to read my ridiculously long dissertation and for all you've done as we've worked together on landscape designs, the Public Horticulture Program, and many other projects. To my amazing grad student friends, Leah Rogers, Monte Baugh, Chris Swindle, Sara Rogers, Jess Kiefer, and the fab five, it has been such a pleasure working with you each. Thank you for all the support you've given me, whether it's editing a paper, listening to me vent, saying an encouraging word, or just hanging out on a Saturday night. You each have made grad school so much more fun and have kept me from going crazy these past three and a half years. I miss you all already. Leah Rogers, it's like we have one mind! If we ever live in the same town again Ampersand/Splash of Neutral is going to take the world by storm.

I also want to thank the four grad students who worked on the initial design with me: Matt Wilson, Laureanne Bond Gygax, Whitney Gaches, and Ashley Baker Witcher. It was such a privilege to work with each of you and I don't think the design would be as amazing as it is if we hadn't had Matt to provide the Disney ideas, Whitney and Ashley to keep us moving and grounded in reality, and Laureanne to provide the perfect bridge between those two opposites. The design at Fayetteville would also never have become a reality without Laureanne Bond Gygax and Christina Jacoway Richardson to lead the implementation of it. Beyond the implementation, the plants would likely be dead if it weren't for the great maintenance work of John Bolton during the summers of 2009 and 2010. Thank you each for your amazing contribution to this project.

Finally, I cannot thank the faculty, staff, and students at Fayetteville School enough for all they've done. Thank you for letting me work at your school and then

conduct research there; thank you for buying into the project in the first place! Without your buy-in I wouldn't be here. To the faculty at Fayetteville, you each are wonderful and it has been such a pleasure working with you these past four years. I'd especially like to thank the staff: Byron Brasher, Nicky Bryant, and Jeff Scott. You each made my year at Fayetteville and the subsequent years of research wonderful and I thank you for your continual support. To Dr. Lagen, it has been such a pleasure working with you all these years. Your constant enthusiasm and encouragement is contagious and appreciated. You've played a big role in making my job fun and in helping this program to not only continue, but flourish. Thank you.

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CHAPTER ONE

INTRODUCTION

The Landscape Project

In January of 2009, a garden project was started at Fayetteville School (FHS), a K through 12 school on 17 acres in Fayetteville, AL. The project is nearly complete and so far an expansive children's garden and over 400 trees and shrubs have been installed. Fayetteville's 650 students participated in plant installation, with many involved in researching and choosing plants for the garden.

Statement of the Research Problem

Fayetteville School served as the subject of a three-part study evaluating the Fayetteville Landscape Project. Part one examined FHS student perceptions of their school grounds before and after the landscape project. Faculty and parent perceptions of the school, pre- and post-landscape project, were also examined. FHS student, faculty and parent perceptions were then compared to a control group's perceptions of their school grounds. The control group was comprised of students, faculty, and staff at Drew Middle School (DMS) and Lincoln High School (LHS), which share the same building and are located in Lincoln, AL. The second part of this study assessed the environmental attitudes of FHS, DMS, and LHS students post-landscape project. This research concluded with a case study that involved gathering FHS faculty and staff perspectives of how students and teachers experienced the landscape project at Fayetteville School. A mixed methods

approach was utilized, with parts one and two of this study being quantitative and part three, qualitative.

Need for the Study

The objective of the landscape project at Fayetteville School is “to engage students in the pursuit of knowledge, to teach them responsible environmental practices, and to instill a desire for lifelong learning” (Campus, 2010). This study was prompted by the need to examine whether those objectives were met. Very few studies have considered the effects of school landscapes on perceptions of school grounds or student environmental attitudes. Additionally, although many school landscape projects have appeared nationwide in recent years, few studies assessed such projects. This research void has left schools interested in incorporating similar projects with little foundation for best practices. Moreover, none of these topics have been examined in Alabama. More data are needed to better understand school gardening as it's related to these areas and to establish a theoretical precedent. One objective of this study was to examine Fayetteville School student, faculty, and parent perceptions of the school grounds before and after the project, and compare their post-perceptions to a control group's perceptions of their school grounds. Another objective was to compare FHS student environmental attitudes to the aforementioned control group's student environmental attitudes. The final objective was to assess the FHS Landscape Project by gathering faculty and staff perceptions of the experiences of those involved in the project. Gathering these perceptions provided a greater understanding of the strengths and weaknesses of the landscape project at FHS and provided practical advice to others wishing to implement a landscape project at their school.

Research Questions

Part 1:

1. How have perceptions of their school grounds changed for FHS student, faculty, and parents since the implementation of the Fayetteville School Landscape Project?
2. Are FHS student, faculty, and parent perceptions of their school grounds post-landscape project better than DMS and LHS student, faculty, and parent perceptions of their school grounds?

Part 2:

1. Are FHS student environmental attitudes post-landscape project better than DMS and LHS student environmental attitudes?

Part 3:

1. How did FHS students and staff experience the landscape project at Fayetteville School?
2. How might other schools better implement a similar landscape project?

Definition of Terms

1. Attitude: manner, disposition, feeling, position with regard to a person or thing; tendency or orientation, especially of the mind (Lexico Publishing Group, A, 2013).
2. Environment: the air, water, minerals, organisms, and all other external factors surrounding and affecting a given organism at any time (Lexico Publishing Group, B, 2013).

3. Horticulture: the culture of plants for food, comfort, and beauty; from the Latin 'hortus', meaning garden and 'colere', meaning to cultivate. A discipline that includes such careers as botany, landscape maintenance, floriculture, landscape horticulture, nursery management, interiorscaping, pomology, and greenhouse management (Schroeder et al., 2000).
4. Mixed methods research: mixed-method studies employ elements from more than one research approach, often capitalizing on the strengths of each procedure. Investigations using mixed-method research may use both quantitative and qualitative methods (Drew et al., 2008).
5. Qualitative research: a type of research in which data are collected in the form of words or a narrative that describes the topic under study and emphasizes collecting data in natural settings (Drew et al., 2008).
6. Quantitative research: studies using quantitative methods collect data in the form of numbers. In this approach to research, the occurrence of behaviors is counted, correct answers or errors are counted, and other types of measures are recorded in terms of quantity (Drew et al., 2008).
7. School perceptions: determined by how people subjectively perceive experiences, rather than how the experiences are objectively perceived, often affected by school climate (Koth et al., 2008).
8. School climate: formed by the social interactions between students and teachers and influenced by educational and social values (Koth et al., 2008).
9. Socio-horticulture: examines the influences of plants on people in all aspects of their lives, regardless of special needs of the individuals (Relf and Dorn, 1995)

Assumptions

To narrow the scope of this research, the following assumptions provide the context for this study:

Part 1: It will be assumed that all the respondents will honestly answer the school perception survey based on their true feelings. Also, it will be assumed that each FHS student will accurately remember their perception of the school before the landscape project began.

Part 2: It will be assumed that all respondents will honestly answer the environmental attitudes survey.

Part 3: It will be assumed that faculty and staff perceptions of participants' experiences during the landscape project are accurate. It will also be assumed that faculty and staff will provide honest answers to interview questions.

Limitations

Student perceptions of the school before the landscape project began will be reflective, as no student perceptions were obtained before the project began. Because of time constraints, a representative sample of faculty and staff involved in the landscape project were interviewed. Also due to time constraints, faculty and staff were asked their perceptions of students' experiences when implementing the landscape project at FHS, rather than the students themselves.

Delimitations

This study examined student, faculty, and parent perceptions of the grounds at Fayetteville School, in Fayetteville, AL. Student, faculty, and parent perceptions of the

grounds at Drew Middle and Lincoln High School, in Lincoln, AL, were also examined.

Student environmental attitudes at Fayetteville School, Drew Middle School, and Lincoln High School were also studied. Finally, this study investigated the experiences of the students, faculty, and staff involved in the landscape project at Fayetteville School.

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CHAPTER TWO

REVIEW OF LITERATURE

The literature reviewed in this chapter is based on the following topics: a general overview of school gardens and their benefits, followed by the subject areas of each of the three parts of this study - school perceptions, environmental attitudes, and case studies.

School Gardens

The literature has indicated that as students know more about a particular subject, their attitudes about it are better, resulting in a more engaged student. As their attitudes improve, their behavior follows (Farmer et al., 2007; Kooler and Bruvold, 1992; Marietta et al., 1999; Sears et al., 1988; Waliczek et al., 2003). Children who have early experiences exploring nature are more likely to develop their imagination and sense of wonder (Cobb, 1977; Louv, 2005), which encourages an interest in lifelong learning (Wilson, 1997; Wilson, 2010). Additionally, hands-on activities have been shown to increase students' knowledge levels, especially when pertaining to the sciences (Freedman, 1997; Klemmer et al., 2005; Solter, 1997; Zimmerman et al., 1998).

Opportunities to explore nature and complete hands-on activities abound in the garden. In fact, it is often suggested that the garden can be used to teach almost any subject (Braun et al., 1989; Laaksoharju et al., 2012). School gardens have steadily gained in popularity since the early nineteen nineties, with many studies addressing the effects of these gardens on participating students (Lohr and Relf, 2000; Sealy, 2001).

School gardens may provide a link between classroom concepts and real life applications (Mohrmann, 1999; Smith and Motsenbocker, 2005). They have also been proposed as a means of increasing student interest and enhancing elementary schools' academic curricula (Waliczek et al., 2003; Zimmerman et al., 1998). Teachers report that gardening improves students' overall academic achievement, (Braun et al., 1989; Smith and Motsenbocker, 2005) and many school garden studies have specifically examined science achievement scores. One such study, conducted in 2005 by Klemmer, Waliczek, and Zajicek, considered the effects of a school garden program on the science achievement scores of 3rd, 4th, and 5th grade students at seven Texas schools. Control group students were taught science through traditional classroom-based methods, while experimental group participants completed school gardening activities, in addition to learning through traditional classroom-based methods. Experimental group participants scored higher on the science achievement test than their control group counterparts. Smith and Motsenbocker (2005) also studied science achievement scores in three Louisiana elementary schools where students completed activities from the Junior Master Gardener Level One Handbook. Those in the experimental group scored an increase in science achievement scores from pre-test to post-test. Math scores also show improvement when students learn in the garden. In 2008, 4th grade students who participated in a habitat program in Houston, Texas experienced a standardized test math score increase compared to students taught with a more traditional curriculum (Danforth et al., 2008).

Many positive results were found in the Edible Schoolyard Project, which is similar to the Fayetteville School Garden Project. The Edible Schoolyard is located at Martin Luther King, Jr. Middle School in Berkeley, CA; their students spent time in both

the school garden and in the kitchen classroom learning how to grow food and prepare healthy meals. The goal of the project is to model sustainable practices and engage in hands-on lessons that connect food, health, and the environment. The program has been integrated into the school's math, science, and humanities curricula, and although no formal studies have been conducted, many student benefits have been reported by faculty and staff. These include improved life skills with increased curiosity, teamwork, respect (for self and others), and a sense of ownership. Faculty and staff have also reported improved agricultural understanding with an increased comprehension of food origins and seasonal availability. Additionally, student nutrition has improved with participants making healthier food choices and showing a willingness to try new foods (Edible, 2010).

School Perceptions

A positive school climate is considered essential for successful and effective schools (Brand et al., 2003). School climate may be defined as the beliefs, values, and attitudes that determine the interactions between students, teachers, and administrators. These norms then determine acceptable educational and social behaviors for the school, thus setting the school climate (Koth et al., 2008). Schools with a positive climate generally exhibit an emphasis on academic achievement, show positive relationships between students and teachers, discipline fairly and consistently, and have involved families (Wilson, 2004). It has been demonstrated that when students perceive their school environment in a positive light, they exhibit higher self-esteem, lower delinquency rates, and better academic performance (Kuperminc et al., 2001; Wilson, 2004).

Parental perceptions of a school can also affect their child's perception. As parents view a school in a positive light, they tend to be more involved (Wilson, 2004).

Parental involvement is considered a key factor in a child's success in school (Epstein et al., 1997; Henderson et al., 1986; Hill and Tyson, 2009; Lindstrom, 1997), with children of involved parents benefitting both academically and psychologically (Henderson et al., 1986; Hill and Tyson, 2009; Lindstrom, 1997; Smith et al., 2011). Such involvement includes an established communication between the parent and their child's school, volunteering at the school, and helping with homework (Epstein, 1995; Hill and Tyson, 2009). Though the majority of parents and teachers agree on the importance of parental involvement, most teachers indicate low parental involvement (Public Agenda, 1999; Smith et al., 2011) primarily due to parental attitudes toward the school (Carey et al., 1998; Hill and Tyson, 2009). As parents' perceptions of a school may be affected by a school's climate, the climate should be addressed by schools. One way to improve a school climate is to include hands-on activities and a favorable learning environment (Kentz and Orman, 1998; Mitchell et al., 2010), precisely what school gardens can provide. A San Antonio study of classroom garden teachers revealed an increase in the frequency of parent involvement after gardens were developed (Alexander and Henderson, 1998). School faculty may also affect student perceptions because teachers' perception of their work environment contributes to their work performance and attitudes (Mitchell et al., 2010).

Plants and nature have been shown to provide many benefits, including improving people's perceptions of their environment. These improvements in perceptions can result in stress reduction (Bennett and Swasey, 1996; Kaplan et al., 1988; Kohlleppe et al., 2002), improved health (Doxon, 1996; Fjeld, 2000; Kaplan et al., 1988; Lohr and Pearson-Mims, 2000), increased employee morale, increased productivity, reduced

absenteeism (Doxon, 1996; Kaplan et al., 1988; Pearson-Mims and Lohr, 2000), and reduced crime (Snelgrove et al., 2004). Contact with nature, even as images, has proven to be beneficial (Adachi et al., 2000). A well-known study by Ulrich (1984) documented that patients in a hospital room with a view of trees required less pain medication and stayed in the hospital for a shorter period of time than those with a view of only buildings. Additionally, viewing plants or nature has been found to reduce stress and increase positive feelings (Hartig et al., 2010; Ulrich, 1981). In each of these situations, the individuals may have benefitted because the plants improved their perception of their environment.

Of more benefit than simply viewing images of nature is being immersed in nature, whereby living in the vicinity of it may have the strongest effect. Fried (1982) claimed that ease of access to nature is the strongest link to residential satisfaction and is the most important factor, after marital role (married people are happier and live longer), to life satisfaction. A study conducted in Sheffield, England surveyed residents with private gardens. Most participants reported that their favorite characteristics of the garden were creation of a pleasant environment and promotion of relaxation. The value of fresh air and exercise, the chance to be creative or express one's personality, and being close to nature were also listed (Dunnett and Qasim, 2000). As faculty and students spend an average of forty hours a week at school, the school environment may have as much impact as the home (Fleener, 2008; Fleener et al., 2011).

As has been discussed, when children's attitudes towards school improve, their academic achievement improves as well (Waliczek et al., 2003). Plants on a school campus have been shown to improve perceptions of schools. A 2001 study of a Texas

school found that females participating in garden activities had more positive attitudes toward school than those who did not participate. Additionally, students attending schools that offered more individual time in the garden had more positive attitudes towards school than those who did not (Waliczek et al., 2001). In another study in Texas, a correlation was found between greater uses of green spaces on a college campus and perceptions of quality of life for students (McFarland et al., 2008). Waliczek, Logan, and Zajicek (2003) found that students participating in outdoor environmental activities demonstrated positive attitudes towards math and science and described the program in such terms as “enjoyable,” “new,” and “interesting.” Attitudes towards school tend to be more negative in older children than in elementary school children. While the latter tend to have more positive attitudes toward science, middle and high-school students tend to consider them boring (Bennett and Hogarth, 2009; Yager and Yager, 1985). Lekies et al. (2006) found that high-school aged children involved in garden design and educational program planning reported their involvement as “fun” and “educational.” Involving youth in the designing of educational programs for younger children, as well as the teaching of some of those programs, may improve older student’s attitudes towards school, while at the same time educating and entertaining them.

Environmental Attitudes

One’s attitude towards the environment may be affected by many things but perhaps the strongest factor is environmental knowledge (Cammack et al., 2002). As this increases, environmental attitudes improve and environmentally friendly behavior tends to follow (Acrury, 1990; Cammack et al., 2002; Newhouse, 1991). Children can learn in the garden that nature is essential for many of our physical and aesthetic needs. This

knowledge can aid in enjoying working with nature, valuing resourcefulness, and seeing the benefits that technological improvements can provide, not just for people, but also for the environment. All this can benefit present as well as future generations (Green, 1994; Mayer-Smith et al., 2007). One of the best known educators of the 20th century, Maria Montessori, was a great advocate for incorporating nature into school lessons (Hainstock, 1997; Matthews, 2007). She stated, “nature can be a great basis for an introduction to the pleasures and later on the necessity for nurturing our living things” (Montessori, 1964).

From gardening, a child can also realize that their actions have consequences. For instance, a plant that is not watered will die, and a flower, once picked, cannot be put back on the plant. If we want children to show concern for one another and for the environment, they must be exposed to that environment and the beauties it holds. If they are shown how to enjoy the beauty and receive the nourishment the earth offers, they will have a greater chance at life satisfaction (Green, 1994; Mayer-Smith et al., 2007; Wilson, 2010). “In a world full of destruction we cannot get a child early enough to learn how to protect life and how to support the weak. In gardening we teach that damaged plants get a bandage to heal and weak ones a support” (Green, 1994).

Many studies have demonstrated that gardening increases a child's respect for nature and improves their environmental attitudes (Lohr and Pearson-Mims, 2005; Montessori, 1912; Skelly and Zajicek, 1998). Environmental education programs that involve activity-based learning have been very successful (Cammack et al., 2002; Campbell et al., 1997; Ramsey, 1993). For example, juvenile offenders in Texas who participated in the Green Brigade Horticulture Program improved their environmental attitudes (Cammack et al., 2002). Waliczek and Zajicek, in 1999, studied the effects of an

environmental curriculum, Project GREEN, on elementary and junior high students in Kansas and Texas. They found that participants' environmental attitudes improved after participating in the program. A study by Dirks and Orvis (2005) found that 3rd grade participants in the Junior Master Gardener Program increased in environmental knowledge and attitudes compared to non-participants. Of the schools participating, schools with a garden demonstrated more positive gains than those without. Finally, environmental attitudes of participants in the Edible Schoolyard have been reported to improve. The students' attitudes improve as they understand how they impact the environment and how they can have a good impact on that environment (Edible, 2010).

Case Studies

Program evaluation's are a type of case study and may be defined as "a systematic method for collecting, analyzing, and using information to answer basic questions about a program." Program evaluations specifically examine a programs efficiency and effectiveness (EPA, 2012). They are often conducted with one or more of the following goals in mind: to assess the need for the program, to assess the program's design and logic, to examine the success of the implementation of the program, to assess the outcome, and to assess the programs cost and efficiency (Rossi et al., 2004). Another important goal of program evaluations is to provide recommendations for improvement (CDC, 2011; EPA, 2012).

A program evaluation may come in many forms, encompassing both quantitative and qualitative research, and often incorporates both research types in a mixed-methods study (EPA, 2012). There are three types of program evaluation based on the timing of the evaluation. The first type, developmental evaluation, involves the evaluation of a

proposed program before its implementation. In this type of study the evaluator provides informal feedback to the design team to help improve the program before it is implemented or pilot tested. The second type, formative evaluation is conducted during a program for the purpose of improvement. Finally, summative evaluation is implemented with the purpose of evaluating a program to provide a final evaluative judgment. It is most often conducted at the conclusion of a program (Rossi et al., 2004).

Program evaluations may be found across many disciplines, including education, sociology, psychology, social work, and even horticulture. When examining evaluations in the field of horticulture, even these studies can cover a range of subjects. In 2009, Steil and Lyons conducted a case study, which examined the evaluation of education programs for public gardens. An evaluation approach, or recommended model for evaluation was developed and 11 public garden employees interviewed about their approach to program evaluation and their opinion of the created model. Several themes emerged from the interviews, including the importance of evaluation for education programs, the difficulty of conducting evaluations, and the characteristics that make for a good evaluation. The interviews also provided feedback for improving the evaluation model developed for the study (Steil and Lyons, 2009).

Another horticulture study in the realm of program evaluation was conducted at an assisted living home. Participants cared for indoor plants over a four-week period and took part in four two-hour horticulture classes. A mixed methods approach was utilized, with surveys, interviews and observations incorporated in the study. Participants increased in feelings of mastery (control over ones' circumstances), self-rated health, and self-rated happiness (Collins and O'Callaghan, 2008). Finally, in a 2006 study 4-H youth

were engaged as “children’s garden consultants” to provide feedback for children’s garden designs. Seven teenagers were given time to research children’s garden designs and educational programming and then were allowed to present recommendations to children’s garden experts. Surveys, interviews, and observations with both the youth and adults were conducted. The 4-H participants reported their experience as both fun and educational, while the adult attendees reported the event as successful and felt the youth had many great ideas to offer (Lekies et al., 2006).

Mixed methods have also been utilized in the education realm. One such study evaluated the Junior Master Gardener (JMG) Program in 3rd grade classrooms. Students completed surveys with both open and close-ended questions and teachers were interviewed at the conclusion of the program for feedback. Students increased in agricultural knowledge and in positive attitudes towards agriculture. They also reported an enjoyment of the program and the desire to participate in more JMG activities. Teachers also reported satisfaction with the program and provided feedback for its further improvement (Dirks and Orvis, 2005). Another 2005 study evaluated the efficacy of pre-visit activities in increasing learning on field trips. Observations, close-ended and open-ended questions were utilized in evaluating the program. Students that completed pre-visit activities such as looking at pictures, visiting the gardens website, or learning the rules of the garden, exhibited less off-task behavior during the garden visit. Additionally, students who completed Internet activities pre-visit, such as visiting the garden website, exhibited increased understanding of the lessons learned while at the garden (Haynes et al., 2005).

Many horticulture studies have been conducted using strictly qualitative methods. These too, have covered a broad spectrum of topics from public garden visits to community garden experiences. They have also covered a variety of qualitative methodologies, from case studies to narratives. In a 2011 study, Glover told the story of a struggling neighborhood, transformed by a community garden. Community garden participants both reported and demonstrated a uniting of community, and an increase in civility and security in the neighborhood as a whole. In 2001, Rappe and Evers conducted a phenomenological study of the meaning of plants to assisted living individuals. They interviewed 12 residents in sheltered housing in Finland, asking them the meanings they associate with growing plants. Three main themes emerged which indicated that growing plants may positively influence the well-being of individuals living in an institutional setting, especially those aspects most often threatened by such settings: a sense of control, the chance to form social relationships, and identity. Finally, a 2006 case study researched fundraising strategies for botanic gardens. This research was conducted in hopes of acquiring ideas for securing an endowment for the University of Delaware Botanic Garden (UDBG). Four university botanic gardens were included in the study, with either garden directors or appropriate development employees interviewed about their fundraising strategies. Several themes emerged that provided the UDBG with a clear direction to head for securing endowment funding (Stephens et al., 2006).

In horticultural research, several data collection methods are often utilized: personal interviews, focus groups, and observations. Personal interviews are ideal when an in-depth understanding of the interviewee's thoughts on the research topic is desired. Focus groups are interviews conducted with a special type of group, which is defined by

either its purpose, size, procedures, or composition. Focus groups provide the advantage of interviewing several people at once, while providing interaction between the participants that may produce data that would not have been produced in a personal interview. For both personal interviews and focus groups, interviews are usually audio-recorded and transcribed for analyses. Observations may be either direct observations from field research or observations from other participant's observations, such as a teacher's observations of her students. Observations may be employed in conjunction with other data collection types, or may stand alone when combined with extensive field time (Shoemaker et al., 2000).

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CHAPTER THREE

EXAMINATION OF STUDENT ENVIRONMENTAL ATTITUDES AFTER A SCHOOL LANDSCAPE PROJECT

Abstract

Children's environmental attitudes have been an area of great interest for the last few decades, with studies finding that as environmental knowledge increases, environmental attitudes improve and environmentally friendly behavior tends to follow (Acrury, 1990; Cammack et al., 2002; Newhouse, 1991). Studies have also demonstrated that gardening increases a child's respect for nature and improves their environmental knowledge and attitudes (Dirks and Orvis, 2005; Lohr and Pearson-Mims, 2005; Montessori, 1912; Skelly and Zajicek, 1998).

This study examined the environmental attitude differences among students at Fayetteville School (FHS), Drew Middle School (DMS), and Lincoln High School (LHS), all located in Talladega County, AL. FHS comprised the experimental group, whereas DMS and LHS served as the control group. FHS participated in a landscape project prior to this study that involved planting over 400 trees and shrubs and installing a children's garden. Many FHS students were involved in planting exercises, with each of the 650 students having the opportunity to be a part of planting.

Both the experimental and control groups completed the Children's Environmental Response Inventory (CERI) Survey, which assessed the students environmental attitudes. The CERI examined two internal scales, environmental

adaptation (EA) and pastoralism (PA). A lower EA score and higher PA score indicate a positive environmental attitude. When examining all study participants, the experimental group exhibited more positive attitudes than the control group in both internal scales, with the experimental group scoring lower in EA and higher in PA. Many other studies reported similar findings when children participate in gardening programs (Bowker and Tearle, 2008; Cammack et al., 2002; Dirks and Orvis, 2005; Lohr and Pearson-Mims, 2005; Waliczek and Zajicek, 1999). There were also gender-specific results, with experimental group females scoring better than control group females in both internal scales. Finally, the groups were compared based on grade. For pastoralism, high school experimental group students scored better than their control group counterparts. Maturity may have played a role in both these results, as females tend to mature more quickly than males, and high school children generally can think more abstractly and have more established personal values than middle school children (Blume and Zembar, 2007; CDC, 2011).

Introduction

The middle and high school years are critical for maintaining many of the views established by children during their elementary school years (Sorge, 2007; Yager and Yager, 1985). Children who were engaged in elementary school often find school boring in middle school (Sorge, 2007; Yager and Yager, 1985). In a 2006 study by Lekies et al., high-school age students involved in garden design and educational program planning reported their involvement as “fun” and “educational.” Involving youth in educational program design for younger children, as well as teaching some of those programs, may improve students’ attitudes towards school. The current research examined the

environmental attitudes of FHS students after their participation in a garden project that involved similar activities to those performed in the Lekies study (Lekies et al., 2006).

Environmental Attitudes: One's attitude towards the environment may be affected by many things but perhaps the strongest factor is environmental knowledge (Cammack et al., 2002). As environmental knowledge increases, environmental attitudes improve and environmentally friendly behavior tends to follow (Acrury, 1990; Cammack et al., 2002; Newhouse, 1991). This is true of students from elementary to college age (Bradley et al., 1997; Ramsey, 1993; Waliczek and Zajicek, 1999). Hands-on activities have been shown to increase students' knowledge levels (Freedman, 1997; Johnson et al., 1998; Solter, 1997; and Zimmerman et al., 1998). The garden offers many opportunities for hands-on activities and children can learn that nature is essential for many of our physical and aesthetic needs. This knowledge can facilitate an enjoyment for nature, valuing resourcefulness, and understanding the benefits of improved technologies, not just for people, but also for the environment, from now and into the future (Green, 1994; Mayer-Smith et al., 2007).

Many studies have demonstrated that gardening increases a child's respect for nature and improves their environmental attitudes (Lohr and Pearson-Mims, 2005; Montessori, 1912; Skelly and Zajicek, 1998). Environmental education programs that involve activity-based learning have been very successful (Cammack et al., 2002; Campbell et al., 1997; Ramsey, 1993). Waliczek and Zajicek (1999) studied the effects of an environmental curriculum, Project GREEN, on elementary and junior high students in Kansas and Texas. They found that participants' environmental attitudes improved after participating in the program. Dirks and Orvis (2005) reported that third grade

participants in the Junior Master Gardener Program possessed an increase in environmental knowledge and attitudes. Of the schools participating, those with a garden demonstrated more positive gains than those without. Similarly, Aguilar et al. (2008) found that students with previous garden experience had better environmental attitudes than those who had never gardened.

Bowker and Tearle evaluated the “Gardens for Life” program in 2008, which involved primary school children from England, India, and Kenya. Students were reported to grow in their environmental attitudes and in their understanding of agriculture and its impact on global economies because they participated in garden activities.

Materials and Methods

Statement of the Research Problem: This chapter will discuss and examine whether FHS student environmental attitudes post-landscape project were better than DMS and LHS student environmental attitudes.

Sample: This study was conducted during the 2011-12 school year and involved three Alabama schools. FHS was the experimental group with grades K through 12, approximately 625 students enrolled, and is located on 17 acres in Fayetteville, AL (FHS, 2013). DMS and LHS were the control group with approximately 400 students enrolled in grades 6 through 8 (DMS, 2013). LHS has approximately 520 students enrolled in grades 9 through 12 (LHS, 2013). DMS and LHS share a building located on 12 acres in Lincoln, AL (LHS, 2013). For the environmental attitudes portion of this study, only 7th through 12th grade students were surveyed. At FHS this involved 295 students; at DMS, 320 students, and at LHS, 520. A total of 60 students participated in the experimental group and 222 in the control group. This provided a response rate of 20% and 26%,

respectively. DMS and LHS were selected as the control group schools because, in terms of landscaping, they were the most similar school to FHS before the project began. They also were similar to FHS in terms of having multiple grade levels, with both middle and high school under one roof. In 2010, the population of Fayetteville was approximately 1300 and Lincoln, approximately 6200. Fayetteville, in 2010, was 97% Caucasian and 3% other. Lincoln was 72% Caucasian, 27% African American, and 1% other. Both school structures were rebuilt in the early 2000's and received no landscaping, as there was no landscaping budget left by the time each project was completed. While the schools weren't a perfect match to FHS, they were the most similar in Talladega County and were therefore asked to participate. After Human Subjects Board approval was obtained, all three schools were asked to participate via a phone call to the school principal.

Instrumentation: The instrument used for this part of the study included a Biographical Information Section and the Children's Environmental Response Inventory (CERI). The CERI was developed in 1983 by Bunting and Cousins (Figures 3.1 and 3.2).

The Biographical Information Section of the survey included 10 questions for FHS and 11 questions for both DMS and LHS. The questions pertained to student demographics such as gender, ethnicity, and place of residence. Questions were also included about gardening activities, such as whether students had gardened before and how much time they spent outside during the school day. Both control group schools were asked one extra question pertaining to whether they had taken a class offered at DMS. The class, entitled Exploratory Class, included a portion of the semester where students worked outside completing gardening activities.

CERI is a nine-scale survey comprised of 185 questions. It is appropriate for children ages 9 and up. The internal scales are: pastoralism, urbanism, environmental adaptation, stimulus seeking, environmental trust, antiquarianism, need for privacy, mechanical orientation, and communality (Bunting and Cousins, 1983). For this study, two of the nine internal scales, pastoralism and environmental adaptation, were utilized, shortening the survey to 44 questions, 22 per scale. This enabled students to complete it during their twenty-minute homeroom period. These two scales were selected because they were deemed most appropriate for the aims of this study. The same two scales were utilized in surveys in two other socio-horticulture studies (Aguilar et al., 2008; Skelly and Zajicek, 1998). Bunting and Cousins (1983) define pastoralism as “enjoyment of the natural environment in an intellectual and aesthetic fashion.” The second internal scale, environmental adaptation, is defined as “belief in man’s right to use technology to adapt and dominate nature.” Cronbach's coefficient alphas were calculated for the two internal scales with pastoralism at 0.87 and environmental adaptation at 0.76. The Cronbach’s Test is an indicator of the internal validity, or consistency, of a survey. Validity at 0.90 and above is considered excellent, which is required for high-stakes testing. Good is assigned to the 0.80 to 0.89 range and is considered appropriate for low-stakes testing, while 0.70 to 0.79 is acceptable, and considered appropriate for survey research. For the purpose of this research, an internal consistency of 0.70 and above was accepted. At 0.87, pastoralism had a good internal consistency and environmental adaptation, at 0.76, was acceptable. The CERI is based on a five-point Likert-type scale (Likert, 1967) where the five possible choices for each question were 1 = Disagree Very Much, 2 = Disagree, 3 = Don’t Know/Don’t Care, 4 = Agree, and 5 = Strongly Agree. The two internal scales

used in this study and their corresponding questions are listed in Figure 3.3.

Data Collection Procedures: The primary researcher attended a “Welcome Back Night” at each of the three schools. Each of the “Welcome Back Nights” were held in August of 2011 the week before school started. At these events the primary researcher provided information to students and parents about the study and interested students and their parents were asked to sign a permission letter. During the first week of school, the same permission slips were sent home with each student. Two weeks were allotted for a sufficient number of permission slips to be returned to each student’s homeroom teacher. Homeroom teachers were then provided with the CERI, which they administered during the next week to students who had returned a permission slip. As teachers were able to ensure that surveys were only completed by students with a permission slip, the surveys were collected anonymously. In the spring of the following year it was determined that more surveys were needed to meet the confidence level statistic, which ensures there are enough surveys to accurately represent a given population. The same procedures were repeated a second time, resulting in a sufficient number of permission slips and completed surveys. The surveys were again administered by each student’s homeroom teacher, who ensured that no student completed the survey twice. Following completion of the study, the primary researcher completed and installed a landscape design on the DMS/LHS school grounds as compensation for the schools’ participation in the study. For FHS, the landscape that was designed and installed at their school prior to this study was considered their compensation. In accordance with Human Subjects Board regulations, all data will be kept in a locked filing cabinet for three years and then shredded and disposed of.

Data Analysis Procedures: The data from the biographical and CERI sections of each test were entered into Microsoft Excel© 2011 for Mac™ (Microsoft Excel, 2011) for scoring. All data were then entered into the Statistical Package for the Social Sciences (SPSS®) for Mac™ Release 19.1 (SPSS, 2010) spreadsheet for evaluation. All missing scores were coded as missing values. The SPSS® procedure “Reliability Analysis” was used to determine the stability of test scores and the internal consistency of the instrument. A Cronbach’s Alpha Coefficient was calculated on the two internal scales of the CERI. The SPSS® procedure “Frequencies” was conducted to ascertain descriptive statistics, including central tendencies and percentages. Independent samples t-tests were calculated and used to compare the CERI scores of the experimental group to those of the control group (Table 3.1). Additionally, independent samples t-tests with “select cases” were calculated and used to determine if there were any connections between CERI scores and certain demographics (Tables 3.2-3.5). The alpha level was set *a priori* at 0.05. In the upcoming results section, all differences reported are significant at $P=0.05$.

Sample Demographics and Frequencies: Frequencies were run to determine demographics and poll opinions from several of the survey questions. Experimental group participants were made up of 28 (46.7%) males and 32 (53.3%) females. The control group was comprised of 87 (39.7%) males and 132 (60.3%) females. Grade was then examined, with 17 (28.3%) of the experimental group being middle school students and 43 (71.7 %) being high school students. Of the control group, 118 (53.9%) were middle school students and 101 (46.1%) were in high school. Next race was surveyed, the experimental group included two (3.4%) Asian students, one (1.7%) African American, 46 (79.7%) Caucasians, and nine (15.3%) other in the experimental group. The control

group was made up of three (1.4%) Asian students, 67 (30.6%) African American's, 105 (47.9%) Caucasians, two (0.9%) Hispanics, and 42 (19.2%) other. Finally, students were asked where they lived and from the experimental group, 55 (91.7%) reported living in the country and five (8.3%) reported living in the city. The control group was made up of 152 (70%) country dwellers and 64 (30%) city dwellers.

Following the standard demographics questions, students were asked demographics questions related to the subject of this study, gardening. First, students were asked whether they had gardened before and 7 (11.7%) of the experimental group reported they had, with 53 (88.3%) reporting they had not. Of the control group 163 (74.4%) reported yes and 56 (25.6%) reported no. Students who had gardened before were then asked where they had gardened. From the experimental group 36 (61%), 22 (37.3%), 26 (44.1%), and 9 (15.3%) reported that they had gardened at home, at school, with a relative, and with a neighbor, respectively. Of the control group 128 (62.1%), 47 (22.8%), 89 (43.2%), and 29 (14.1%) reported that they had gardened at home, at school, with a relative, and with a neighbor.

Control group students were asked one additional question pertaining to whether they'd taken a class available at DMS during the 2010-11 school year. This class, titled the Exploratory Class, taught life skills to students, with each student working outside on a small landscape project for a portion of the school year. Forty-seven (21.9%) control group students reported they had taken the class, while 167 (78.1%) reported they had not.

Results

Experimental vs. Control: T-tests for independent samples were used to examine whether FHS student environmental attitudes post-landscape project were significantly higher than DMS and LHS student environmental attitudes. The experimental and control groups were compared using an independent samples t-test. When examining the environmental adaptation construct, the experimental group scored lower than the control group. Scores for this construct ranged from 22 to 108, with lower scores indicating a positive endorsement of environmental adaptation and a respect for the environment (Table 3.1). The experimental and control group were also significantly different when examining pastoralism, with the experimental group scoring higher than the control group. Scores for this construct range from 22-110, with high scores indicating a high endorsement of pastoralism and a belief in environmental conservation (Table 3.1).

Experimental versus Control by Demographics: Independent samples t-tests were conducted with select cases to compare the experimental and control group based on each of the demographic questions. This included examining gender, grade level, race, where the student reported they lived (country versus city), whether they had gardened before and where, and whether they spent time outside during school. Two of these demographics yielded significant results and are reported below.

Experimental versus Control by Gender: When comparing males, no differences were found (Table 3.2). Females were then compared and the findings were consistent with the overall results (Table 3.3). For environmental adaptation, the

experimental group scored lower than the control group. When examining pastoralism, the experimental group scored higher than the control group.

Experimental versus Control by Grade: The second demographic which yielded significant results was grade level, with students being grouped by middle school (grades 7 and 8) and high school (grades 9 through 12). Findings when examining middle school CERI scores yielded no significant results (Table 3.4). When examining environmental adaptation, high school student results were not statistically significant, though they were approaching significance at $P=0.055$. This result is odd, considering that the overall group yielded significant results, and may be explained by a few students not selecting a grade level and therefore not being included in the analysis by grade level. When assessing high school pastoralism, results were consistent with the overall results with experimental students scoring higher than their control group counterparts (Table 3.5).

Conclusions and Recommendations

When examining all study participants, the experimental group scored better than the control group in both internal scales. The experimental group scored lower in environmental adaptation and higher in pastoralism, which are both positive results. Many other studies have reported similar findings when children participate in gardening programs (Bowker and Tearle, 2008; Cammack et al., 2002; Dirks and Orvis, 2005; Lohr and Pearson-Mims, 2005; Waliczek and Zajicek, 1999). Connections have also been found between higher environmental attitudes and previous garden experience (Aguilar et al., 2008). Both the existing literature and the findings from this study indicate that time spent in the garden improves environmental attitudes. In future environmental attitude

studies it would be advantageous to compare the results of different environmental education programs, perhaps comparing one where students spend part of their time in the garden and another where the students' time is spent solely inside.

Following examination of the overall group, the experimental and control groups were then compared based on gender. While no differences were found for male participants, experimental and control group females were different, with outcomes consistent with the overall results. Studies comparable to this one have reported similar results, with girls scoring higher than boys (Aguilar et al., 2008; Moore, 1986). As girls tend to mature more quickly than boys, especially emotionally, the experimental group girls may have benefitted more from the garden program (Blume and Zembar, 2007; CDC, 2011). It has also been demonstrated that girls tend to be more sensitive to environmental actions (Aguilar et al., 2008; Bunting and Cousins, 1985; Harvey, 1989; Waliczek and Zajicek, 1999). Because no differences were found for males, future studies should focus on this population to determine ways to improve male environmental attitudes during this critical age.

Finally, the two groups were compared based on grade. When the middle school experimental and control groups were compared, no differences were observed. The high school experimental and control groups were then compared and differences were found in pastoralism, with the experimental group scoring higher. Maturity may have played a role in these results, as middle school students are between the age of 12 and 14 and this is a period of many changes. These changes include the development of the ability for more complex thought and a stronger moral compass. By the time a child reaches high school age (15 to 18), they are often more settled into these skills and have developed a

stronger sense of identity (Blume and Zembar, 2007; CDC, 2011). Future studies could focus solely on the middle school population to further examine the best ways to improve environmental attitudes at this age.

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Table 3.1. Independent samples t-test comparing the experimental (7th-12th grade Fayetteville High School [FHS] students) and control group (7th-12th grade Drew Middle School [DMS] & Lincoln High School [LHS]^z students) Children's Environmental Response Inventory (CERI) scores^y.

CERI Scale	Treatment	N	Mean Score	SD	Mean Difference	df	T ^x	P
EA ^w	Experimental	60	53.97	11.412	-3.700	280	-2.364	0.019 ^{*v}
	Control	222	57.67	10.578				
PA ^u	Experimental	60	84.93	12.807	8.379	280	4.454	0.000 ^{**t}
	Control	222	76.55	12.962				

^zFHS, DMS, and LHS are all located in Talladega County, AL.

^yThe CERI is a survey that was given to students. Two internal scales were utilized: environmental adaptation and pastoralism.

^xT-scores are standard scores which use standard deviation units to express an individual's performance relative to the groups' performance.

^wEA= Environmental Adaptation.

^{v*}P less than or equal to 0.05.

^uPA= Pastoralism.

^{t**}P less than or equal to 0.01.

Table 3.2. Independent samples t-test comparing the male experimental (7th-12th grade Fayetteville High School [FHS] students) and control group (7th-12th grade Drew Middle School [DMS] & Lincoln High School [LHS]^z students) Children's Environmental Response Inventory (CERI) scores^y.

CERI Scale	Treatment	N	Mean Score	SD	Mean Difference	df	T ^x	P
EA ^w	Experimental	28	58.54	9.998	-0.557	112	-2.30	0.818
	Control	86	59.09	11.446				
PA ^v	Experimental	28	81.75	12.960	4.390	112	1.611	0.110
	Control	86	77.36	12.379				

^zFHS, DMS, and LHS are all located in Talladega County, AL.

^yThe CERI is a survey that was given to students. Two internal scales were utilized: environmental adaptation and pastoralism.

^xT-scores are standard scores which use standard deviation units to express an individual's performance relative to the groups' performance.

^wEA= Environmental Adaptation.

^vPA= Pastoralism.

Table 3.3. Independent samples t-test comparing the female experimental (7th-12th grade Fayetteville High School [FHS] students) and control group (7th-12th grade Drew Middle School [DMS] & Lincoln High School [LHS]^z students) Children's Environmental Response Inventory (CERI) scores^y.

CERI Scale	Treatment	N	Mean Score	SD	Mean Difference	df	T ^x	P
EA ^w	Experimental	32	49.97	11.200	-6.569	162	-3.279	0.001 ^{**v}
	Control	132	56.54	9.907				
PA ^u	Experimental	32	87.72	12.195	11.635	162	4.467	0.000 ^{**}
	Control	132	76.08	13.449				

^zFHS, DMS, and LHS are all located in Talladega County, AL.

^yThe CERI is a survey that was given to students. Two internal scales were utilized: environmental adaptation and pastoralism.

^xT-scores are standard scores which use standard deviation units to express an individual's performance relative to the groups' performance.

^wEA= Environmental Adaptation.

^{v**}P less than or equal to 0.01.

^uPA= Pastoralism.

Table 3.4. Independent samples t-test comparing middle school experimental (7th-8th grade Fayetteville High School [FHS] students) and control group (7th-8th grade Drew Middle School [DMS]^z students) Children's Environmental Response Inventory (CERI) scores^y.

CERI Scale	Treatment	N	Mean Score	SD	Mean Difference	df	T ^x	P
EA ^w	Experimental	17	55.18	9.723	-2.875	133	-1.006	0.339
	Control	118	58.05	11.835				
PA ^v	Experimental	17	84.76	14.839	6.320	133	1.789	0.077
	Control	118	78.44	13.429				

^zFHS, DMS, and LHS are all located in Talladega County, AL.

^yThe CERI is a survey that was given to students. Two internal scales were utilized: environmental adaptation and pastoralism.

^xT-scores are standard scores which use standard deviation units to express an individual's performance relative to the groups' performance.

^wEA= Environmental Adaptation.

^vPA= Pastoralism.

Table 3.5. Independent samples t-test comparing high school experimental (9th-12th grade Fayetteville High School [FHS] students) and control group (9th-12th grade Lincoln High School [LHS]^z students) Children's Environmental Response Inventory (CERI) scores^y.

CERI Scale	Treatment	N	Mean Score	SD	Mean Difference	df	T ^x	P
EA ^w	Experimental	43	53.49	12.088	-3.541	142	-1.935	0.055
	Control	101	57.03	9.059				
PA ^v	Experimental	43	85.00	12.105	10.465	142	4.728	0.000 ^{**u}
	Control	101	74.53	12.176				

^zFHS, DMS, and LHS are all located in Talladega County, AL.

^yThe CERI is a survey that was given to students. Two internal scales were utilized: environmental adaptation and pastoralism.

^xT-scores are standard scores which use standard deviation units to express an individual's performance relative to the groups' performance.

^wEA= Environmental Adaptation.

^vPA= Pastoralism.

^{u**} P less than or equal to 0.01.

Figure 3.1

Experimental Group Children’s Environmental Response Inventory Survey

FHS Students

Children’s Environmental Response Inventory

This test tries to find out about your feelings toward the world around you. Read each sentence carefully and decide if you agree with what the sentence says or if you disagree. There are no right or wrong answers.

Write the number next to the sentence which best tells how you feel about the sentence. Choose only one answer. Try to give an answer to each question, even if you must guess. Please check when you turn a page to be sure that you do not miss any questions.

1	2	3	4	5
Disagree very much	Disagree	Don’t know/Don’t care	Agree	Strongly Agree

- _____ 1. I am glad that people can change nature.
- _____ 2. It is silly to get upset about dirty air from factories.
- _____ 3. I really enjoy nature.
- _____ 4. The world may soon run out of lots of things.
- _____ 5. People should be able to cut down trees whenever they want to.
- _____ 6. Every person must work to solve pollution problems.
- _____ 7. People should learn how to control the weather.
- _____ 8. We must use less energy although it will be hard to do.
- _____ 9. It is hopeless to try and improve things.
- _____ 10. It is wrong to use lots of chemicals to kill weeds and insects.
- _____ 11. I enjoy watching the sky on summer nights.
- _____ 12. I enjoy pictures of birds and animals.
- _____ 13. Factories spoil the look of the countryside.
- _____ 14. I don’t worry much about wasting a few things.
- _____ 15. People’s activities don’t really hurt nature.
- _____ 16. Polluted water can always be cleaned up.
- _____ 17. People have the right to change nature whenever they need to.
- _____ 18. I like sitting beside a quite pond.
- _____ 19. Walking in the woods is a waste of time.

- | 1 | 2 | 3 | 4 | 5 |
|-----------------------|----------|--------------------------|-------|----------------|
| Disagree very
much | Disagree | Don't know/Don't
care | Agree | Strongly Agree |
-
- _____ 20. People are stronger than the forces of nature.
 - _____ 21. I wish I knew more about nature.
 - _____ 22. There will always be enough land for people to live on.
 - _____ 23. People should spend even more time out-of-doors.
 - _____ 24. It does not matter if people change parts of the environment.
 - _____ 25. Going on a long hike is boring.
 - _____ 26. It would be fun to go to a nature camp for a weekend.
 - _____ 27. I really like the work of looking after animals.
 - _____ 28. Machines and other inventions are going to make life a lot better.
 - _____ 29. There are times when I like things to be very quiet.
 - _____ 30. I would like to get up very early just to see the sun rise.
 - _____ 31. There will always be enough of everything for everybody.
 - _____ 32. I like T.V. programs about nature better than most other programs.
 - _____ 33. I would like to live in a cabin in the woods.
 - _____ 34. There should be more laws to punish people who harm the environment.
 - _____ 35. I worry about what will happen to the environment in the future.
 - _____ 36. I like things to wear out quickly because then I can get new ones.
 - _____ 37. People will soon be able to solve all the world's problems.
 - _____ 38. I feel good when I am close to nature.
 - _____ 39. It is fun to walk in the rain even if you get wet.
 - _____ 40. I like the smell of a lawn just after it has been cut.
 - _____ 41. I would like to get a job working out-of-doors.
 - _____ 42. I like the sounds that a stream makes.
 - _____ 43. I like walking through the leaves in the fall.
 - _____ 44. All playgrounds should have artificial grass.

45. What gender are you?
Male Female
46. What grade are you in? _____
47. What race are you? (you can circle more than one)
Asian
African American
Caucasian
Hispanic
Other
48. Where have you lived most your life?
Country City
49. Do you have a garden at home?
Yes No
50. Have you ever worked in a garden before?
Yes No
51. If you have worked in a garden before, where was the garden? (you can circle more than one)
Home
School
A relative's house (grandparent, aunt, etc.)
Neighbor's house
I have not worked in a garden before
52. How many minutes per week do you spend outside with a teacher (during the school day)?

53. Of that time outside, is some of it with a PE teacher?
Yes No
- 54b. If yes, how many minutes per week are you outside with your PE teacher?

Figure 3.2

Control Group Children's Environmental Response Inventory Survey

DMS/LHS Students

Children's Environmental Response Inventory

This test tries to find out about your feelings toward the world around you. Read each sentence carefully and decide if you agree with what the sentence says or if you disagree. There are no right or wrong answers.

Write the number next to the sentence which best tells how you feel about the sentence. Choose only one answer. Try to give an answer to each question, even if you must guess. Please check when you turn a page to be sure that you do not miss any questions.

1	2	3	4	5
Disagree very much	Disagree	Don't know/Don't care	Agree	Strongly Agree

- _____ 1. I am glad that people can change nature.
- _____ 2. It is silly to get upset about dirty air from factories.
- _____ 3. I really enjoy nature.
- _____ 4. The world may soon run out of lots of things.
- _____ 5. People should be able to cut down trees whenever they want to.
- _____ 6. Every person must work to solve pollution problems.
- _____ 7. People should learn how to control the weather.
- _____ 8. We must use less energy although it will be hard to do.
- _____ 9. It is hopeless to try and improve things.
- _____ 10. It is wrong to use lots of chemicals to kill weeds and insects.
- _____ 11. I enjoy watching the sky on summer nights.
- _____ 12. I enjoy pictures of birds and animals.
- _____ 13. Factories spoil the look of the countryside.
- _____ 14. I don't worry much about wasting a few things.
- _____ 15. People's activities don't really hurt nature.
- _____ 16. Polluted water can always be cleaned up.
- _____ 17. People have the right to change nature whenever they need to.
- _____ 18. I like sitting beside a quite pond.
- _____ 19. Walking in the woods is a waste of time.

- | 1 | 2 | 3 | 4 | 5 |
|-----------------------|----------|--------------------------|-------|----------------|
| Disagree very
much | Disagree | Don't know/Don't
care | Agree | Strongly Agree |
-
- _____ 20. People are stronger than the forces of nature.
- _____ 21. I wish I knew more about nature.
- _____ 22. There will always be enough land for people to live on.
- _____ 23. People should spend even more time out-of-doors.
- _____ 24. It does not matter if people change parts of the environment.
- _____ 25. Going on a long hike is boring.
- _____ 26. It would be fun to go to a nature camp for a weekend.
- _____ 27. I really like the work of looking after animals.
- _____ 28. Machines and other inventions are going to make life a lot better.
- _____ 29. There are times when I like things to be very quiet.
- _____ 30. I would like to get up very early just to see the sun rise.
- _____ 31. There will always be enough of everything for everybody.
- _____ 32. I like T.V. programs about nature better than most other programs.
- _____ 33. I would like to live in a cabin in the woods.
- _____ 34. There should be more laws to punish people who harm the environment.
- _____ 35. I worry about what will happen to the environment in the future.
- _____ 36. I like things to wear out quickly because then I can get new ones.
- _____ 37. People will soon be able to solve all the world's problems.
- _____ 38. I feel good when I am close to nature.
- _____ 39. It is fun to walk in the rain even if you get wet.
- _____ 40. I like the smell of a lawn just after it has been cut.
- _____ 41. I would like to get a job working out-of-doors.
- _____ 42. I like the sounds that a stream makes.
- _____ 43. I like walking through the leaves in the fall.
- _____ 44. All playgrounds should have artificial grass.

45. What gender are you?
Male Female
46. What grade are you in? _____
47. What race are you? (you can circle more than one)
Asian
African American
Caucasian
Hispanic
Other
48. Where have you lived most your life?
Country City
49. Do you have a garden at home?
Yes No
50. Have you ever worked in a garden before?
Yes No
51. If you have worked in a garden before, where was the garden? (you can circle more than one)
Home
School
A relative's house (grandparent, aunt, etc.)
Neighbor's house
I have not worked in a garden before
52. Did you take the Exploratory class with Dr. Reese during the 2010-2011 school year?
Yes No
53. How many minutes per week do you spend outside with a teacher (during the school day)?

54. Of that time outside, is some of it with a PE teacher?
Yes No
- 55b. If yes, how many minutes per week are you outside with your PE teacher?

Figure 3.3

The Children's Environmental Response Inventory internal scales and statements.

Scale	Item #	Statement
Pastoralism	3	I really enjoy nature.
	9	It is hopeless to try and improve things.
	11	I enjoy watching the sky on summer nights.
	12	I enjoy pictures of birds and animals.
	13	Factories spoil the look of the countryside.
	18	I like sitting beside a quiet pond.
	19	Walking in the woods is a waste of time.
	21	I wish I knew more about nature.
	23	People should spend even more time out-of-doors.
	25	Going on a long hike is boring.
	26	It would be fun to go to a nature camp for a weekend.
	27	I really like the work of looking after animals.
	29	There are times when I like things to be very quiet.
	30	I would like to get up very early just to see the sun rise.
	32	I like T.V. programs about nature better than most other programs.
	33	I would like to live in a cabin in the woods.
	38	I feel good when I am close to nature.
39	It is fun to walk in the rain even if you get wet.	
40	I like the smell of a lawn just after it has been cut.	
41	I would like to get a job working out-of-doors.	
42	I like the sounds that a stream makes.	
43	I like walking through the leaves in the fall.	
Environmental Adaptation	1	I am glad that man can change nature.
	2	It is silly to get upset about dirty air from factories.
	4	The world may soon run out of lots of things.
	5	People should be able to cut down trees whenever they want to.
	6	Every person must work to solve pollution problems.
	7	Man should learn how to control the weather.
	8	We must use less energy although it will be hard to do.
	10	It is wrong to use lots of chemicals to kill weeds and insects.
	14	I don't worry much about wasting a few things.
	15	Man's activities don't really hurt nature.
16	Polluted water can always be cleaned up.	
17	People have the right to change nature whenever they need to.	
20	Man is stronger than the forces of nature.	

-
- 22 There will always be enough land for people to live on.
- 24 It does not matter if people change parts of the environment.
- 28 Machines and other inventions are going to make life a lot better.
- 31 There will always be enough of everything for everybody.
- 34 There should be more laws to punish people who harm the environment.
- 35 I worry about what will happen to the environment in the future.
- 36 I like things to wear out quickly because then I can get new ones.
- 37 Man will soon be able to solve all the world's problems.
- 44 All playgrounds should have artificial grass.
-

CHAPTER FOUR

EXAMINATION OF CHANGES IN SCHOOL GROUND PERCEPTIONS AFTER A LANDSCAPE PROJECT

Abstract

It has been demonstrated that when students perceive their school environment in a positive light, they exhibit higher self-esteem, lower delinquency rates, and better academic performance (Kuperminc et al., 2001, Wilson, 2004). A parent's perception of a school can also affect their child's perception. As parents view a school in a positive light, they tend to be more involved (Wilson, 2004) and children of those parents benefit both academically and psychologically (Henderson et al., 1986; Hill and Tyson, 2009; Lindstrom, 1997; Smith et al., 2011). Another group that may affect student perceptions is faculty, since a faculty member's perception of their work environment contributes to their work performance and attitudes (Mitchell et al., 2010). As parent and faculty perceptions of a school may be affected by a school's climate, the climate should be addressed by schools. One way to improve a school climate is to include hands-on activities and a favorable environment (Kentz and Orman, 1998; Mitchell et al., 2010). School gardens may provide such an environment.

This study examined the differences among Fayetteville School (FHS) faculty, parent, and student perceptions pre-and post-project. FHS faculty, parent, and student school perceptions were also compared to the perceptions of faculty, parents, and students at Drew Middle School (DMS) and Lincoln High School (LHS). FHS comprised

the experimental group, whereas DMS and LHS were the control group. FHS participated in a landscape project prior to this study that involved planting over 400 trees and shrubs and installing a children's garden. Many of the FHS students were involved in planting dates, with each of the school's 650 students having the opportunity to participate in the planting.

Both the experimental and control group completed the School Grounds Inventory (SGI) Survey, which assessed perceptions of the school grounds. Three similar versions of the SGI were developed; with some wording changes and question omissions to ensure the surveys were appropriate for each of the three groups. Five internal scales were utilized for both faculty and students: pride, needs met, benefits, use, and total. For the parents' survey, four internal scales were used: pride, needs met, benefits, and total.

When examining the faculty experimental group, their post-test scores were significantly higher than their pre-test scores in four of the five constructs: pride, needs met, use, and total. The experimental and control group faculty were then compared, and the experimental group scored significantly higher than the control group in pride and total. Next, parents' SGI scores were examined, with four significant increases from pre-to-post-test in the areas of pride, needs met, benefits, and total. When comparing the experimental and control group parents, the experimental group scored significantly higher than the control group in three of the constructs: needs met, benefits, and total score. Finally, student SGI scores were examined. When comparing the experimental group pre-and post-tests, there were significant increases in pride, needs met, benefits, and total. The experimental and control group students were then compared and the

experimental group scored significantly higher than the control group in the same four areas.

Plants and nature have been shown to provide many benefits, including improving people's perceptions of their environment. These improvements in perceptions may result in stress reduction (Bennett and Swasey, 1996; Kohlleppel et al., 2002), improved health (Fjeld, 2000; Lohr and Pearson-Mims, 2000), increased employee morale, increased productivity, reduced absenteeism (Doxon, 1996; Pearson-Mims and Lohr, 2000), and increased pride in an environment (Kentz and Orman, 1998; Mitchell et al., 2010). Even viewing plants or nature has been found to reduce stress and increase positive feelings (Hartig et al., 2010; Ulrich, 1981). The results of this study support previous findings that plants on a school campus improve perceptions of school grounds, as well as students' attitudes toward school (Waliczek et al., 2001). These results may have occurred because the experimental group experienced the benefits of being around plants and nature in an improved school grounds environment. They may have benefitted from, not only their involvement in the landscape project, but also their improved view out their classroom window.

Introduction

School Perceptions: A positive school climate is considered essential for successful and effective schools (Brand et al., 2003). School climate may be defined as the beliefs, values, and attitudes that determine the interactions among students, teachers, and administrators. These norms then determine acceptable educational and social behaviors for the school, thus setting the school climate (Koth et al., 2008). Schools with a positive climate generally exhibit an emphasis on academic achievement, show positive

relationships between students and teachers, discipline fairly and consistently, and have involved families (Wilson, 2004). When students perceive their school environment in a positive light, they exhibit higher self-esteem, lower delinquency rates, and better academic performance (Kuperminc et al., 2001, Wilson, 2004).

Parent perceptions of a school can affect their child's perception. As parents view a school in a positive light, they tend to be more involved (Wilson, 2004). Parent involvement is considered a key factor in a child's success in school (Epstein et al., 1997; Henderson et al., 1986; Hill and Tyson, 2009; Lindstrom, 1997), with children of involved parents benefitting both academically and psychologically (Henderson et al., 1986; Hill and Tyson, 2009; Lindstrom, 1997; Smith et al., 2011). Parent involvement includes communicating with their child's school, volunteering at the school, and aiding their child with homework (Epstein, 1995; Hill and Tyson, 2009). Though the majority of parents and teachers agree on the importance of parent involvement, most teachers say that parent involvement at their school is low (Public Agenda, 1999; Smith et al., 2011). This is attributed to parents' attitudes towards the school (Carey et al., 1998; Hill and Tyson, 2009), and since a parent's perception may be affected by a school's climate, the climate should be addressed. One way to improve a school climate is to include hands-on activities and a favorable environment (Kentz and Orman, 1998; Mitchell et al., 2010), and school gardens can provide such an environment. In a San Antonio study of classroom gardens, teachers in the school district noticed an increase in the frequency of parent involvement after gardens were developed (Alexander and Henderson, 1998). Another group that may affect student perceptions is faculty, as a faculty member's perception of their work environment contributes to their work performance and attitude

(Mitchell et al., 2010).

Plants and nature have been shown to provide many benefits, including improving people's perceptions of their environment, which may result in stress reduction (Bennett and Swasey, 1996; Kaplan et al., 1988; Kohlleppel et al., 2002), improved health (Doxon, 1996; Fjeld, 2000; Kaplan et al., 1988; Lohr and Pearson-Mims, 2000), increased employee morale, increased productivity, reduced absenteeism (Doxon, 1996; Kaplan et al., 1988; Pearson-Mims and Lohr, 2000), and reduced crime (Snelgrove et al., 2004). Contact with nature, even images of nature, has been found to benefit people (Adachi et al., 2000). In a key study by Ulrich (1984), patients in a room with a view of trees required less pain medication and stayed in the hospital for a shorter period of time than those who viewed only buildings. Additionally, viewing plants or nature has been found to reduce stress and increase positive feelings (Hartig et al., 2010; Ulrich, 1981). In each of these situations, the individuals may have benefitted because the plants improved their perception of their environment. Of more benefit than viewing images of nature is being around nature (Doxon, 1996; Dunnett, 2000; Fried, 1982; Relf, 1992).

As has been discussed, when children's attitudes towards school improve, so does their academic achievement (Waliczek et al., 2003). Plants on a school campus have improved student perceptions of schools, and a 2001 Texas study found that females participating in garden activities had significantly more positive attitudes toward school. Additionally, students attending schools that offered more individual time in the garden had more positive attitudes towards school (Waliczek et al., 2001). In fact, a correlation was found between higher uses of green spaces on a college campus and perceptions of quality of life for college students (McFarland et al., 2008). Waliczek, Logan, and

Zajicek (2003) found that students participating in outdoor environmental activities demonstrated positive attitudes towards math and science and described the program in such terms as “enjoyable,” “new,” and “interesting.” Attitudes towards school tend to be more negative in older children rather than elementary school children. While elementary school children tend to have more positive attitudes toward science, middle and high-school students tend to consider those subjects boring (Bennett and Hogarth, 2009; Sorge, 2007; Yager and Yager, 1985). Lekies et al. (2006) found that high school age children involved in garden design and educational program planning reported their involvement as “fun” and “educational.” Involving youth in educational program design for younger children, as well as teaching some of those programs, may improve older students’ attitudes towards school, while at the same time educating and engaging them.

Materials and Methods

Statement of the Research Problem: This chapter discusses and examines whether Fayetteville School (FHS) faculty, parent, and student perceptions of school grounds significantly changed from pre-to-post landscape project. FHS faculty, parent, and student school ground perceptions post-landscape project were also examined for significant differences from the control group, Drew Middle School (DMS) and Lincoln High School (LHS) faculty, parents, and students.

Sample: This study was conducted during the 2011-12 school year and involved three Talladega County, Alabama schools. The first school, FHS, was the experimental group. FHS is a K through 12 school located on 17 acres in Fayetteville, AL and consisted of 46 faculty, approximately 400 parents, and approximately 625 students (FHS, 2013). DMS and LHS were the control group. DMS includes grades 6th to 8th and

has 26 faculty, approximately 380 parents and 400 students (DMS, 2013). LHS is comprised of grades 9 through 12 with 33 faculty and an estimated 680 parents and 520 students (LHS, 2013). DMS and LHS share a building located on 12 acres in Lincoln, AL (LHS, 2013). For the school grounds perception portion of this study, all faculty and parents, and only 7th through 12th grade students, were eligible to participate. As the elementary grades are a more commonly studied demographic in socio-horticulture (Lohr and Relf, 2000), the middle and high school grades were chosen to add to the literature on this age group. At FHS, this involved 46 faculty, 400 parents, and 295 students. At DMS this included 26 faculty, 380 parents, and 320 students. At LHS, 33 faculty, 680 parents, and 520 students were eligible to participate. Pre-test data was obtained from FHS only. DMS and LHS were selected as the control group because, in terms of landscaping, they were the most similar school to FHS before the project began. They also were similar to FHS in terms of having multiple grade levels, with both middle and high school under one roof. In 2010 the population of Fayetteville was approximately 1300 and Lincoln, approximately 6200. Fayetteville, in 2010, was 97% Caucasian and 3% other. Lincoln was 72% Caucasian, 27% African American, and 1% other. Both schools' structures were rebuilt in the early 2000's and received no landscaping because there was no landscaping budget left by the time each project was completed. While the schools weren't a perfect match to FHS, they were the most similar in Talladega County and were therefore asked to participate. After Human Subjects Board approval was obtained, all three schools were asked to participate via a phone call to the school principal.

Experimental Group Pre-test Demographics: A total of 33 faculty, 37 parents, and 59 students completed the pre-test survey. This provided a response rate of 72% for

faculty, 9% for parents, and 20% for students. Of the participating faculty, 25 (47.2%) taught kindergarten through 6th grade, 13 (24.2%) taught 7th and 8th grade, and 15 (28.3%) taught 9th through 12th (Table 4.10). Totals exceeded 33 faculty because faculty were allowed to enter more than one grade and, as FHS is K through 12, many middle and high school faculty teach both grade levels. When examining parent participants, 24 (52.2%) reported having a child/children in kindergarten through 6th grade, 8 (17.4%) had a child/children in 7th to 8th grade, and 14 (30.4%) had a child/children in 9th to 12th grade (Table 4.22). As several parents had children in more than one age group, the total numbers reported are more than the actual participants. Finally, when examining the pre-test student results, 20 (34.5%) were 7th to 8th grade students, while the remaining 38 (65.5%) were 9th to 12th graders (Table 4.33).

Experimental Group Post-test Demographics: Post-test data was obtained from all three schools. For the experimental group (FHS), 38 faculty, 59 parents, and 59 students participated, representing a response rate of 83% for faculty, 15% for parents, and 20% for students. Kindergarten through 6th grade teachers made up 48.2% (27) of the post-experimental group, while 7th to 8th grades made up 19.6% (11), and 9th to 12th grade teachers made up the final 32.2% (18). As with the pre-tests, faculty numbers exceed the number of participating faculty members (38) because several faculty teach more than one grade level (Table 4.10). Of the parents who completed the post-test, 38 (48.1%) had a child/children in Kindergarten through 6th grade, 19 (24.1%) had a child/children in 7th to 8th grade, and 22 (27.8%) had a child/children in 9th to 12th grade (Table 4.22). Similar to the pre-tests, several parents had children in more than one age group, meaning that parent numbers by grade are more than the actual participants. Student participants were

comprised of 20 (34.5%) 7th to 8th grade students, while the remaining 38 (65.5%) were 9th to 12th graders (Table 4.33).

Control Group Demographics: For the control group (DMS and LHS), 55 faculty, 215 parents, and 235 students participated, which accounted for a response rate of 93% for faculty, 20% for parents, and 28% for students. Of the control group faculty, 26 (44.1%) taught 6th to 8th grades, while the remaining 33 (55.9%) taught 9th through 12th grades (Table 4.10). Once again, total faculty numbers by grade exceeded total participants since some faculty work with more than one grade level. Parents in the control group were made up of almost two-thirds 6th to 8th grade parents (164/64.3%) while the remaining one-third (91/35.7%) was comprised of 9th to 12th grade parents (Table 4.22). As with the previous two groups, total numbers by grade level add up to more than total participants since several parents had students in both grade levels. Finally, the control group students were nearly split (Table 4.33) with 131 7th to 8th graders (56.5%), and 101 9th to 12th graders (43.5%).

Instrumentation: This portion of the study used the School Grounds Inventory (SGI), developed by Robinson in 2008. The SGI is based on two surveys, the Scottish School Grounds Survey (SSGS; McKendrick, 2005) and the Secondary Action Research Programme Survey (SARPS; Rickinson and Sanders, 2005).

The SSGS (McKendrick, 2005) was created to survey every school in Scotland, and was a joint venture by Grounds for Learning, Play Scotland, and sportscotland. The SSGS consisted of 47 statements with 10 internal scales. The internal scales are “About Your School,” “Character of School Grounds,” “Planning and School Grounds,” “School Grounds as a Resource,” “Rules and Monitoring,” “Problems with Grounds,” “Use of

School Grounds,” “Improvements,” “Special Education Needs and School Grounds,” and “For the Record” (which contained demographic questions). The SARPS was created in 2001 by Learning through Landscapes (Rickinson, 2005) and consisted of 40 statements with 2 internal scales, which are “The School Grounds” and “School in General.”

For the purposes of this study, portions from each survey were utilized in developing the SGI. From the SSGS, four of the internal scales were repeated in the SGI, “Character of Grounds,” “School Grounds as a Resource,” “Problems with Grounds,” and “Use of School Grounds.” From the SARPS, one of the two internal scales was utilized, “The School Grounds.” The SGI was then developed into three separate SGI surveys, one each for faculty (Figures 4.1-4.3), parents (Figures 4.5-4.7) and students (Figures 4.9-4.10). The three surveys are similar, with some wording changes and question omissions to ensure the surveys were appropriate for each of the three groups. All questions included from the SARPS were based on a five-point Likert-type scale (Likert, 1967). The five possible choices for each question were 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree. As the SGI is the result of two combined surveys, the SGI’s internal scales were re-named to better reflect the resulting categories. Four internal scales were utilized: benefits, needs met, pride, and use. Demographic questions and one qualitative question were also asked. Benefits questions relate to perceived benefits of the school grounds. Needs met questions pertain to how well the school grounds are meeting the school’s needs. Pride questions relate to how much pride the survey participants have in their school and school grounds. Finally, use questions relate to how the school grounds are being used. The internal scales and their corresponding questions are listed in Figures 4.4, 4.8, 4.11, and 4.12. Each internal scale

was tested for reliability using the Cronbach's Alpha Test. The Cronbach's Test is an indicator of the internal validity, or consistency, of a survey. Validity at 0.90 and above is considered excellent, which is required for high-stakes testing. Good is assigned to the 0.80 to 0.89 range and is considered appropriate for low-stakes testing, while 0.70 to 0.79 is acceptable, and considered appropriate for survey research. For the purpose of this research, an internal consistency of 0.70 and above was accepted. The Cronbach's Alpha for each scale will be listed in the upcoming results section.

Faculty SGI: For the faculty survey, twenty questions were utilized from the SARPS and 13 from the SSGS. Thirty of these questions made up the four internal scales: benefits, needs met, pride, and use. Eight of the questions acquired information about the benefits of school grounds and the benefits of the elements on the school grounds. Ten questions pertained to school ground needs that are either currently met or need to be addressed. Eight questions acquired information about pride in the school grounds and four questions pertained to use of the school grounds. Three additional demographics questions pertained to the grade each faculty member taught, the school ground size, and the use of the grounds by age group. Finally, one qualitative question, "are there any specific items that you would like to see added to our school grounds that may not have been previously mentioned?" was included. Figure 4.4 lists the internal scales and their corresponding questions.

Parents SGI: The parent survey was created by utilizing 20 questions from the SARPS. Questions from the SSGS were not included, as they were more appropriate for faculty and students who are on the school grounds on a daily basis. The survey also contained one demographic question pertaining to grade level and one qualitative

question, “are there any items that you would like to see added to our school grounds?”

The 20 statements from the SARPS each correspond to the following three internal scales: benefits, needs met, and pride. Four questions acquired information about the benefits of the school grounds, while eight pertained to school ground needs that are either being met or need to be addressed. Finally, eight questions pertained to pride in the school grounds. The internal scales and their corresponding questions are listed in Figure 4.8.

Student SGI: The student survey was very similar to the faculty survey. Seventeen questions were included from the SARPS and 12 from the SSGS. Of the 20 questions utilized from the SARPS for the faculty, three were determined unnecessary for the students. Of the 13 questions utilized from the SSGS, one was determined redundant and was therefore omitted. Twenty-seven of the statements made up the four internal scales: benefits, needs met, pride, and use. Eight of the questions acquired information about the benefits of school grounds and the benefits of the elements on the school grounds. Nine questions pertained to school ground needs that are either currently met or need to be addressed. Seven questions acquired information about pride in the school grounds while three questions pertained to use of the school grounds. Two demographics questions were also asked. They pertained to the grade each student was in and the use of the grounds by age group. Finally, one qualitative question, “what would you like to see added to your school grounds?” was included. For the student SGI survey, both the experimental and control group surveys were identical with two exceptions. First, the experimental survey asked students to offer reflective pre-test answers, along with their post-test answers as no pre-data was obtained before the project began. Second, the control group survey had

one extra question pertaining to whether the students had taken a class offered at DMS. The class, entitled Exploratory Class, included a portion of the semester where students worked outside completing gardening activities. Figures 4.11 and 4.12 list the internal scales and their corresponding questions.

Data Collection Procedures: The primary researcher attended a faculty in-service day at each of the three schools the week before school started. The researcher explained the study to the faculty members and those willing to participate in the study completed a faculty survey. The primary researcher also attended a “Welcome Back Night” at each of the three schools. Each of the “Welcome Back Nights” was held in August 2011 the week before school started. At these events, the primary researcher provided information to students and parents about the study. Interested students and their parents were asked to sign a permission letter granting the student permission to complete a student survey. Interested parents also completed a survey. During the first week of school, the same permission slips were sent home with each student. Two weeks were allotted for a sufficient number of permission slips to be returned to each student’s homeroom teacher who then provided the SGI, which they administered during the next week to students who had returned a permission slip. As teachers were able to ensure the surveys were only completed by students with a permission slip, the surveys were collected anonymously. In the spring of the following year, it was determined that more student surveys were needed to meet statistical requirements. The same procedures were repeated, resulting in a sufficient number of permission slips and completed surveys. As homeroom teachers administered the surveys, they were able to ensure each student only took the survey once. Following completion of the study, the primary researcher

completed and installed a landscape design on the DMS/LHS school grounds as compensation for the school's participation in the study. For FHS, the landscape that was designed and installed at their school prior to this study was considered their compensation. In accordance with Human Subjects Board regulations, all data will be kept in a locked filing cabinet for three years and then shredded and disposed of.

Data Analysis Procedures: The data from the SGI were entered into Microsoft Excel© 2011 for Mac™ (Microsoft Excel, 2011) for scoring. All data were then entered into the Statistical Package for the Social Sciences (SPSS®) for Mac™ Release 19.1 (SPSS, 2010) spreadsheet for analyses. All missing scores were coded as missing values. The SPSS® procedure “Reliability Analysis” was used to determine the stability of test scores and the internal consistency of the instrument. A Cronbach's Alpha Coefficient was calculated on the four internal scales of the SGI. The SPSS® procedure “Frequencies” ascertained descriptive statistics, including central tendencies and percentages. Independent samples t-tests were conducted to compare the SGI pre-scores of the experimental group to the SGI post-scores of the experimental group (Tables 4.1, 4.15, and 4.23). One-way analysis of variance tests were conducted to compare the SGI post-scores of the experimental group to the SGI post-scores of the control group (Table 4.6, 4.19, and 4.27). Additionally, independent samples t-tests and one-way analysis of variance tests with “select cases” were conducted to determine if there were any relationships between SGI scores and certain demographics (Tables 4.2 to 4.5, 4.7 to 4.9, 4.16 to 4.18, 4.20, 4.21, 4.24, to 4.26, 4.28 to 4.32). The alpha level was set *a priori* at 0.05. In the upcoming results section, all differences reported are significant at $P=0.05$.

Results

Faculty SGI

Pre-test versus Post-test: T-tests for independent samples were used to test for any significant differences between FHS Faculty pre-test scores and their post-test scores. Eight questions pertained to the internal scale pride, which had a Cronbach's reliability of 0.767 (an acceptable level for survey work) and a score range from 8 to 40 points. A higher pride score indicates more school pride. Ten questions pertained to the internal scale needs met. Its Cronbach's reliability was 0.763 (acceptable) and its total score ranged from -6 to 41 points. A negative score was possible because one of the questions listed potential problems on the school grounds and asked participants to circle each of the problems. Each problem circled was counted as minus one point. A higher score for this construct indicates that faculty members feel the school's needs pertaining to the school grounds are being met. The next internal scale, benefits, had eight questions and a reliability at 0.793 (acceptable). Total scores for this construct ranged from 4 to 44 points, with a higher score indicating that the school grounds were benefitting the school. The final internal scale, use, was reliable at 0.720 (acceptable) and had four questions. Use scores ranged from 3 to 19 points, with a higher score indicating that the grounds are being used regularly for education and recreation. Each of the four internal scales were combined for a total score, which was then treated as a fifth scale, "total." This scale had a Cronbach's reliability at 0.799 (acceptable) and a score range of 9 to 144 points, with a higher total score indicating a positive perception of the school grounds.

The experimental group pre-and post-tests were compared using an independent samples t-test. When examining each of the constructs four were significantly higher: pride, needs met, use, and total (Table 4.1).

Pre-test versus Post-test by Grade: Independent samples t-tests were conducted with select cases to compare the pre-and post-tests based on the grade level each faculty member taught. Faculty members were grouped by elementary school (grades K through 6) middle school (grades 7 and 8) and high school (grades 9 through 12). Findings for elementary school teachers were consistent with the overall group findings, with post-scores being higher than pre-scores in the same four constructs: pride, needs met, use, and total (Table 4.2). Middle (Table 4.3) and high school faculty (Table 4.4) significantly increased in three of the five constructs: pride, needs met, and total.

Pre-test versus Post-test, School Ground Usefulness: Independent samples t-tests compared the experimental group pre-test scores to their post-test scores for three questions relating to the school grounds usefulness: “how useful are your school grounds as a curriculum learning resource?,” “how useful are your school grounds as a resource for sports/physical activity?,” and “how useful are your school grounds as a play resource?.” These three questions fell under the benefits construct but were also analyzed separately because they were broad enough to stand-alone. Post-test scores were significantly higher than pre-test scores for each question (Table 4.5).

Experimental versus Control: One-way ANOVA tests were used to determine whether FHS faculty school ground perceptions post-landscape project were significantly higher than DMS and LHS faculty school ground perceptions (Table 4.6). The experimental group scored higher than the control group in two constructs, pride and total

score.

Experimental versus Control by Grade: The experimental and control groups were then compared based on the grade level each faculty member taught. To accomplish this, one-way analysis of variance tests were conducted with select cases. As the control group only contained middle and high school grade levels, experimental elementary teachers were not included. Faculty members were grouped by middle school, which included grades 7 and 8 for FHS and grades 6 through 8 for DMS. While 6th grade DMS teachers were included, FHS 6th grade teachers were not because they are grouped with the elementary teachers at FHS. This means the nature of their classes are very different from DMS 6th grade teachers, with no rotation to different class periods and more inclusion in elementary level activities. For both FHS and LHS, high school included grades 9 through 12. When examining middle school faculty only, significant differences were found in two additional constructs (Table 4.7). Experimental faculty scored significantly higher in pride, needs met, benefits, and total. High school experimental faculty results were consistent with the overall group results, with significant differences in two of the five constructs, pride and total (Table 4.8).

Experimental versus Control, School Ground Usefulness: One-way ANOVAs were conducted to compare the experimental group post-test scores to the control group post-test scores for three questions. The three questions were: “how useful are your school grounds as a curriculum learning resource?,” “how useful are your school grounds as a resource for sports/physical activity?,” and “how useful are your school grounds as a play resource?.” These three questions fell under the benefits construct but were also analyzed separately as they were broad enough to stand-alone. The experimental group

scored higher than the control group in the questions pertaining to the grounds usefulness as a curriculum learning resource and a play resource (Table 4.9).

Sample Frequencies: Frequencies were run to poll opinions from several of the survey questions. Faculty were asked “relative to your school enrollment, do you think your school grounds are: much too small, too small, about the right size, too large, or much too large.” From the experimental pre-test, two faculty (6.3%) chose much too small, 11 (34.3%) chose too small, and the remaining 19 (59.4%) chose about the right size. When the experimental group took the post-test there was a shift towards “about the right size” with 1 (2.6%) faculty member choosing too small, 35 (92.1%) choosing about the right size, and 2 (5.3%) choosing too large. The control group results were similar to the experimental post-test results, with most faculty reporting that the grounds were about the right size. One 1 (1.8%) faculty member chose much too small, 8 (14.5%) chose too small, 45 (81.9%) chose about the right size, and 1 (1.8%) chose too large (Table 4.11).

When asked, “which students make the most use of the play areas of your school grounds for learning?,” from the experimental group the majority (23; 74.2%) said elementary school. The remainder of the answers chosen were scattered among the other grade levels, with several choosing more than one grade level. From the experimental post-tests, the majority (30; 85.7%) again chose elementary school, 1 (2.9%) chose junior high, and 4 (11.4%) chose both elementary school and junior high. From pre-test to post-test 11% more faculty reported that elementary used the grounds more often. When examining the control group answers, the choices were more scattered with the majority choosing either elementary school (14; 26.9%) or junior high (23; 44.3%). Another 10

(19.2%) faculty members chose senior high, with the remainder of the choices being some combination of the grades (Table 4.12).

Faculty members were also given a list of 12 curriculum areas and asked to identify which areas of the school grounds were being used to support learning. In the pre-test, eight of the 12 curriculum areas were chosen by at least one person. The majority of the experimental group identified physical education (21; 65.6%), 5 (15.6%) identified personal social skills, 3 (9.4%) identified environmental science, and 2 (6.2%) identified moral education. More curriculum areas were reported when the experimental group took the post-test, with at least one person choosing 11 of the 12 categories and increases being experienced in each of those 11 categories. Thirty-one (81.6%) reported the grounds were used for physical education, 29 (76.3%) chose environmental science, 21 (55.3%) chose personal social skills, 12 (31.6%) chose art and design, and 9 (23.7%) chose moral education. Like the experimental group post-tests, at least one faculty member from the control group chose 11 of the 12 categories. The majority of the control group (41; 74.5%) chose physical education, 27 (49.1%) chose environmental science, 11 (20.0%) chose personal social skills, seven (12.7%) chose music education, and 5 (9.1%) chose social studies (Table 4.13).

Finally, faculty members were given a list of 14 potential problems and asked to identify any problems they experience on their school grounds. From the experimental pre-tests at least one faculty member identified a problem in 11 of the 14 categories. Thirteen (40.6%) reported a lack of variation in equipment and a lack of use in teaching, 9 (28.1%) reported problems with maintenance, 6 (18.8%) selected a lack of space, and 4 (12.5%) reported intrusion from others. Half of the 14 categories were chosen by at least

one faculty member when the experimental group took the post-test. All the categories but two (maintenance and lack of variation in equipment) decreased in reported problems. Twenty-five (65.8%) chose maintenance as a problem and 14 (36.8%) reported a lack of variation in equipment. Eleven (28.9%) also reported a lack of use in teaching, though this was a decrease in the number of reports from the pre-test. Just as with the experimental group pre-tests, the control group reported problems in 11 of the 14 categories. The majority (32; 58.2%) reported a lack of use in teaching, 17 (30.9%) reported a lack of variation in equipment, 11 (20.0%) selected maintenance as a problem, 7 (12.7%) reported a lack of space, and 6 (10.9%) selected other problems (Table 4.14).

Parents SGI

Pre-test versus Post-test: T-tests for independent samples were used to examine whether there were significant differences between FHS parent pre-test scores and their post-test scores. Eight questions pertained to the internal scale pride, which had a Cronbach's reliability of 0.733 (an acceptable level for survey work) and a score range from 8 to 40 points. A higher pride score indicates more school pride. Eight questions pertained to the internal scale needs met. Its Cronbach's reliability was 0.738 (acceptable) and its total score ranged from 8 to 40 points. A higher score for this construct indicates that parents feel the schools' needs pertaining to the school grounds are being met. The next internal scale, benefits, had four questions and a reliability at 0.745 (acceptable). Total scores for this construct ranged from 4 to 20 points, with a higher score indicating that the school grounds were benefitting the school. Each of the three internal scales were combined for a total score, which was then treated as a fourth scale, "total." This scale

had a Cronbach's reliability at 0.803 (good) and a score range of 20 to 100 points. A higher total score indicates an overall positive perception of the school grounds.

The experimental group pre-and post-tests were compared using an independent samples t-test. When examining each of the constructs, the post-test scores were significantly higher than the pre-test scores in each of the four constructs: pride, needs met, benefits, and total (Table 4.15).

Pre-test versus Post-test by Grade: Independent samples t-tests were conducted with select cases to compare the pre-and post-tests based on the grade level each parents' child or children were in. Grades were grouped by elementary school (grades K through 6) middle school (grades 7 and 8) and high school (grades 9 through 12). Elementary school parents significantly increased in three of the four constructs: pride, needs met, and total. (Table 4.16). Middle school parent results were consistent with the overall results, with significant increases in each construct (Table 4.17). Finally, high school parents post-test findings were higher than the pre-test scores in pride, needs met, and total (Table 4.18).

Experimental versus Control: One-way analysis of variance tests were used to determine whether FHS parent school ground perceptions post-landscape project were significantly higher than DMS and LHS parent school ground perceptions (Table 4.19). The experimental group scored higher than the control group in needs met, benefits, and total score.

Experimental versus Control by Grade: The experimental and control group were then compared based on the grade level each parents' child or children were in. To accomplish this, one-way analysis of variance tests were conducted with select cases. As

the control group only contained middle and high school grade levels, experimental elementary parents were not included. Parents were grouped by middle school, which included grades 7 and 8 for FHS and grades 6 to 8 for DMS. While 6th grade DMS parents were included, FHS 6th grade parents were not because their child is grouped with the other elementary grades at FHS. This means the nature of the child's classes are very different from DMS 6th grade students, with no rotation to different class periods and more inclusion in elementary level activities. For both FHS and LHS, high school included grades 9 through 12. When examining middle school parents, the experimental group scored higher than the control group in two constructs, needs met and benefits (Table 4.20). When the high school experimental parent results were examined no significant differences were found (Table 4.21).

Students SGI

Pre-test versus Post-test: T-tests for independent samples were used to examine whether there were any significant differences between FHS student pre-test scores and their post-test scores. Seven questions pertained to the internal scale pride, which had a Cronbach's reliability of 0.708 (considered an appropriate level for survey work) and a score range from 7 to 35 points. A higher pride score indicates more school pride. Nine questions pertained to the internal scale needs met. Its Cronbach's reliability was 0.708 (acceptable) and its total score ranged from -7 to 34 points. A negative score was possible because one of the questions listed potential problems on the school grounds and asked participants to circle each of the problems. Each problem circled was counted as minus one point. A higher score for this construct indicates that students feel the schools needs pertaining to the school grounds are being met. The next internal scale, benefits, had

eight questions and a reliability at 0.766 (acceptable). Total scores for this construct ranged from 4 to 45 points, with a higher score indicating that the school grounds were benefitting the school. The final internal scale, use, was reliable at 0.761 (acceptable) and had three questions. Use scores ranged from 2 to 13 points, with a higher score indicating that the grounds are being used regularly for education and recreation. Each of the four internal scales were combined for a total score, which was then treated as a fifth scale, “total.” This scale had a Cronbach’s reliability at 0.756 (acceptable) and a score range of 6 to 127 points. A higher total score indicates an overall positive perception of the school grounds.

The experimental group pre-and post-tests were compared using an independent samples t-test. When examining each of the constructs, four of the five post-test scores were higher than the pre-test scores: pride, needs met, benefits and total (Table 4.23).

Pre-test versus Post-test by Grade: Independent samples t-tests were conducted with select cases to compare the pre-and post-tests based on the grade level of each student. Students were grouped by middle school (grades 7 and 8) and high school (grades 9 through 12). When examining both middle (Table 4.24) and high school students (Table 4.25), post-test findings were higher than the pre-test scores in the same four constructs as the overall group.

Pre-test versus Post-test School Ground Usefulness: Independent samples t-tests were conducted to compare the experimental group pre-test scores to their post-test scores for three questions relating to the school grounds usefulness. The three questions were: “how useful are your school grounds for learning school lessons?,” “how useful are your school grounds for sports/physical activity?,” and “how useful are your school

grounds as a place to play or hang out?.” These three questions fell under the benefits construct but were also analyzed separately as they were broad enough to stand-alone. Significant differences were found for each of the three questions with the post-test scores being higher than the pre-test scores in each instance (Table 4.26).

Experimental versus Control: One-way analysis of variance tests were used to determine whether FHS student school ground perceptions post-landscape project were significantly higher than DMS and LHS student school ground perceptions (Table 4.27). The experimental group scored higher than the control group in four of the five constructs: pride, needs met, benefits, and total score. These results were consistent with the pre-to-post-test results, where the experimental group scored significantly higher than the control group in each area but use.

Experimental versus Control by Grade: The experimental and control group were then compared based on the grade level of each student. To accomplish this, one-way analysis of variance tests were conducted with select cases. Students were grouped by middle school (grades 7 and 8) and high school (grades 9 through 12). When examining middle school students, the experimental group scored higher than the control group in pride and needs met (Table 4.28). High school student results were consistent with the overall group results, with significant differences in the same four constructs: pride, needs met, benefits, and total (Table 4.29).

Experimental versus Control School Ground Usefulness: One-way analysis of variance tests were conducted to compare the experimental group post-test scores to the control group post-test scores for three questions. The three questions were: “how useful are your school grounds for learning school lessons?,” “how useful are your school

grounds for sports/physical activity?,” and “how useful are your school grounds as a place to play or hang out?.” These three questions fell under the benefits construct but were also analyzed separately as they were broad enough to stand-alone. The experimental group scored higher than the control group for two of the questions (Table 4.30). The two questions pertained to the grounds usefulness as a place for learning school lessons and the grounds usefulness as a place to play.

Experimental versus Control by Class Participation: One-way analysis of variance tests were conducted to compare the experimental group post-test scores to the control group post-test scores based on whether control group students had taken a class offered at DMS during the 2010-11 school year. This class, titled the Exploratory Class, taught life skills to students, with each student working outside on a small landscape project for a portion of the school year. First, select cases were used to compare students who had taken the Exploratory Class to the entire experimental group. One-way analysis of variance tests were conducted and the experimental group scored higher than the control group in three of the five constructs: pride, needs met, and total score (Table 4.31). When examining use, the control group scored higher than the experimental group. Next, control students who had not taken the Exploratory Class were compared to the experimental group, with results consistent with the overall results. Differences were found in four of the areas: pride, needs met, benefits, and total score. For each of these differences, the experimental group scored higher than the control group (Table 4.32).

Sample Frequencies: Frequencies were run to poll opinions from several of the survey questions. Students were asked “do you think your school grounds are: much too small, too small, about the right size, too big, or much too big.” From the experimental

pre-test 4 students (6.8%) chose much too small, 7 (11.9%) chose too small, and the remaining 48 (81.3%) chose about the right size. Experimental group post-test results were similar, with 3 (5.2%) students choosing much too small, 6 (10.3%) choosing too small, and 49 (84.5%) choosing about the right size. Control group results were more varied, with 6 (2.7%) students choosing much too small, 46 (20.4%) choosing too small, 164 (72.9%) choosing about the right size, 7 (3.1%) choosing too large, and 2 (0.9%) choosing much too large (Table 4.34).

When asked, “which grades use the school grounds for learning most often?,” from the experimental group pre-tests the majority (45; 85.0%) said elementary school, 3 (5.7%) chose junior high, and 5 (9.3%) selected senior high. From the experimental post-tests, the majority (49; 86.0%) again chose elementary school, 5 (8.8%) chose junior high, and 3 (5.2%) chose senior high. When examining the control group answers, the choices were nearly split, with 120 (53.8%) choosing junior high and 103 (46.2%) choosing senior high (Table 4.35).

Students were also given a list of 12 curriculum areas and asked to identify which areas of the school grounds were being used to support learning. In the pre-test, 11 of the 12 curriculum areas were chosen by at least one person. The majority of the experimental group identified physical education (36; 63.2%), 23 (40.4%) identified environmental science, eight (14.0%) identified social studies, six (10.5%) selected art and design, and five (8.8%) chose math. In the experimental group post-tests, each of the 12 curriculum areas were chosen by at least one person, with 12 of the 14 categories increasing in number, while the other two remained the same. Thirty-seven (63.8%) reported the grounds were used for physical education, 25 (44.8%) chose environmental science, 10

(17.2%) each chose math as well as art and design, eight (13.8%) each selected social studies and personal social skills, and seven (12.1%) chose music education. Like the experimental group post-tests, each of the 12 categories were chosen by at least one student from the control group. The majority of the control group (152; 66.1%) chose physical education, 66 (28.7%) chose math, 64 (27.8%) chose environmental science, 58 (25.2%) chose social studies, and 44 (19.1%) chose language (Table 4.36).

Finally, students were given a list of 14 potential problems and asked to identify any problems they experience on their school grounds. From the experimental pre-tests at least one student identified a problem in 12 of the 14 categories. Twenty-five (42.4%) reported a lack of use in teaching, 17 (28.8%) reported a lack of variation in equipment, 14 (23.7%) selected poor quality sports fields, 12 (20.3%) each selected vandalism and lack of space, and 11 (18.6%) reported intrusion from others as a problem. Twelve of the 14 categories were chosen by at least one student when the experimental group took the post-test. All the categories but one decreased in reported problems. Twenty-two (37.3%) reported a lack of use in teaching as a problem, nine (15.3%) chose lack of space, seven (11.9%) each reported a lack of variation in equipment and bullying, six (10.2%) reported maintenance as a problem, and five (8.5%) each reported intrusion from others and poor quality sports fields as a problem. The control group reported problems in each of the 14 categories. Ninety-six (41.6%) reported problems with bullying, 64 (27.7%) each reported a lack of use in teaching and problems with theft. Thirty-eight (16.5%) students selected lack of variation in equipment as a problem, while 33 (14.3%) reported a lack of space, and 24 (10.4%) reported that accidents were a problem (Table 4.37).

Conclusions and Recommendations

Faculty SGI

Pre-test versus Post-test: The experimental group faculty pre-and post-tests were compared and the post-test scores were higher than the pre-test scores in four of the five constructs: pride, needs met, use, and total (Table 4.1). Next the faculty were examined by the grade level they teach. Findings when examining elementary faculty (Table 4.2) were consistent with the overall group findings, with post-scores being higher than pre-scores in the same four constructs. Middle (Table 4.3) and high school (Table 4.4) faculty experienced a significant score increase in three constructs: pride, needs met, and total. Plants and nature have been shown to provide many advantages, including improving people's perceptions of their environment. These improvements in perceptions may result in stress reduction (Bennett and Swasey, 1996; Kaplan et al., 1988; Kohlleppel et al., 2002), improved health (Doxon, 1996; Fjeld, 2000; Kaplan et al., 1988; Lohr and Pearson-Mims, 2000), increased employee morale, increased productivity, and reduced absenteeism (Doxon, 1996; Pearson-Mims and Lohr, 2000). These results likely have occurred because the experimental group faculty experienced the benefits of being around plants and nature in an improved school grounds environment. They also may have felt more valued as employees, as someone cared enough to invest in their school grounds.

The middle and high school faculty did not experience a significant increase in use from pre-to-post-test. This increase did occur for the elementary school faculty. Elementary school faculty have more flexibility in their day, whereas middle and high school faculty teach seven, 45 minutes periods each day. Less time with each class may

mean that once they've covered all the required material, middle and high school faculty have little time to complete outside activities. In the third part of this study, middle and high school faculty reported a high emphasis placed on testing, which made for less time to incorporate active learning, including projects outside.

Benefits was the only construct that across all faculty levels experienced no increase. While the faculty did increase in the other constructs, this construct examined benefits offered by the grounds, especially the educational benefits offered. In part three of this study many faculty, including elementary, discussed the increased emphasis on testing and said this often took away from time to incorporate active learning. Perhaps the faculty did not report an increase in benefits as they felt they didn't have the time to utilize the grounds as much for education as they would like.

Finally, the experimental group pre-test scores were compared to their post-test scores for three questions relating to the school grounds usefulness. The three questions were: "how useful are your school grounds as a curriculum learning resource?," "how useful are your school grounds as a resource for sports/physical activity?," and "how useful are your school grounds as a play resource?." Significant differences were found for each of the three questions with the post-test scores being higher than the pre-test scores in each instance (Table 4.5). From the faculty perspective the improvements made to the school grounds have aided in the grounds being useful for learning, sports, and recreation. These findings are interesting, considering faculty responses did not increase in benefits, the construct these three questions fell under. The findings may support the hypothesis that, while the faculty value the grounds, they are not experiencing the benefits of them because of a lack of time to spend on active learning. One way to

improve a school climate is to include hands-on activities and a favorable environment (Kentz and Orman, 1998; Mitchell et al., 2010). School gardens can provide such an environment. In improving the school grounds and providing a school garden, the perceptions of the grounds improved. As school ground perceptions improved, faculty valued the grounds more for each of these areas.

Experimental versus Control: When comparing the experimental and control groups, the experimental group scored higher than the control group in two constructs, pride and total (Table 4.6). Following examination of the overall group, the experimental and control groups were then compared based on the grade level they taught. When examining middle school faculty only, significant differences were found in two additional constructs, needs met and benefits (Table 4.7). High school experimental faculty results were consistent with the overall group results, with significant differences in two of the five constructs, pride and total (Table 4.8). A favorable environment may improve perceptions of an environment and improved perceptions may lead to pride in the environment (Kentz and Orman, 1998; Mitchell et al., 2010). Plants and nature have been shown to provide many benefits such as increased employee morale and reduced absenteeism (Adachi et al., 2000; Doxon, 1996; Kaplan et al., 1988; Pearson-Mims and Lohr, 2000). The experimental group may have scored higher than the control group in these two areas because of their increased exposure to nature and the improvements made to their school grounds. Even viewing plants or nature has been found to reduce stress and increase positive feelings (Hartig et al., 2010; Ulrich, 1981). The faculty at FHS may have benefitted from, not only their involvement in the landscape project, but also from the improved view out their classroom window.

Finally, the experimental group post-test scores were compared to the control group post-test scores for three questions. The three questions were: “how useful are your school grounds as a curriculum learning resource?,” “how useful are your school grounds as a resource for sports/physical activity?,” and “how useful are your school grounds as a play resource?.” The experimental group scored higher than the control group for the questions pertaining to the grounds usefulness as a curriculum learning resource and as a play source (Table 4.9). One way to improve a school climate is to include hands-on activities and a favorable environment (Kentz and Orman, 1998; Mitchell et al., 2010). School gardens may provide such an environment. In improving the school grounds and providing a school garden, the perceptions of the grounds improved. As school ground perceptions improved, faculty may have viewed the grounds as more useful for each of these areas.

Sample Frequencies: Faculty were asked “relative to your school enrollment, do you think your school grounds are: much too small, too small, about the right size, too large, or much too large.” From pre-test to post-test there was a 38% drop in the number of faculty that reported the grounds were too small and a very small increase in the faculty that said it was too large (Table 4.11). The increase in the number of faculty being satisfied about the school ground size may have resulted from a better use of the school grounds and an improvement in grounds appearance as well. The faculty who reported the grounds were now too large may have done so because of the increased maintenance required by the newly installed landscape. The control group results were similar to the experimental post-test results, with most faculty reporting that the grounds were about the right size.

When asked, “which students make the most use of the play areas of your school grounds for learning?,” for both the pre-and post-test, the majority of the experimental group said elementary school (Table 4.12). It is important to note, however, that from pre-test to post-test 11% more faculty reported that elementary used the grounds most. This may have occurred because use of the grounds increased overall and, as the elementary grades have more flexibility in their lessons and more time in the same classroom each day, they may have increased in use of the grounds the most. When examining the control group answers, the choices were more scattered, with the majority choosing either elementary school or junior high. These results may have been different from the experimental group as only middle and high school faculty were surveyed. Faculty may have been less inclined to choose elementary school since the elementary grades are not directly affiliated with their school.

Faculty members were also given a list of 12 curriculum areas and asked to identify which areas of the school grounds were being used to support learning (Table 4.13). In the pre-test, eight of the 12 curriculum areas were chosen by at least one person. More curriculum areas were reported when the experimental group took the post-test, with at least one person choosing 11 of the 12 categories and increases being experienced in each of those 11 categories. With so many increases, some of which were sizeable, it can be concluded that the experimental group is using their grounds more for education since the project was implemented. Finally, like the experimental group post-tests, at least one faculty member from the control group chose 11 of the 12 categories. Of note, is the fact that among all the groups, physical education was the most reported, followed by personal social skills and environmental science, which split second and third place.

Lastly, faculty members were given a list of 14 potential problems and asked to identify any problems they experience on their school grounds (Table 4.14). From the experimental pre-tests at least one faculty member identified a problem in 11 of the 14 categories. Half of the 14 categories were chosen by at least one faculty member when the experimental group took the post-test. All the categories but two, maintenance and lack of variation in equipment, decreased in reported problems. As the school grounds were being improved, over 250 shrubs and perennials, and 150 trees were installed. These two categories may have increased because of an increased need for maintenance and the equipment required for maintenance. As with the experimental group pre-tests, the control group reported problems in 11 of the 14 categories. It is also important to note that among all three groups, lack of use in teaching, maintenance, and lack of variation in equipment, were in the top three chosen each time.

These results are important because a faculty member's perception of their work environment can contribute to their work performance and attitudes, potentially affecting student perceptions of their school environment (Mitchell et al., 2010). The significant increase in pride among the experimental group faculty may play an especially important role in a positive perception of the school, encouraging students to view it positively as well.

Parents SGI

Pre-test versus Post-test: When examining each of the constructs, the parent post-test scores were significantly higher than the pre-test scores in each of the four constructs: pride, needs met, benefits, and total (Table 4.15). After examination of the entire group, the experimental and control group were compared based on the grade level

each parents child or children were in. When examining elementary school parents, post-scores were higher than pre-scores in three of the constructs: pride, needs met, and total (Table 4.16). When examining middle school parents, post-test findings were higher than the pre-test scores in each of the four constructs (Table 4.17). Finally, high school parents significantly increased in pride, needs met, and total (Table 4.18). Contact with nature, even images of nature, has been found advantageous for people (Adachi et al., 2000). Additionally, viewing plants or nature has been found to reduce stress and increase positive feelings (Hartig et al., 2010; Ulrich, 1981). As parents of FHS students saw the campus improving, their perceptions of the school environment may have improved, thereby offering them some of the many advantages people experience when their perceptions of their environment improve.

Experimental versus Control: When comparing the experimental and control group, the experimental group scored higher than the control group in three of the four constructs: needs met, benefits, and total score (Table 4.19). The experimental and control group were then compared based on the grade level each parents child or children were in. When examining middle school parents, the experimental group scored higher than the control group in two constructs, needs met and benefits (Table 4.20). The high school experimental parent results yielded no significant differences (Table 4.21). The results when examining the overall group support previous studies that claim that when people's perceptions of their environment improve, they receive many benefits (Bennett and Swasey, 1996; Fjeld, 2000; Kohlleppe et al., 2002; Lohr and Pearson-Mims, 2000; Pearson-Mims and Lohr, 2000; Snelgrove et al., 2004). Once the experimental groups perception of their school grounds had improved, they were more satisfied than their

control group counterparts that, as far as the school grounds were concerned, their child's needs were being met and their child was benefitting from the school grounds. Though the experimental group significantly increased in pride from pre-test to post-test, they did not score significantly higher than the control group in this construct. This indicates that the control group has more pride in their school grounds than the experimental group did before the landscape project and that the experimental group has come a long way. When examining the grade levels, the high school group yielded no significant differences between the control and experimental group. These results occurred because FHS high school parent scores were lower than FHS middle school parent results, with the lower high school scores causing no significant differences between the high school experimental and control group. FHS high school parents may have scored lower because the high school classes offer less flexibility with their schedule, thereby preventing the high school students from using the school grounds as much as the other grade levels.

These overall results are encouraging, as parent perceptions of a school can also affect their child's perception. As parents view a school in a positive light they tend to be more involved (Wilson, 2004). Parent involvement is considered a key factor in a child's success in school (Epstein et al., 1997; Henderson et al., 1986; Hill and Tyson, 2009; Lindstrom, 1997), with children of involved parents benefitting both academically and psychologically (Henderson et al., 1986; Hill and Tyson, 2009; Lindstrom, 1997; Smith et al., 2011).

Students SGI

Pre-test versus Post-test: When comparing the experimental group pre- and post-tests, four of the five post-test scores were higher than the pre-test scores: pride,

needs met, benefits, and total (Table 4.23). The students' pre-and post-test scores were then compared based on grade level. When examining middle (Table 4.24) and high school students (Table 4.25), post-test findings were again higher than the pre-test scores in the same four constructs. These results support previous literature that claims that plants on a school campus improve perceptions of schools. One such study, conducted in 2001 at a Texas school found that females participating in garden activities had significantly more positive attitudes toward school post-project (Waliczek et al., 2001). It appears that no matter the grade, the improvements made to Fayetteville's campus have improved students' perceptions of the school grounds in multiple areas. One area that yielded no significant results in either of the age groups was the use construct. From pre-to-post-test, the reported use of the school grounds changed very little. These results are interesting, considering that faculty reported an increase in use but not benefits, while with students it was the opposite. However, use results are consistent when grade-level is considered, where elementary school faculty reported a significant increase in use of the grounds and middle and high school faculty reported an increase in use, but not a significant one. The student results support that while the improvements to the grounds have benefitted the middle and high school grades, their use of the grounds has not increased. This may be explained by less flexibility with school lessons and a high emphasis on testing scores. It may also be explained by the class period schedule, where each teacher has a class for only 45 minutes at a time, affording fewer opportunities to leave the classroom for less traditional forms of instruction.

The experimental group pre-test scores were then compared to their post-test scores for three questions relating to the school grounds usefulness. The three questions

were: “how useful are your school grounds for learning school lessons?,” “how useful are your school grounds for sports/physical activity?,” and “how useful are your school grounds as a place to play or hang out?.” Significant differences were found for each of the three questions with the post-test scores being higher than the pre-test scores in each instance (Table 4.26). It is interesting that the students report the grounds as useful for learning, sports, and play, considering they did not report using the grounds more often. Before the middle and high school grades can make better use of this valued resource, their inflexible schedule must be addressed.

Experimental versus Control: The experimental and control groups were then compared, and the experimental group scored higher than the control group in four of the five constructs: pride, needs met, benefits, and total score (Table 4.27). The experimental and control group were then compared based on the grade level of each student. When examining middle school students, the experimental group scored higher than the control group in pride and needs met (Table 4.28). High school student results were consistent with the overall group results, with significant differences in the same four constructs: pride, needs met, benefits, and total score (Table 4.29). Of the many benefits plants offer, one is improving people’s perceptions of their environment (Hartig et al., 2010; Ulrich, 1981). The students at FHS improved in their perceptions of their school grounds, thereby making their perceptions significantly higher than the control group. The middle school results may have occurred because of a class offered to the control group middle school students. This class, which focused on teaching students life skills, offered students the chance to work on both planning and implementing a small landscape project at DMS. When these students were compared to the experimental group, less significant

differences were found. However, when these students were taken out of the analyses, the results were consistent with the overall results. This analysis will be discussed in further detail shortly.

The experimental group post-test scores were then compared to the control group post-test scores for three questions. The three questions were: “how useful are your school grounds for learning school lessons?,” “how useful are your school grounds for sports/physical activity?,” and “how useful are your school grounds as a place to play or hang out?.” The experimental group scored higher than the control group for two of the questions (Table 4.30). These two questions pertained to the grounds usefulness as a place for learning school lessons and as a place to play. These results indicate that FHS views its grounds as more beneficial than the control group for school lessons and for recreation. The similarity between the two groups in terms of the grounds being useful for sports are consistent with the faculty results as well. It appears that the control group values their grounds as a sports resource, while the experimental group values it more now than they did before the landscape project.

Finally, the experimental and control group post-test scores were compared based on whether control group students had taken a class offered at DMS during the 2010-11 school year. This class, titled the Exploratory Class, taught life skills to students, with each student working outside on a small landscape project for a portion of the school year. First, students who had taken the Exploratory Class were compared to the entire experimental group, with significant differences found in four of the five constructs (Table 4.31). For three of those significant differences, pride, needs met, and total score, the experimental group scored higher than the control group. When examining use, the

control group scored higher than the experimental group. Next, control students who had not taken the Exploratory Class were compared to the experimental group, with results consistent with the overall results. The experimental group scored significantly higher than the control group in four of the areas, pride, needs met, benefits, and total score (Table 4.32). The results when comparing the experimental group to the Exploratory Class participants indicate that the Exploratory Class participants used their grounds more than the experimental group and that they received benefits from their use of the grounds. They may have used their grounds more because the class was specifically developed with plans to incorporate working on the school grounds into lessons. While the experimental group has opportunities to incorporate the school grounds into their lessons, they have no classes specifically designed with this objective in mind. While the control group did not score higher than the experimental group in the benefits construct, the results, which otherwise have been significant in the experimental groups favor, were more similar with these two groups. Numerous studies have discovered the advantages of spending time outside and time working with plants. These results, along with the rest of the results of this study, support those findings (Adachi et al., 2000; Bennett and Swasey, 1996; Doxon, 1996; Kaplan et al., 1988; Kohlleppe et al., 2002; Pearson-Mims and Lohr, 2000; Waliczek et al., 2001)

Sample Frequencies: Frequencies were run to poll opinions from several of the survey questions. Students were asked “do you think your school grounds are: much too small, too small, about the right size, too big, or much too big.” When examining the experimental group pre-and post-tests the vast majority were satisfied with the school ground size. From pre-to-post-test there was little change in numbers, with the changes

that did occur being a switch to the grounds being about the right size. The control group offered more variety in their selection with the majority reporting the grounds were about the right size and most of the other answers reporting that the grounds were too small (Table 4.34).

When asked, “which grades use the school grounds for learning most often?,” the experimental group results were consistent with the faculty results, which also indicated that the elementary grades used the grounds for learning most often (Table 4.35). As has been previously speculated, this may be the case because the younger grades have more flexibility in their class schedules. The control group, though they had no elementary grade level to choose, did report the younger grade level, junior high, as using the grounds most often. This may have to do with the Exploratory Class using the grounds often, or with the younger grades having more flexibility with their schedule.

Students were also given a list of 12 curriculum areas and asked to identify which areas of the school grounds were being used to support learning. In the pre-test, 11 of the 12 curriculum areas were chosen by at least one person. In the experimental group post-tests, each of the 12 curriculum areas were chosen by at least one person, with 10 of the 12 categories increasing in number, while the other two remained the same. Like the experimental group post-tests, each of the 12 categories were chosen by at least one student from the control group (Table 4.36). Across all three groups, physical education and environmental science were in the top three reported each time. The increase from pre-to-post-test in ten of the categories, with the other two categories remaining the same indicates that the use of the grounds for teaching subjects did increase once the landscape project was implemented. This is an interesting find, considering that no significant

differences were found in the use construct when comparing pre-to-post-test or experimental to control group.

Finally, students were given a list of 14 potential problems and asked to identify any problems they experience on their school grounds. From the experimental pre-tests at least one student identified a problem in 12 of the 14 categories. Twelve of the 14 categories were again chosen by at least one student when the experimental group completed the post-test, though all the categories but one decreased in reported problems. Finally, the control group reported problems in each of the 14 categories (Table 4.37). Of note, is the fact that lack of use in teaching and lack of variation in equipment were reported in the top three problems with each group. It is also important to note that the experimental group reported less problems in the post-test in 13 of the 14 categories. It appears that many perceived problems with the school grounds were improved once the landscape project was implemented.

These results are very encouraging, as it has been demonstrated that when students perceive their school environment in a positive light they exhibit higher self esteem, lower delinquency rates, and better academic performance (Kuperminc et al., 2001, Wilson, 2004). One advantage that was experienced across each of the groups was an increase in pride in the school grounds. This is a great benefit, as increased pride in the school grounds may lead to improved attitudes towards school. When children's attitudes towards school improve, their academic achievement improves as well (Waliczek et al., 2003). Additionally, students attending schools that offer more individual time in the garden demonstrate more positive attitudes towards school (Waliczek et al., 2001). The improvements of the experimental students perceptions of the FHS grounds may offer

them many more benefits, such as increased interest in school and improved grades (Lekies et al., 2006; Waliczek et al., 2003).

Attitudes towards school tend to be more negative in older children rather than elementary school children. While elementary school children tend to have more positive attitudes toward science, middle and high-school students tend to consider it boring (Bennett and Hogarth, 2009; Yager and Yager, 1985). Lekies et al. (2006) found that high-school age children involved in garden design and educational program planning reported their involvement as “fun” and “educational.” Involving youth in the designing of educational programs for younger children, as well as the teaching of some of those programs, may improve older student’s attitudes towards school, while at the same time educating and engaging them. The students at FHS, as well as any other school with a garden, will likely benefit if offered more time in the garden, especially in teaching the younger students lessons in the garden. While many benefits have been received thus far, more inclusion in the project may lead to additional benefits.

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Table 4.1. Independent samples t-test comparing the entire experimental group (K-12 Fayetteville High School [FHS]^z faculty) pre-test School Grounds Inventory (SGI)^y scores to their post-test scores.

SGI Scale	Test Variable	N	Mean Score	SD	Mean Difference	df	T ^x	P
Pride Total ^w	Pre	33	30.12	3.489	-6.800	69	-9.470	0.000**
	Post	38	36.92	2.540				
Needs Total ^v	Pre	33	22.18	4.792	-6.817	69	-6.090	0.000**
	Post	38	28.37	3.759				
Benefits Total ^u	Pre	33	15.58	2.332	-0.398	69	-0.785	0.435
	Post	38	15.97	1.938				
Use Total ^t	Pre	33	7.21	3.814	-2.814	69	-2.785	0.007**
	Post	38	10.03	4.588				
Total ^s	Pre	33	75.09	8.240	-16.199	69	-8.748	0.000**
	Post	38	91.29	7.363				

^zFHS, located in Talladega County, AL.

^yThe SGI is a survey that was given to faculty members. Four internal scales were utilized: pride, needs met, benefits, and use. Also asked, were one qualitative question and three demographics questions.

^xT-scores are standard scores which use standard deviation units to express an individual's performance relative to the groups' performance.

^wTotal scores range from 8-40 points.

** *P* less than or equal to 0.01.

^vTotal scores range from -6-41 points.

^uTotal scores range from 4-44 points.

^tTotal scores range from 3-19 points.

^sTotal scores range from 9-144 points.

Table 4.2. Independent samples t-test comparing the experimental group (Fayetteville High School [FHS]^z faculty) elementary school teachers (K-6th grade) pre-test School Grounds Inventory (SGI)^y scores to their post-test scores.

SGI Scale	Test Variable	N	Mean Score	SD	Mean Difference	df	T ^x	P
Pride Total ^w	Pre	25	30.52	3.417	-6.369	50	-7.446	0.000**
	Post	27	36.89	3.736				
Needs Total ^v	Pre	25	22.48	4.788	-5.816	50	-5.101	0.000**
	Post	27	28.30	3.361				
Benefits Total ^u	Pre	25	15.72	2.458	-0.095	50	-0.155	0.878
	Post	27	15.81	1.942				
Use Total ^t	Pre	25	7.80	3.819	-3.311	50	-2.865	0.006**
	Post	27	11.11	4.458				
Total ^s	Pre	25	76.52	7.757	-15.591	50	-7.753	0.000**
	Post	27	92.11	6.739				

^zFHS, located in Talladega County, AL.

^yThe SGI is a survey that was given to faculty members. Four internal scales were utilized: pride, needs met, benefits, and use. Also asked, were one qualitative question and three demographics questions.

^xT-scores are standard scores which use standard deviation units to express an individual's performance relative to the groups' performance.

^wTotal scores range from 8-40 points.

** *P* less than or equal to 0.01.

^vTotal scores range from -6-41 points.

^uTotal scores range from 4-44 points.

^tTotal scores range from 3-19 points.

^sTotal scores range from 9-144 points.

Table 4.3. Independent samples t-test comparing the experimental group (Fayetteville High School [FHS]^z faculty) middle school teachers (7th-8th grade) pre-test School Grounds Inventory (SGI)^y scores to their post-test scores.

SGI Scale	Test Variable	N	Mean Score	SD	Mean Difference	df	T ^x	P
Pride Total ^w	Pre	13	31.15	3.955	-6.392	22	-4.739	0.000**
	Post	11	37.55	2.252				
Needs Total ^v	Pre	13	22.92	6.474	-5.986	22	-2.473	0.022*
	Post	11	28.91	5.147				
Benefits Total ^u	Pre	13	15.62	2.468	-1.112	22	-1.333	0.196
	Post	11	16.73	1.348				
Use Total ^t	Pre	13	6.23	3.745	-2.497	22	-1.368	0.185
	Post	11	8.73	5.179				
Total ^s	Pre	13	75.92	10.251	-15.986	22	-4.009	0.001**
	Post	11	91.91	9.071				

^zFHS, located in Talladega County, AL.

^yThe SGI is a survey that was given to faculty members. Four internal scales were utilized: pride, needs met, benefits, and use. Also asked, were one qualitative question and three demographics questions.

^xT-scores are standard scores which use standard deviation units to express an individual's performance relative to the groups' performance.

^wTotal scores range from 8-40 points.

***P* less than or equal to 0.01.

^vTotal scores range from -6-41 points.

**P* less than or equal to 0.05.

^uTotal scores range from 4-44 points.

^tTotal scores range from 3-19 points.

^sTotal scores range from 9-144 points.

Table 4.4. Independent samples t-test comparing the experimental group (Fayetteville High School [FHS]^z faculty) high school teachers (9th-12th grade) pre-test School Grounds Inventory (SGI^y) scores to their post-test scores.

SGI Scale	Test Variable	N	Mean Score	SD	Mean Difference	df	T ^x	P
Pride Total ^w	Pre	15	31.20	3.688	-6.189	31	-6.081	0.000**
	Post	18	37.39	2.090				
Needs Total ^v	Pre	15	22.80	6.002	-6.311	31	-3.540	0.001**
	Post	18	29.11	4.213				
Benefits Total ^u	Pre	15	15.67	2.289	-0.833	31	-1.233	0.227
	Post	18	16.50	1.581				
Use Total ^t	Pre	15	6.00	3.566	-1.667	31	-1.157	0.256
	Post	18	7.67	4.524				
Total ^s	Pre	15	75.67	9.544	-15.000	31	-5.008	0.000**
	Post	18	90.67	7.670				

^zFHS, located in Talladega County, AL.

^yThe SGI is a survey that was given to faculty members. Four internal scales were utilized: pride, needs met, benefits, and use. Also asked, were one qualitative question and three demographics questions.

^xT-scores are standard scores which use standard deviation units to express an individual's performance relative to the groups' performance.

^wTotal scores range from 8-40 points.

** *P* less than or equal to 0.01.

^vTotal scores range from -6-41 points.

^uTotal scores range from 4-44 points.

^tTotal scores range from 3-19 points.

^sTotal scores range from 9-144 points.

Table 4.5. Independent samples t-test comparing the entire experimental group (K-12 Fayetteville High School [FHS]² faculty) pre-test answers to their post-test answers for 3 questions: “How useful are your school grounds as a...”

Question	Test Variable	N	Mean Score	SD	Mean Difference	df	T ^y	P
...curriculum learning resource ^x	Pre	32	0.94	0.619	-1.484	68	-8.150	0.000**
	Post	38	2.42	0.858				
...resource for sports/physical activity ^x	Pre	32	2.16	1.221	-0.949	68	-4.021	0.000**
	Post	38	3.11	0.727				
...play resource ^x	Pre	32	1.59	1.043	-1.090	68	-4.924	0.000**
	Post	38	2.68	0.809				

²FHS, located in Talladega County, AL.

^yT-scores are standard scores which use standard deviation units to express an individual’s performance relative to the groups’ performance.

** *P* less than or equal to 0.01.

^xTotal scores range from 0-4 points.

Table 4.6. One-way analyses of variance tests comparing the entire experimental group (K-12 Fayetteville High School [FHS]^z faculty) post-test School Grounds Inventory (SGI)^y scores to the entire control group (K-12 Drew Middle School [DMS]^z & Lincoln High School [LHS]^z faculty) post-test SGI scores.

SGI Scale	Treatment	N	Mean Score	SD	Mean Difference	df	F ^x	P
Pride Total ^w	Experimental	38	36.92	2.540	5.94	91	82.186	0.000**
	Control	55	30.98	3.440				
Needs Total ^v	Experimental	38	28.37	3.759	1.39	91	2.173	0.144
	Control	55	26.98	4.882				
Benefits Total ^u	Experimental	38	15.97	1.938	0.48	91	1.391	0.241
	Control	55	15.49	1.942				
Use Total ^t	Experimental	38	10.03	4.588	1.14	91	1.145	0.287
	Control	55	8.89	5.311				
Total ^s	Experimental	38	91.29	7.363	8.94	91	25.681	0.000**
	Control	55	82.35	8.990				

^zFHS, DMS, and LHS are all located in Talladega County, AL.

^yThe SGI is a survey that was given to faculty members. Four internal scales were utilized: pride, needs met, benefits, and use. Also asked, were one qualitative question and three demographics questions.

^xF-scores are standard scores which use standard deviation units to express an individual's performance relative to the groups' performance.

^wTotal scores range from 8-40 points.

** *P* less than or equal to 0.01.

^vTotal scores range from -6-41 points.

^uTotal scores range from 4-44 points.

^tTotal scores range from 3-19 points.

^sTotal scores range from 9-144 points.

Table 4.7. One-way analyses of variance tests comparing the experimental group (Fayetteville High School [FHS]^z faculty) middle school teachers (7th-8th grade) post-test School Grounds Inventory (SGI)^y scores to the control group (Drew Middle School [DMS]^z & Lincoln High School [LHS]^z faculty) middle school teachers (6th-8th grade) post-test SGI^y scores.

SGI Scale	Treatment	N	Mean Score	SD	Mean Difference	df	F ^x	P
Pride Total ^w	Experimental	11	37.55	2.252	7.51	35	46.245	0.000**
	Control	26	30.04	3.340				
Needs Total ^v	Experimental	11	28.91	5.147	3.95	35	5.167	0.029*
	Control	26	24.96	4.695				
Benefits Total ^u	Experimental	11	16.73	1.348	1.46	35	5.360	0.027*
	Control	26	15.27	1.888				
Use Total ^t	Experimental	11	8.73	5.179	-0.81	35	0.191	0.665
	Control	26	9.54	5.155				
Total ^s	Experimental	11	91.91	9.071	12.10	35	16.298	0.000*
	Control	26	79.81	8.020				

^zFHS, DMS, and LHS are all located in Talladega County, AL.

^yThe SGI is a survey that was given to faculty members. Four internal scales were utilized: pride, needs met, benefits, and use. Also asked, were one qualitative question and three demographics questions.

^xF-scores are standard scores which use standard deviation units to express an individual's performance relative to the groups' performance.

^wTotal scores range from 8-40 points.

***P* less than or equal to 0.01.

^vTotal scores range from -6-41 points.

**P* less than or equal to 0.05.

^uTotal scores range from 4-44 points.

^tTotal scores range from 3-19 points.

^sTotal scores range from 9-144 points.

Table 4.8. One-way analyses of variance tests comparing the experimental group (Fayetteville High School [FHS]^z faculty) high school teachers (9th-12th grade) post-test School Grounds Inventory (SGI)^y scores to the control group (Drew Middle School [DMS]^z & Lincoln High School [LHS]^z faculty) high school teachers (9th-12th grade) post-test SGI^y scores.

SGI Scale	Treatment	N	Mean Score	SD	Mean Difference	df	F ^x	P
Pride Total ^w	Experimental	18	37.39	2.090	5.97	49	41.578	0.000**
	Control	33	31.42	3.597				
Needs Total ^v	Experimental	18	29.11	4.213	0.84	49	0.411	0.525
	Control	33	28.27	4.591				
Benefits Total ^u	Experimental	18	16.50	1.581	0.74	49	1.802	0.186
	Control	33	15.76	2.031				
Use Total ^t	Experimental	18	7.67	4.524	-1.72	49	1.132	0.293
	Control	33	9.39	6.010				
Total ^s	Experimental	18	90.67	7.670	5.82	49	5.357	0.025*
	Control	33	84.85	9.025				

^zFHS, DMS, and LHS are all located in Talladega County, AL.

^yThe SGI is a survey that was given to faculty members. Four internal scales were utilized: pride, needs met, benefits, and use. Also asked, were one qualitative question and three demographics questions.

^xF-scores are standard scores which use standard deviation units to express an individual's performance relative to the groups' performance.

^wTotal scores range from 8-40 points.

***P* less than or equal to 0.01.

^vTotal scores range from -6-41 points.

**P* less than or equal to 0.05.

^uTotal scores range from 4-44 points.

^tTotal scores range from 3-19 points.

^sTotal scores range from 9-144 points.

Table 4.9. One-way analyses of variance tests comparing the entire experimental group (K-12 Fayetteville High School [FHS]^z faculty) post-test answers to the entire control group (K-12 Drew Middle School [DMS]^z & Lincoln High School [LHS]^z faculty) post-test answers for 3 questions: “How useful are your school grounds as a...”

SGI Scale	Treatment	N	Mean Score	SD	Mean Difference	df	F ^y	P																					
...curriculum learning resource ^x	Experimental	38	2.42	0.858	0.93	91	15.656	0.000**																					
	Control	55	1.49	1.260					...resource for sports/physical activity ^x	Experimental	38	3.11	0.727	0.34	91	3.811	0.054	Control	55	2.77	0.847	...play resource ^x	Experimental	38	2.68	0.809	0.90	91	15.336
...resource for sports/physical activity ^x	Experimental	38	3.11	0.727	0.34	91	3.811	0.054																					
	Control	55	2.77	0.847					...play resource ^x	Experimental	38	2.68	0.809	0.90	91	15.336	0.000**	Control	55	1.78	1.254								
...play resource ^x	Experimental	38	2.68	0.809	0.90	91	15.336	0.000**																					
	Control	55	1.78	1.254																									

^zFHS, DMS, and LHS are all located in Talladega County, AL.

^yF-scores are standard scores which use standard deviation units to express an individual's performance relative to the groups' performance.

***P* less than or equal to 0.01.

^xTotal scores range from 0-4 points.

Table 4.10. Sample demographics of the experimental group (Fayetteville High School [FHS]^z faculty) and the control group (Drew Middle School [DMS]^z and Lincoln High School [LHS]^z faculty): “What grade or subject/s do you teach?”

Treatment	Test Variable	Grade Taught	N	Percentages
Experimental	Pre	K-6	25	47.2
		7-8	13	24.5
		9-12	15	28.3
Total			53 ^y	100.0
Experimental	Post	K-6	27	48.2
		7-8	11	19.6
		9-12	18	32.2
Total			56 ^x	100.0
Control	Post	6-8	26	44.1
		9-12	33	55.9
Total			59 ^w	100.0

^zFHS, DMS, and LHS are all located in Talladega County, AL.

^yTotal numbers represent more than total faculty as some faculty members work with more than one age group. Total faculty=33.

^xTotal numbers represent more than total faculty as some faculty members work with more than one age group. Total faculty=38.

^wTotal numbers represent more than total faculty as some faculty members work with more than one age group. Total faculty=55.

Table 4.11. Sample frequencies of the experimental group (Fayetteville High School [FHS]² faculty) and the control group (Drew Middle School [DMS]² and Lincoln High School [LHS]² faculty) when asked: “Relative to your school enrollment, do you think your school grounds are....”

Treatment	Test Variable	Ground Size	N	Percentages
Experimental	Pre	Much too small	2	6.3
		Too small	11	34.3
		About the right size	19	59.4
		Too large	0	0.0
		Much too large	0	0.0
Total			32	100.0
Experimental	Post	Much too small	0	0.0
		Too small	1	2.6
		About the right size	35	92.1
		Too large	2	5.3
		Much too large	0	0.0
Total			38	100.0
Control	Post	Much too small	1	1.8
		Too small	8	14.5
		About the right size	45	81.9
		Too large	1	1.8
		Much too large	0	0.0
Total			55	100.0

²FHS, DMS, and LHS are all located in Talladega County, AL.

Table 4.12. Sample frequencies of the experimental group (Fayetteville High School [FHS]^z faculty) and the control group (Drew Middle School [DMS]^z and Lincoln High School [LHS]^z faculty): “Which students make most use of the play areas of your school grounds in learning?”

Treatment	Test Variable	Grade Usage	N	Percentages
Experimental	Pre	Elementary School	23	74.2
		Junior High	1	3.2
		Senior High	1	3.2
		Elementary and Junior	3	9.7
		Junior and Senior	2	6.5
		All Grades	1	3.2
Total			31	100.0
Experimental	Post	Elementary School	30	85.7
		Junior High	1	2.9
		Senior High	0	0.0
		Elementary and Junior	4	11.4
		Junior and Senior	0	0.0
		All Grades	0	0.0
Total			35	100.0
Control	Post	Elementary School	14	26.9
		Junior High	23	44.3
		Senior High	10	19.2
		Elementary and Junior	4	7.7
		Junior and Senior	1	1.9
		All Grades	0	0.0
Total			52	100.0

^zFHS, DMS, and LHS are all located in Talladega County, AL.

Table 4.13. Sample frequencies of the experimental group (Fayetteville High School [FHS]^z faculty) and the control group (Drew Middle School [DMS]^z and Lincoln High School [LHS]^z faculty): “Are your school grounds being used to support learning in these curriculum areas?”

Grounds Used For:	Pre- Experimental	Post- Experimental	Post-Control
Moral Education	2 (6.2%)	9 (23.7%)	4 (7.3%)
Personal Social Skills	5 (15.6%)	21 (55.3%)	11 (20.0%)
Environmental Science	3 (9.4%)	29 (76.3%)	27 (49.1%)
Social Studies	0 (0.0%)	4 (10.5%)	5 (9.1%)
Technology	0 (0.0%)	1 (2.6%)	2 (3.6%)
Math	1 (3.1%)	4 (10.5%)	4 (7.3%)
Language	1 (3.1%)	3 (7.9%)	0 (0.0%)
Drama	0 (0.0%)	0 (0.0%)	2 (3.6%)
Art and Design	1 (3.1%)	12 (31.6%)	3 (5.5%)
Music Education	1 (3.1%)	2 (5.3%)	7 (12.7%)
Physical Education	21 (65.6%)	31 (81.6%)	41 (74.5%)
Other	0 (0.0%)	1 (2.6%)	4 (7.3%)

^zFHS, DMS, and LHS are all located in Talladega County, AL.

Table 4.14. Sample frequencies of the experimental group (Fayetteville High School [FHS]^z faculty) and the control group (Drew Middle School [DMS]^z and Lincoln High School [LHS]^z faculty): “Which of the following do you see as problems within your school grounds?”

Grounds Used For:	Pre- Experimental	Post- Experimental	Post-Control
Vandalism	3 (9.4%)	1 (2.6%)	4 (7.4%)
Arson	0 (0.0%)	0 (0.0%)	0 (0.0%)
Lack of use in teaching	13 (40.6%)	11 (28.9%)	32 (58.2%)
Maintenance	9 (28.1%)	25 (65.8%)	11 (20.0%)
Lack of variation in equipment	13 (40.6%)	14 (36.8%)	17 (30.9%)
Noise	0 (0.0%)	0 (0.0%)	4 (7.3%)
Lack of supervision	3 (9.4%)	0 (0.0%)	0 (0.0%)
Bullying	2 (6.3%)	0 (0.0%)	2 (3.6%)
Accidents	1 (3.2%)	0 (0.0%)	0 (0.0%)
Theft	0 (0.0%)	0 (0.0%)	3 (5.5%)
Lack of space	6 (18.8%)	0 (0.0%)	7 (12.7%)
Intrusion from others	4 (12.5%)	2 (5.3%)	2 (3.6%)
Poor quality sports fields	2 (6.3%)	1 (2.6%)	3 (5.5%)
Other problems	2 (6.3%)	1 (2.6%)	6 (10.9%)

^zFHS, DMS, and LHS are all located in Talladega County, AL.

Table 4.15. Independent samples t-test comparing the entire experimental group (K-12 Fayetteville High School [FHS]^z parents) pre-test School Grounds Inventory (SGI)^y scores to their post-test scores.

SGI Scale	Test Variable	N	Mean Score	SD	Mean Difference	df	T ^x	P
Pride Total ^w	Pre	37	23.76	4.856	-5.481	94	-6.034	0.000**
	Post	59	29.24	3.971				
Needs Total ^v	Pre	37	23.08	4.030	-3.546	94	-4.314	0.000**
	Post	59	31.63	3.850				
Benefits Total ^u	Pre	37	16.57	1.994	-1.382	94	-3.251	0.002**
	Post	59	17.95	2.046				
Total ^t	Pre	37	68.41	9.338	-10.408	94	-5.601	0.000**
	Post	59	78.81	8.553				

^zFHS, DMS, and LHS are all located in Talladega County, AL.

^yThe SGI is a survey that was given to parents. Three internal scales were utilized: pride, needs met, and benefits. Also asked, were one qualitative question and one demographics question.

^xT-scores are standard scores which use standard deviation units to express an individual's performance relative to the groups' performance.

^wTotal scores range from 8-40 points.

** *P* less than or equal to 0.01.

^vTotal scores range from 8-40 points.

^uTotal scores range from 4-20 points.

^tTotal scores range from 20-100 points.

Table 4.16. Independent samples t-test comparing the experimental group (Fayetteville High School [FHS]^z parents) elementary school parents (K-6th grade) pre-test School Grounds Inventory (SGI)^y scores to their post-test scores.

SGI Scale	Test Variable	N	Mean Score	SD	Mean Difference	df	T ^x	P
Pride Total ^w	Pre	24	24.13	5.294	-5.559	60	-4.903	0.000**
	Post	38	29.68	3.640				
Needs Total ^v	Pre	24	28.88	3.651	-2.809	60	-2.968	0.004**
	Post	38	31.68	3.618				
Benefits Total ^u	Pre	24	17.21	1.793	-0.950	60	-1.872	0.066
	Post	38	18.16	2.034				
Total ^t	Pre	24	70.21	9.619	-9.318	60	-4.158	0.000**
	Post	38	79.53	7.890				

^zFHS, DMS, and LHS are all located in Talladega County, AL.

^yThe SGI is a survey that was given to parents. Three internal scales were utilized: pride, needs met, and benefits. Also asked, were one qualitative question and one demographics question.

^xT-scores are standard scores which use standard deviation units to express an individual's performance relative to the groups' performance.

^wTotal scores range from 8-40 points.

** *P* less than or equal to 0.01.

^vTotal scores range from 8-40 points.

^uTotal scores range from 4-20 points.

^tTotal scores range from 20-100 points.

Table 4.17. Independent samples t-test comparing the experimental group (Fayetteville High School [FHS]^z parents) middle school parents (7th-8th grade) pre-test School Grounds Inventory (SGI)^y scores to their post-test scores.

SGI Scale	Test Variable	N	Mean Score	SD	Mean Difference	df	T ^x	P
Pride Total ^w	Pre	8	23.38	4.926	-5.414	25	-2.911	0.007**
	Post	19	28.79	4.198				
Needs Total ^v	Pre	8	28.88	3.643	-3.283	25	-2.289	0.031*
	Post	19	32.16	3.304				
Benefits Total ^u	Pre	8	16.13	1.642	-2.296	25	-3.592	0.001**
	Post	19	18.42	1.465				
Total ^t	Pre	8	63.38	9.007	-10.993	25	-3.222	0.004**
	Post	19	79.37	7.712				

^zFHS, DMS, and LHS are all located in Talladega County, AL.

^yThe SGI is a survey that was given to parents. Three internal scales were utilized: pride, needs met, and benefits. Also asked, were one qualitative question and one demographics question.

^xT-scores are standard scores which use standard deviation units to express an individual's performance relative to the groups' performance.

^wTotal scores range from 8-40 points.

** *P* less than or equal to 0.01.

^vTotal scores range from 8-40 points.

* *P* less than or equal to 0.05.

^uTotal scores range from 4-20 points.

^tTotal scores range from 20-100 points.

Table 4.18. Independent samples t-test comparing the experimental group (Fayetteville High School [FHS]^z parents) high school parents (9th-12th grade) pre-test School Grounds Inventory (SGI)^y scores to their post-test scores.

SGI Scale	Test Variable	N	Mean Score	SD	Mean Difference	df	T ^x	P
Pride Total ^w	Pre	14	24.00	4.279	-4.909	34	-3.336	0.002 ^{**}
	Post	22	28.91	4.319				
Needs Total ^v	Pre	14	27.50	4.848	-3.909	34	-2.466	0.019 [*]
	Post	22	31.41	4.500				
Benefits Total ^u	Pre	14	16.29	2.091	-1.032	34	-1.286	0.207
	Post	22	17.32	2.495				
Total ^t	Pre	14	67.79	9.366	-9.851	34	-2.933	0.006 ^{**}
	Post	22	77.64	10.097				

^zFHS, DMS, and LHS are all located in Talladega County, AL.

^yThe SGI is a survey that was given to parents. Three internal scales were utilized: pride, needs met, and benefits. Also asked, were one qualitative question and one demographics question.

^xT-scores are standard scores which use standard deviation units to express an individual's performance relative to the groups' performance.

^wTotal scores range from 8-40 points.

^{**}*P* less than or equal to 0.01.

^vTotal scores range from 8-40 points.

^{*}*P* less than or equal to 0.05.

^uTotal scores range from 4-20 points.

^tTotal scores range from 20-100 points.

Table 4.19 One-way analyses of variance tests comparing the entire experimental group (K-12 Fayetteville High School [FHS]^z parents) post-test School Grounds Inventory (SGI)^y scores to the entire control group (K-12 Drew Middle School [DMS]^z & Lincoln High School [LHS]^z parents) post-test SGI^y scores.

SGI Scale	Treatment	N	Mean Score	SD	Mean Difference	df	F ^x	P
Pride Total ^w	Experimental	59	29.24	3.971	-0.44	272	0.489	0.485
	Control	215	29.68	4.385				
Needs Total ^v	Experimental	59	31.63	3.850	2.08	272	13.295	0.000**
	Control	215	29.55	3.886				
Benefits Total ^u	Experimental	59	17.95	2.046	1.06	272	8.652	0.004**
	Control	215	16.89	2.540				
Total ^t	Experimental	59	78.81	8.553	2.69	272	4.297	0.039*
	Control	215	76.12	8.914				

^zFHS, DMS, and LHS are all located in Talladega County, AL.

^yThe SGI is a survey that was given to parents. Three internal scales were utilized: pride, needs met, and benefits. Also asked, were one qualitative question and one demographics question.

^xF-scores are standard scores which use standard deviation units to express an individual's performance relative to the groups' performance.

^wTotal scores range from 8-40 points.

** *P* less than or equal to 0.01.

^vTotal scores range from 8-40 points.

* *P* less than or equal to 0.05.

^uTotal scores range from 4-20 points.

^tTotal scores range from 20-100 points.

Table 4.20. One-way analyses of variance tests comparing the experimental group (Fayetteville High School [FHS]^z parents) middle school parents (7th-8th grade) post-test School Grounds Inventory (SGI)^y scores to the control group (Drew Middle School [DMS]^z & Lincoln High School [LHS]^z parents) middle school (6th-8th grade) parents post-test SGI^y scores.

SGI Scale	Treatment	N	Mean Score	SD	Mean Difference	df	F ^x	P
Pride Total ^w	Experimental	19	28.79	4.198	-0.89	181	0.732	0.393
	Control	164	29.68	4.289				
Needs Total ^v	Experimental	19	32.16	3.304	2.48	181	7.158	0.008**
	Control	164	29.68	3.880				
Benefits Total ^u	Experimental	19	18.42	1.465	1.55	181	7.074	0.009**
	Control	164	16.87	2.495				
Total ^t	Experimental	19	79.37	7.712	3.15	181	2.328	0.129
	Control	164	76.22	8.600				

^zFHS, DMS, and LHS are all located in Talladega County, AL.

^yThe SGI is a survey that was given to parents. Three internal scales were utilized: pride, needs met, and benefits. Also asked, were one qualitative question and one demographics question.

^xF-scores are standard scores which use standard deviation units to express an individual's performance relative to the groups' performance.

^wTotal scores range from 8-40 points.

** *P* less than or equal to 0.01.

^vTotal scores range from 8-40 points.

^uTotal scores range from 4-20 points.

^tTotal scores range from 20-100 points.

Table 4.21. One-way analyses of variance tests comparing the experimental group (Fayetteville High School [FHS]^z parents) high school parents (9th-12th grade) post-test School Grounds Inventory (SGI)^y scores to the control group (Drew Middle School [DMS]^z & Lincoln High School [LHS]^z parents) high school parents (9th-12th grade) post-test SGI^y scores.

SGI Scale	Treatment	N	Mean Score	SD	Mean Difference	df	F ^x	P
Pride Total ^w	Experimental	22	28.91	4.319	2.31	111	0.396	0.530
	Control	91	29.60	4.723				
Needs Total ^v	Experimental	22	31.41	4.500	162	111	2.978	0.087
	Control	91	29.79	3.805				
Benefits Total ^u	Experimental	22	17.32	2.495	0.45	111	0.500	0.481
	Control	91	16.87	2.721				
Total ^t	Experimental	22	77.64	10.097	1.38	111	0.352	0.554
	Control	91	76.26	9.660				

^zFHS, DMS, and LHS are all located in Talladega County, AL.

^yThe SGI is a survey that was given to parents. Three internal scales were utilized: pride, needs met, and benefits. Also asked, were one qualitative question and one demographics question.

^xF-scores are standard scores which use standard deviation units to express an individual's performance relative to the groups' performance.

^wTotal scores range from 8-40 points.

** *P* less than or equal to 0.01.

^vTotal scores range from 8-40 points.

* *P* less than or equal to 0.05.

^uTotal scores range from 4-20 points.

^tTotal scores range from 20-100 points.

Table 4.22. Sample demographics of the experimental group (Fayetteville High School [FHS]^z parents) and the control group (Drew Middle School [DMS]^z and Lincoln High School [LHS]^z parents): Child's grade.

Treatment	Test Variable	Child's grade	N	Percentages
Experimental	Pre	K-6	24	52.2
		7-8	8	17.4
		9-12	14	30.4
Total			46 ^y	100.0
Experimental	Post	K-6	38	48.1
		7-8	19	24.1
		9-12	22	27.8
Total			79 ^x	100.0
Control	Post	6-8	164	64.3
		9-12	91	35.7
Total			255 ^w	100.0

^zFHS, DMS, and LHS are all located in Talladega County, AL.

^yTotal numbers represent more than total parents as some parents have children in more than one age group. Total parents=37.

^xTotal numbers represent more than total parents as some parents have children in more than one age group. Total parents=59.

^wTotal numbers represent more than total parents as some parents have children in more than one age group. Total parents=215.

Table 4.23. Independent samples t-test comparing the entire experimental group (7th-12th grade Fayetteville High School [FHS]^z students) pre-test School Grounds Inventory (SGI)^y scores to their post-test scores.

SGI Scale	Test Variable	N	Mean Score	SD	Mean Difference	df	T ^x	P
Pride Total ^w	Pre	59	24.66	7.432	-6.712	116	-6.389	0.000**
	Post	59	31.37	3.145				
Needs Total ^v	Pre	59	18.15	6.552	-5.576	116	-5.670	0.000**
	Post	59	23.73	3.759				
Benefits Total ^u	Pre	59	19.76	6.553	-5.458	116	-5.117	0.000**
	Post	59	25.22	4.917				
Use Total ^t	Pre	59	4.07	4.382	0.034	116	0.042	0.967
	Post	59	4.03	4.382				
Total ^s	Pre	59	66.64	17.991	-17.712	116	-6.542	0.000**
	Post	59	84.36	10.428				

^zFHS, located in Talladega County, AL.

^yThe SGI is a survey that was given to students. Four internal scales were utilized: pride, needs met, benefits, and use. Also asked, were one qualitative question and two demographics question.

^xT-scores are standard scores which use standard deviation units to express an individual's performance relative to the groups' performance.

^wTotal scores range from 7-35 points.

** *P* less than or equal to 0.01.

^vTotal scores range from -7-34 points.

^uTotal scores range from 4-45 points.

^tTotal scores range from 2-13 points.

^sTotal scores range from 6-127 points.

Table 4.24. Independent samples t-test comparing the experimental group (Fayetteville High School [FHS]^z students) middle school students (7th-8th grade) pre-test School Grounds Inventory (SGI)^y scores to their post-test scores.

SGI Scale	Test Variable	N	Mean Score	SD	Mean Difference	df	T ^x	P
Pride Total ^w	Pre	20	23.25	9.569	-7.000	38	-3.079	0.004 ^{**}
	Post	20	30.25	3.432				
Needs Total ^v	Pre	20	18.65	8.628	-5.050	38	-2.341	0.025 [*]
	Post	20	23.70	4.318				
Benefits Total ^u	Pre	20	18.90	7.269	-4.400	38	-2.251	0.030 [*]
	Post	20	23.30	4.857				
Use Total ^t	Pre	20	6.70	3.908	0.000	38	0.0000	1.000
	Post	20	6.70	3.908				
Total ^s	Pre	20	67.50	23.354	-16.450	38	-2.781	0.008 ^{**}
	Post	20	83.95	12.416				

^zFHS, located in Talladega County, AL.

^yThe SGI is a survey that was given to students. Four internal scales were utilized: pride, needs met, benefits, and use. Also asked, were one qualitative question and two demographics question.

^xT-scores are standard scores which use standard deviation units to express an individual's performance relative to the groups' performance.

^wTotal scores range from 7-35 points.

^{**}*P* less than or equal to 0.01.

^vTotal scores range from -7-34 points.

^{*}*P* less than or equal to 0.05.

^uTotal scores range from 4-45 points.

^tTotal scores range from 2-13 points.

^sTotal scores range from 6-127 points.

Table 4.25. Independent samples t-test comparing the experimental group (Fayetteville High School [FHS]^z students) high school students (9th-12th grade) pre-test School Grounds Inventory (SGI)^y scores to their post-test scores.

SGI Scale	Test Variable	N	Mean Score	SD	Mean Difference	df	T ^x	P
Pride Total ^w	Pre	38	25.29	6.129	-6.737	74	-6.140	0.000**
	Post	38	32.03	2.862				
Needs Total ^v	Pre	38	17.71	5.240	-6.000	74	-5.849	0.000**
	Post	38	23.71	3.541				
Benefits Total ^u	Pre	38	20.18	6.290	-6.158	74	-4.838	0.000**
	Post	38	26.34	4.692				
Use Total ^t	Pre	38	2.79	4.048	0.053	74	0.057	0.955
	Post	38	2.74	4.032				
Total ^s	Pre	38	65.97	14.986	-18.842	74	-6.563	0.000**
	Post	38	84.82	9.415				

^zFHS, located in Talladega County, AL.

^yThe SGI is a survey that was given to students. Four internal scales were utilized: pride, needs met, benefits, and use. Also asked, were one qualitative question and two demographics question.

^xT-scores are standard scores which use standard deviation units to express an individual's performance relative to the groups' performance.

^wTotal scores range from 7-35 points.

** *P* less than or equal to 0.01.

^vTotal scores range from -7-34 points.

^uTotal scores range from 4-45points.

^tTotal scores range from 2-13 points.

^sTotal scores range from 6-127 points.

Table 4.26. Independent samples t-test comparing the entire experimental group (7th-12th grade Fayetteville High School [FHS]^z students) pre-test answers to their post-test answers for 3 questions: “How useful are your school grounds for....”

Question	Test Variable	N	Mean Score	SD	Mean Difference	df	T ^y	P
...learning school lessons ^x	Pre	56	1.95	1.197	-0.847	112	-4.255	0.000**
	Post	58	2.79	0.913				
...sports/physical activity ^x	Pre	55	2.38	1.063	-0.530	110	-2.893	0.005**
	Post	57	2.91	0.872				
...a place to play or hang out ^x	Pre	56	1.95	1.212	-0.450	112	-2.044	0.043*
	Post	58	2.40	1.138				

^zFHS, located in Talladega County, AL.

^yT-scores are standard scores which use standard deviation units to express an individual's performance relative to the groups' performance.

***P* less than or equal to 0.01.

^xTotal scores range from 0-4 points.

Table 4.27. One-way analyses of variance tests comparing the entire experimental group (7th-12th grade Fayetteville High School [FHS]^z students) post-test School Grounds Inventory (SGI)^y scores to the entire control group (7th-12th grade Drew Middle School [DMS]^z & Lincoln High School [LHS]^z students) post-test SGI^y scores.

SGI Scale	Treatment	N	Mean Score	SD	Mean Difference	df	F ^x	P
Pride Total ^w	Experimental	59	31.37	3.145	4.46	292	41.055	0.000**
	Control	235	26.91	5.102				
Needs Total ^v	Experimental	59	23.73	3.759	2.91	292	20.967	0.000**
	Control	235	20.82	4.497				
Benefits Total ^u	Experimental	59	25.22	4.917	2.72	292	11.459	0.001**
	Control	235	22.50	5.663				
Use Total ^t	Experimental	59	4.03	4.382	-0.84	292	1.667	0.198
	Control	235	4.87	4.450				
Total ^s	Experimental	59	84.36	10.428	9.27	292	21.641	0.000**
	Control	235	75.09	14.365				

^zFHS, DMS, and LHS are all located in Talladega County, AL.

^yThe SGI is a survey that was given to students. Four internal scales were utilized: pride, needs met, benefits, and use. Also asked, were one qualitative question and two demographics question.

^sF-scores are standard scores which use standard deviation units to express an individual's performance relative to the groups' performance.

^wTotal scores range from 7-35 points.

** *P* less than or equal to 0.01.

^vTotal scores range from -7-34 points.

^uTotal scores range from 4-45 points.

^tTotal scores range from 2-13 points.

^sTotal scores range from 6-127 points.

Table 4.28. One-way analyses of variance tests comparing the experimental group (Fayetteville High School [FHS]^z students) middle school students (7th-8th grade) post-test School Grounds Inventory (SGI)^y scores to the control group (Drew Middle School [DMS]^z & Lincoln High School [LHS]^z students) middle school students (7th-8th grade) post-test SGI^y scores.

SGI Scale	Treatment	N	Mean Score	SD	Mean Difference	df	F ^x	P
Pride Total ^w	Experimental	20	30.25	3.432	2.36	149	5.784	0.017*
	Control	131	27.89	4.184				
Needs Total ^v	Experimental	20	23.70	4.318	2.06	149	5.630	0.019*
	Control	131	21.64	3.500				
Benefits Total ^u	Experimental	20	23.30	4.857	0.00	149	0.000	0.999
	Control	131	23.30	5.485				
Use Total ^t	Experimental	20	6.70	3.908	-0.25	149	0.062	0.803
	Control	131	6.95	4.284				
Total ^s	Experimental	20	83.95	12.416	4.19	149	2.349	0.127
	Control	131	79.76	11.219				

^zFHS, DMS, and LHS are all located in Talladega County, AL.

^yThe SGI is a survey that was given to students. Four internal scales were utilized: pride, needs met, benefits, and use. Also asked, were one qualitative question and two demographics question.

^xF-scores are standard scores which use standard deviation units to express an individual's performance relative to the groups' performance.

^wTotal scores range from 7-35 points.

**P* less than or equal to 0.05.

^vTotal scores range from -7-34 points.

^uTotal scores range from 4-45 points.

^tTotal scores range from 2-13 points.

^sTotal scores range from 6-127 points.

Table 4.29. One-way analyses of variance tests comparing the experimental group (Fayetteville High School [FHS]^z students) high school students (9th-12th grade) post-test School Grounds Inventory (SGI)^y scores to the control group (Drew Middle School [DMS]^z & Lincoln High School [LHS]^z students) high school students (9th-12th grade) post-test SGI^y scores.

SGI Scale	Treatment	N	Mean Score	SD	Mean Difference	df	F ^x	P
Pride Total ^w	Experimental	38	32.03	2.862	6.10	137	44.459	0.000**
	Control	101	25.93	5.347				
Needs Total ^v	Experimental	38	23.71	3.541	3.80	137	18.326	0.000**
	Control	101	19.91	5.016				
Benefits Total ^u	Experimental	38	26.34	4.692	4.58	137	21.404	0.000**
	Control	101	21.76	5.378				
Use Total ^t	Experimental	38	2.74	4.032	0.43	137	0.453	0.502
	Control	101	2.31	3.072				
Total ^s	Experimental	38	84.82	9.415	14.91	137	35.322	0.000**
	Control	101	69.91	14.322				

^zFHS, DMS, and LHS are all located in Talladega County, AL.

^yThe SGI is a survey that was given to students. Four internal scales were utilized: pride, needs met, benefits, and use. Also asked, were one qualitative question and two demographics question.

^xF-scores are standard scores which use standard deviation units to express an individual's performance relative to the groups' performance.

^wTotal scores range from 7-35 points.

** *P* less than or equal to 0.01.

^vTotal scores range from -7-34 points.

* *P* less than or equal to 0.05.

^uTotal scores range from 4-45 points.

^tTotal scores range from 2-13 points.

^sTotal scores range from 6-127 points.

Table 4.30. One-way analyses of variance tests comparing the entire experimental group (7th-12th grade Fayetteville High School [FHS]^z students) post-test answers to the entire control group (7th-12th grade Drew Middle School [DMS]^z & Lincoln High School [LHS]^z students) post-test answers for 3 questions: “How useful are your school grounds for....”

SGI Scale	Treatment	N	Mean Score	SD	Mean Difference	df	F ^y	P
...learning school lessons ^x	Experimental	58	2.79	0.913	0.85	287	22.006	0.000 ^{**}
	Control	231	1.94	1.307				
...sports/physical activity ^x	Experimental	57	2.91	0.872	0.21	285	2.812	0.095
	Control	230	2.70	0.873				
...a place to play or hang out ^x	Experimental	58	2.40	1.138	0.57	286	9.958	0.002 ^{**}
	Control	230	1.83	1.252				

^zFHS, DMS, and LHS are all located in Talladega County, AL.

^yF-scores are standard scores which use standard deviation units to express an individual’s performance relative to the groups’ performance.

^{**}*P* less than or equal to 0.01.

^xTotal scores range from 0-4 points.

Table 4.31. One-way analyses of variance tests comparing the entire experimental group (7th-12th grade Fayetteville High School [FHS]^z students) post-test School Grounds Inventory (SGI)^y scores to the control group (7th-12th grade Drew Middle School [DMS]^z & Lincoln High School [LHS]^z students) post-test SGI^y scores of the students who took the Exploratory class during the 2010-11 school year.

SGI Scale	Treatment	N	Mean Score	SD	Mean Difference	df	F ^x	P
Pride Total ^w	Experimental	59	31.37	3.145	3.11	111	41.055	0.000**
	Control	54	28.26	3.567				
Needs Total ^v	Experimental	59	23.73	3.759	2.16	111	20.967	0.001**
	Control	54	21.57	3.213				
Benefits Total ^u	Experimental	59	25.22	4.917	1.39	111	11.459	0.142
	Control	54	23.83	5.061				
Use Total ^t	Experimental	59	4.03	4.382	-2.71	111	1.667	0.001**
	Control	54	6.74	4.349				
Total ^s	Experimental	59	84.36	10.428	3.99	111	21.641	0.039*
	Control	54	80.37	9.804				

^zFHS, DMS, and LHS are all located in Talladega County, AL.

^yThe SGI is a survey that was given to students. Four internal scales were utilized: pride, needs met, benefits, and use. Also asked, were one qualitative question and two demographics question.

^xF-scores are standard scores which use standard deviation units to express an individual's performance relative to the groups' performance.

^wTotal scores range from 7-35 points.

***P* less than or equal to 0.01.

^vTotal scores range from -7-34 points.

**P* less than or equal to 0.05.

^uTotal scores range from 4-45 points.

^tTotal scores range from 2-13 points.

^sTotal scores range from 6-127 points.

Table 4.32. One-way analyses of variance tests comparing the entire experimental group (7th-12th grade Fayetteville High School [FHS]^z students) post-test School Grounds Inventory (SGI)^y scores to the control group (7th-12th grade Drew Middle School [DMS]^z & Lincoln High School [LHS]^z students) post-test SGI^y scores of the students who did not take the Exploratory class during the 2010-11 school year.

SGI Scale	Treatment	N	Mean Score	SD	Mean Difference	df	F ^x	P
Pride Total ^w	Experimental	59	31.37	3.145	4.54	229	47.358	0.000**
	Control	172	26.83	4.726				
Needs Total ^v	Experimental	59	23.73	3.759	2.84	229	20.665	0.000**
	Control	172	20.89	4.261				
Benefits Total ^u	Experimental	59	25.22	4.917	2.73	229	12.219	0.001**
	Control	172	22.49	5.267				
Use Total ^t	Experimental	59	4.03	4.382	-0.40	229	0.359	0.550
	Control	172	4.43	4.384				
Total ^s	Experimental	59	84.36	10.428	9.73	229	26.944	0.000**
	Control	172	74.63	13.019				

^zFHS, DMS, and LHS are all located in Talladega County, AL.

^yThe SGI is a survey that was given to students. Four internal scales were utilized: pride, needs met, benefits, and use. Also asked, were one qualitative question and two demographics question.

^xF-scores are standard scores which use standard deviation units to express an individual's performance relative to the groups' performance.

^wTotal scores range from 7-35 points.

** *P* less than or equal to 0.01.

^vTotal scores range from -7-34 points.

* *P* less than or equal to 0.05.

^uTotal scores range from 4-45 points.

^tTotal scores range from 2-13 points.

^sTotal scores range from 6-127 points.

Table 4.33. Sample demographics of the experimental group (Fayetteville High School [FHS]^z students) and the control group (Drew Middle School [DMS]^z and Lincoln High School [LHS]ⁱ students): “What grade are you in?”

Treatment	Test Variable	Grade	N	Percentages
Experimental	Pre	7-8	20	34.5
		9-12	38	65.5
Total			58	100.0
Experimental	Post	7-8	20	34.5
		9-12	38	65.5
Total			58	100.0
Control	Post	7-8	131	56.5
		9-12	101	43.5
Total			232	100.0

^zFHS, DMS, and LHS are all located in Talladega County, AL.

Table 4.34. Sample demographics of the experimental group (Fayetteville High School [FHS]² students) and the control group (Drew Middle School [DMS]² and Lincoln High School [LHS]² students): “Do you think your school grounds are....”

Treatment	Test Variable	Ground Size	N	Percentages
Experimental	Pre	Much too small	4	6.8
		Too small	7	11.9
		About the right size	48	81.3
		Too big	0	0.0
		Much too big	0	0.0
Total			59	100.0
Experimental	Post	Much too small	3	5.2
		Too small	6	10.3
		About the right size	49	84.5
		Too big	0	0.0
		Much too big	0	0.0
Total			58	100.0
Control	Post	Much too small	6	2.7
		Too small	46	20.4
		About the right size	164	72.9
		Too large	7	3.1
		Much too large	2	0.9
Total			225	100.0

²FHS, DMS, and LHS are all located in Talladega County, AL.

Table 4.35. Sample demographics of the experimental group (Fayetteville High School [FHS]^z students) and the control group (Drew Middle School [DMS]^z and Lincoln High School [LHS]^z students): “Which grades use the school grounds for learning most often?”

Treatment	Test Variable	Grade Usage	N	Percentage
Experimental	Pre	Elementary School	45	85.0
		Junior High	3	5.7
		Senior High	5	9.3
Total			53	100.0
Experimental	Post	Elementary School	49	86.0
		Junior High	5	8.8
		Senior High	3	5.2
Total			57	100.0
Control	Post	Junior High	120	53.8
		Senior High	103	46.2
Total			223	100.0

^zFHS, DMS, and LHS are all located in Talladega County, AL.

Table 4.36. Sample demographics of the experimental group (Fayetteville High School [FHS]² students) and the control group (Drew Middle School [DMS]² and Lincoln High School [LHS]² students): “Are your school grounds being used to teach any of these subjects?”

Grounds Used For:	Pre- Experimental	Post- Experimental	Post-Control
Moral Education	2 (3.6%)	2 (3.4%)	17 (7.4%)
Personal Social Skills	4 (7.0%)	8 (13.8%)	17 (7.4%)
Environmental Science	23 (40.4%)	25 (44.8%)	64 (27.8%)
Social Studies	8 (14.0%)	8 (13.8%)	58 (25.2%)
Technology	1 (1.8%)	2 (3.4%)	33 (14.3%)
Math	5 (8.8%)	10 (17.2%)	66 (28.7%)
Language	1 (1.8%)	4 (6.9%)	44 (19.1%)
Drama	0 (0.0%)	2 (3.4%)	20 (8.7%)
Art and Design	6 (10.5%)	10 (17.2%)	13 (5.7%)
Music Education	3 (5.3%)	7 (12.1%)	43 (18.7%)
Physical Education	36 (63.2%)	37 (63.8%)	152 (66.1%)
Other	1 (1.8%)	2 (3.4%)	12 (5.2%)

²FHS, DMS, and LHS are all located in Talladega County, AL.

Table 4.37. Sample demographics of the experimental group (Fayetteville High School [FHS]^z students) and the control group (Drew Middle School [DMS]^z and Lincoln High School [LHS]^z students): “Which of the following do you see as problems within your school grounds?”

Grounds Used For:	Pre- Experimental	Post- Experimental	Post-Control
Vandalism	12 (20.3%)	1 (1.7%)	22 (9.5%)
Arson	0 (0.0%)	2 (3.4%)	2 (0.9%)
Lack of use in teaching	25 (42.4%)	22 (37.3%)	64 (27.7%)
Maintenance	9 (15.3%)	6 (10.2%)	16 (6.9%)
Lack of variation in equipment	17 (28.8%)	7 (11.9%)	38 (16.5%)
Noise	4 (6.8%)	3 (5.1%)	22 (9.5%)
Lack of supervision	3 (5.1%)	0 (0.0%)	16 (6.9%)
Bullying	10 (16.9%)	7 (11.9%)	96 (41.6%)
Accidents	3 (5.1%)	1 (1.7%)	24 (10.4%)
Theft	5 (8.5%)	3 (5.1%)	64 (27.7%)
Lack of space	12 (20.3%)	9 (15.3%)	33 (14.3%)
Intrusion from others	11 (18.6%)	5 (8.5%)	17 (7.4%)
Poor quality sports fields	14 (23.7%)	5 (8.5%)	8 (3.5%)
Other problems	0 (0.0%)	0 (0.0%)	8 (3.5%)

^zFHS, DMS, and LHS are all located in Talladega County, AL.

Figure 4.1

Experimental Group Faculty School Grounds Inventory Pre-Survey

Part 1 Faculty PRE Survey

Dear Faculty,

We would like to take a few minutes of your time to determine how you perceive our school grounds. As you may be aware, we have made some big changes to our campus in the last few years and we're hoping to make even more. Please answer the following questions to the best of your ability.

This questionnaire deals with the **outdoor areas** of your school grounds **as they are now**. Please keep that in mind as you answer the following questions.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. I like our school grounds. -----	5	4	3	2	1
2. I think our children are safe on our school grounds. -----	5	4	3	2	1
3. I am proud of our school grounds. -----	5	4	3	2	1
4. The grounds are an important part of the school. -----	5	4	3	2	1
5. The school grounds have everything the children need. -----	5	4	3	2	1
6. It wouldn't matter if no one looked after the grounds. -----	5	4	3	2	1
7. I use the school grounds outside of school day hours. -----	5	4	3	2	1
8. Litter is a big problem on our school grounds. -----	5	4	3	2	1
9. The parking for teachers is adequate on our school grounds. -----	5	4	3	2	1
10. Parking for students is adequate on our school grounds. -----	5	4	3	2	1
11. My students like the school grounds. -----	5	4	3	2	1
12. I think better school grounds would encourage my students to attend school. -----	5	4	3	2	1
13. Nice school grounds give young people pride in their school. -----	5	4	3	2	1
14. School grounds can be a place for teaching academic lessons. -----	5	4	3	2	1
15. My students like being outside at school. -----	5	4	3	2	1
16. My students participate in after school activities on campus. -----	5	4	3	2	1
17. I would like to see our school grounds improved. -----	5	4	3	2	1
18. The outdoor sports areas are ideal. -----	5	4	3	2	1
19. The outdoor play areas are ideal. -----	5	4	3	2	1
20. We have a very attractive campus. -----	5	4	3	2	1

If multiple answers are given, please circle your choice.

21. What grade or subject/s do you teach?

22. How many minutes per day do you spend outside with your students?

23. How many minutes per week do you spend outside with your students?

24. Do your students go outside with another teacher (PE, etc.) during the day? Yes No

24.b. If so, how many minutes are your students outside with another teacher?

25. Relative to your school enrollment, do you think your school grounds are
Much too small, too small, about the right size, too large, much too large

26. Do you have separate play areas for older and younger children? Yes No

27. How useful are your school grounds as a **curriculum learning resource**?

Not useful at all, quite useful, very useful, essential, don't know

28. How useful are your school grounds as a resource for **sports/physical activity**?

Not useful at all, quite useful, very useful, essential, don't know

29. How useful are your school grounds as a **play resource**?

Not useful at all, quite useful, very useful, essential, don't know

30. Which students make most use of the play areas of your school grounds in learning?

Elementary school middle school junior high senior high

31. Are your school grounds being used to support learning in these curriculum areas?

(circle all that apply)

Moral education

Environmental science

Technology

Language

Art and design

Physical education

None of the above

Personal & social development

Social studies

Mathematics

Drama

Music

Other_____

Don't know

32. Which of the following do you see as problems within your school grounds? Please place a star next to your biggest problem.

Vandalism

Lack of use in teaching

Lack of variation in equipment

Lack of supervision

Accidents

Lack of space

Poor quality of sports fields

Arson

Maintenance

Noise

Bullying

Theft

Intrusion from others

Other_____

	Check the following items that are <u>currently a part of</u> your school grounds.	Check the following Items that you think your school <u>needs more of</u> on campus.
Food growing areas		
Plant growing areas, in ground		
Plant growing areas, in containers		
Inner courtyards		
Wooded areas		
Sport fields		
Grass areas, not used for sport		
Parking		
Playground areas		
Outdoor sheltered areas		
Ponds or marshes		
Bike racks		
Seating areas		
Picnic tables/areas		
Specific parent waiting area		
Murals		
Sculptures		
Other artwork		
Sandpit		
Painted playground markings		
Outdoor chalk areas		
Fixed play equipment		
Non-fixed play equipment		
Trees		
Pond/water feature		
Bird house/s		
Wildlife habitats		
Wildflower area		
Nature trail		
Recycle bins		
Compost bins		
Weather station		
Equipment storage facilities		
Areas of "wild" grass		
Other		

33. Are there any specific items that you would like to see added to our school grounds that may not have been previously mentioned? _____

Figure 4.2

Experimental Group Faculty School Grounds Inventory Post-Survey

FHS Faculty

Dear Faculty,

We would like to take a few minutes of your time to determine how you perceive our school grounds. As you may be aware, we have made some big changes to our campus in the last few years and we're hoping to make even more. Please answer the following questions to the best of your ability.

This questionnaire deals with the **outdoor areas** of your school grounds **as they are now**. Please keep that in mind as you answer the following questions.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
School grounds= all outside areas					
1. I like our school grounds. -----	5	4	3	2	1
2. I think our children are safe on our school grounds. -----	5	4	3	2	1
3. I am proud of our school grounds. -----	5	4	3	2	1
4. The grounds are an important part of the school. -----	5	4	3	2	1
5. The school grounds have everything the children need. -----	5	4	3	2	1
6. It wouldn't matter if no one looked after the grounds. -----	5	4	3	2	1
7. I use the school grounds outside of school day hours. -----	5	4	3	2	1
8. Litter is a big problem on our school grounds. -----	5	4	3	2	1
9. The parking for teachers is adequate on our school grounds. -----	5	4	3	2	1
10. Parking for students is adequate on our school grounds. -----	5	4	3	2	1
11. My students like the school grounds. -----	5	4	3	2	1
12. I think better school grounds would encourage my students to attend school. -----	5	4	3	2	1
13. Nice school grounds give young people pride in their school. -----	5	4	3	2	1
14. School grounds can be a place for teaching academic lessons. -----	5	4	3	2	1
15. My students like being outside at school. -----	5	4	3	2	1
16. My students participate in after school activities on campus. -----	5	4	3	2	1
17. I would like to see our school grounds improved. -----	5	4	3	2	1
18. The outdoor sports areas are ideal. -----	5	4	3	2	1
19. The outdoor play areas are ideal. -----	5	4	3	2	1
20. We have a very attractive campus. -----	5	4	3	2	1

If multiple answers are given, please circle your choice.

21. What grade or subject/s do you teach?

22. How many minutes per day do you spend outside with your students?

23. How many minutes per week do you spend outside with your students?

24. Do your students go outside with another teacher (PE, etc.) during the day? Yes No

24.b. If so, how many minutes are your students outside with another teacher?

25. Relative to your school enrollment, do you think your school grounds are

Much too small, too small, about the right size, too large, much too large

26. Do you have separate play areas for older and younger children? Yes No

27. How useful are your school grounds as a **curriculum learning resource**?

Not useful at all, quite useful, very useful, essential, don't know

28. How useful are your school grounds as a resource for **sports/physical activity**?

Not useful at all, quite useful, very useful, essential, don't know

29. How useful are your school grounds as a **play resource**?

Not useful at all, quite useful, very useful, essential, don't know

30. Which students make most use of the play areas of your school grounds in learning?

Elementary school middle school junior high senior high

31. Are your school grounds being used to support learning in these curriculum areas?

Circle all that apply.

Moral education

Personal & social development

Environmental science

Social studies

Technology

Mathematics

Language

Drama

Art and design

Music

Physical education

Other_____

None of the above

Don't know

32. Which of the following do you see as problems within your school grounds? Circle all that apply and place a star next to your biggest problem.

- | | |
|--------------------------------|-----------------------|
| Vandalism | Arson |
| Lack of use in teaching | Maintenance |
| Lack of variation in equipment | Noise |
| Lack of supervision | Bullying |
| Accidents | Theft |
| Lack of space | Intrusion from others |
| Poor quality of sports fields | Other_____ |

33. What would you like to see added to your school grounds?

Figure 4.3

Control Group Faculty School Grounds Inventory Post-Survey

LHS/DMS Faculty

Dear Faculty,

We would like to take a few minutes of your time to determine how you perceive our school grounds. As you may be aware, a few plants have been added to the front of the school.

This questionnaire deals with the **outdoor areas** of your school grounds **as they were before the front plants were added**. Please keep that in mind as you answer the following questions.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
School grounds= all outside areas					
1. I like our school grounds. -----	5	4	3	2	1
2. I think our children are safe on our school grounds. -----	5	4	3	2	1
3. I am proud of our school grounds. -----	5	4	3	2	1
4. The grounds are an important part of the school. -----	5	4	3	2	1
5. The school grounds have everything the children need. -----	5	4	3	2	1
6. It wouldn't matter if no one looked after the grounds. -----	5	4	3	2	1
7. I use the school grounds outside of school day hours. -----	5	4	3	2	1
8. Litter is a big problem on our school grounds. -----	5	4	3	2	1
9. The parking for teachers is adequate on our school grounds. -----	5	4	3	2	1
10. Parking for students is adequate on our school grounds. -----	5	4	3	2	1
11. My students like the school grounds. -----	5	4	3	2	1
12. I think better school grounds would encourage my students to attend school. -----	5	4	3	2	1
13. Nice school grounds give young people pride in their school. -----	5	4	3	2	1
14. School grounds can be a place for teaching academic lessons. -----	5	4	3	2	1
15. My students like being outside at school. -----	5	4	3	2	1
16. My students participate in after school activities on campus. -----	5	4	3	2	1
17. I would like to see our school grounds improved. -----	5	4	3	2	1
18. The outdoor sports areas are ideal. -----	5	4	3	2	1
19. The outdoor play areas are ideal. -----	5	4	3	2	1
20. We have a very attractive campus. -----	5	4	3	2	1

If multiple answers are given, please circle your choice.

21. What grade or subject/s do you teach?

22. How many minutes per day do you spend outside with your students?

23. How many minutes per week do you spend outside with your students?

24. Do your students go outside with another teacher (PE, etc.) during the day? Yes No

24.b. If so, how many minutes are your students outside with another teacher?

25. Relative to your school enrollment, do you think your school grounds are

Much too small, too small, about the right size, too large, much too large

26. Do you have separate play areas for older and younger children? Yes No

27. How useful are your school grounds as a **curriculum learning resource**?

Not useful at all, quite useful, very useful, essential, don't know

28. How useful are your school grounds as a resource for **sports/physical activity**?

Not useful at all, quite useful, very useful, essential, don't know

29. How useful are your school grounds as a **play resource**?

Not useful at all, quite useful, very useful, essential, don't know

30. Which students make most use of the play areas of your school grounds in learning?

Elementary school middle school junior high senior high

31. Are your school grounds being used to support learning in these curriculum areas?

Circle all that apply.

Moral education

Personal & social development

Environmental science

Social studies

Technology

Mathematics

Language

Drama

Art and design

Music

Physical education

Other_____

None of the above

Don't know

32. Which of the following do you see as problems within your school grounds? Circle all that apply and place a star next to your biggest problem.

- | | |
|--------------------------------|-----------------------|
| Vandalism | Arson |
| Lack of use in teaching | Maintenance |
| Lack of variation in equipment | Noise |
| Lack of supervision | Bullying |
| Accidents | Theft |
| Lack of space | Intrusion from others |
| Poor quality of sports fields | Other_____ |

33. What would you like to see added to your school grounds?

Figure 4.4

Faculty School Grounds Inventory Internal Scales and Statements.

Scale	Item #	Statement
Pride	1	I like our school grounds.
	3	I am proud of our school grounds.
	4	The grounds are an important part of the school.
	6	It wouldn't matter if no one looked after the grounds.
	11	My students like the school grounds.
	13	Nice school grounds give young people pride in their school.
	15	My students like being outside at school.
	20	We have a very attractive campus
Needs Met	2	I think our children are safe on our school grounds.
	5	The school grounds have everything the children need.
	8	Litter is a big problem on our school grounds.
	9	The parking for teachers is adequate on our school grounds.
	10	Parking for students is adequate on our school grounds.
	17	I would like to see our school grounds improved.
	18	The outdoor sports areas are ideal.
	19	The outdoor play areas are ideal.
	26	Do you have separate play areas for older and younger children?
	32	Which of the following do you see as problems within your school grounds? Place a star next to your biggest problem...
	33	
Benefits	7	I use the school grounds outside of school day hours.
	12	I think better school grounds would encourage my students to attend school.
	14	School grounds can be a place for teaching academic lessons.
	16	My students participate in after school activities on campus.
	27	How useful are your school grounds as a curriculum learning resource?
	28	How useful are your school grounds as a resource for sports/physical activity?
	29	How useful are your school grounds as a play resource?
	31	Are your school grounds being used to support learning in these curriculum areas?...

Demographics	21	What grade or subject/s do you teach?
	25	Relative to your school enrollment, do you think your school grounds are...
	30	Which students make most use of the play areas of your school grounds in learning?...
Use	22	How many minutes per day do you spend outside with your students?
	23	How many minutes per week do you spend outside with your students?
	24	Do your students go outside with another teacher (PE, etc.) during the day?
	24b	If so, how many minutes are your students outside with another teacher?
Qualitative	33	Are there any specific items that you would like to see added to our school grounds that may not have been previously mentioned?

Figure 4.5

Experimental Group Parent School Grounds Inventory Pre-Survey

Part 1 Parent Pre Survey

Dear Parents,

We would like to take a few minutes of your time to determine how you perceive your child’s school grounds. As you may be aware, we have made some big changes to our campus in the last few years and we’re hoping to make even more. Please answer the following questions to the best of your ability.

In the next few weeks you will be receiving a permission slip for your child to participate in a similar survey. Please take the time to sign the permission forms if you would agree to the survey and return them to school promptly.

This questionnaire deals with the **outdoor areas** of your school grounds **as they are now**. Please keep that in mind as you answer the following questions.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. I like our school grounds. -----	5	4	3	2	1
2. I think my children are safe on our school grounds. -----	5	4	3	2	1
3. I am proud of our school grounds. -----	5	4	3	2	1
4. The grounds are an important part of the school. -----	5	4	3	2	1
5. The school grounds have everything the children need. -----	5	4	3	2	1
6. It wouldn’t matter if no one looked after the grounds. -----	5	4	3	2	1
7. I use the school grounds with my children outside of school day hours. -----	5	4	3	2	1
8. Litter is a big problem on our school grounds. -----	5	4	3	2	1
9. The parking for parents is adequate on our school grounds. -----	5	4	3	2	1
10. Parking for students is adequate on our school grounds. -----	5	4	3	2	1
11. My children like the school grounds. -----	5	4	3	2	1
12. I think better school grounds would encourage my child to attend school. -----	5	4	3	2	1
13. Nice school grounds give young people pride in their school. -----	5	4	3	2	1
14. School grounds can be a place for teaching academic lessons. -----	5	4	3	2	1
15. My child/children likes being outside at school. -----	5	4	3	2	1
16. My child/children participates in after school activities on campus. -----	5	4	3	2	1
17. I would like to see our school grounds improved. -----	5	4	3	2	1
18. The outdoor sports areas are ideal. -----	5	4	3	2	1
19. The outdoor play areas are ideal. -----	5	4	3	2	1
20. We have a very attractive campus. -----	5	4	3	2	1

(OVER)

21. Are there any items that you would like to see added to our school grounds?

22. This year I have a child or children entering the following grade/s:

K 1 2 3 4 5 6 7 8 9 10 11 12

Figure 4.6

Experimental Group Parent School Grounds Inventory Post-Survey

FHS Parents

Dear Parents,

We would like to take a few minutes of your time to determine **how you perceive your child’s school grounds**. As you may be aware, we have made some big changes to our campus in the last few years and we’re hoping to make even more.

This questionnaire deals with the **outdoor areas** of your school grounds **as they are now**. Please keep that in mind as you answer the following questions.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
School grounds= outside areas					
1. I like our school grounds. -----	5	4	3	2	1
2. I think my children are safe on our school grounds. -----	5	4	3	2	1
3. I am proud of our school grounds. -----	5	4	3	2	1
4. The grounds are an important part of the school. -----	5	4	3	2	1
5. The school grounds have everything the children need. -----	5	4	3	2	1
6. It wouldn't matter if no one looked after the grounds. -----	5	4	3	2	1
7. I use the school grounds with my children outside of school day hours. -----	5	4	3	2	1
8. Litter is a big problem on our school grounds. -----	5	4	3	2	1
9. The parking for parents is adequate on our school grounds. -----	5	4	3	2	1
10. Parking for students is adequate on our school grounds. -----	5	4	3	2	1
11. My children like the school grounds. -----	5	4	3	2	1
12. I think better school grounds would encourage my child to attend school. -----	5	4	3	2	1
13. Nice school grounds give young people pride in their school. -----	5	4	3	2	1
14. School grounds can be a place for teaching academic lessons. -----	5	4	3	2	1
15. My child/children likes being outside at school. -----	5	4	3	2	1
16. My child/children participates in after school activities on campus. -----	5	4	3	2	1
17. I would like to see our school grounds improved. -----	5	4	3	2	1
18. The outdoor sports areas are ideal. -----	5	4	3	2	1
19. The outdoor play areas are ideal. -----	5	4	3	2	1
20. We have a very attractive campus. -----	5	4	3	2	1

21. Are there any items that you would like to see added to our school grounds?

22. This year I have a child or children in the following grade/s:

K 1 2 3 4 5 6 7 8 9 10 11 12

Figure 4.7

Control Group Parent School Grounds Inventory Post-Survey

LHS/DMS Parents

Dear Parents,

We would like to take a few minutes of your time to determine **how you perceive your child's school grounds**. As you may be aware, a few plants have been added to the front of the school.

This questionnaire deals with the **outdoor areas** of your school grounds **as they were before the front plants were added**. Please keep that in mind as you answer the following questions.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
School grounds= outside areas					
1. I like our school grounds. -----	5	4	3	2	1
2. I think my children are safe on our school grounds. -----	5	4	3	2	1
3. I am proud of our school grounds. -----	5	4	3	2	1
4. The grounds are an important part of the school. -----	5	4	3	2	1
5. The school grounds have everything the children need. -----	5	4	3	2	1
6. It wouldn't matter if no one looked after the grounds. -----	5	4	3	2	1
7. I use the school grounds with my children outside of school day hours. -----	5	4	3	2	1
8. Litter is a big problem on our school grounds. -----	5	4	3	2	1
9. The parking for parents is adequate on our school grounds. -----	5	4	3	2	1
10. Parking for students is adequate on our school grounds. -----	5	4	3	2	1
11. My children like the school grounds. -----	5	4	3	2	1
12. I think better school grounds would encourage my child to attend school. -----	5	4	3	2	1
13. Nice school grounds give young people pride in their school. -----	5	4	3	2	1
14. School grounds can be a place for teaching academic lessons. -----	5	4	3	2	1
15. My child/children likes being outside at school. -----	5	4	3	2	1
16. My child/children participates in after school activities on campus. -----	5	4	3	2	1
17. I would like to see our school grounds improved. -----	5	4	3	2	1
18. The outdoor sports areas are ideal. -----	5	4	3	2	1
19. The outdoor play areas are ideal. -----	5	4	3	2	1
20. We have a very attractive campus. -----	5	4	3	2	1

21. Are there any items that you would like to see added to our school grounds?

22. This year I have a child or children in the following grade/s:

K 1 2 3 4 5 6 7 8 9 10 11 12

Figure 4.8

Parent School Grounds Inventory Internal Scales and Statements

Scale	Item #	Statement
Pride	1	I like our school grounds.
	3	I am proud of our school grounds.
	4	The grounds are an important part of the school.
	6	It wouldn't matter if no one looked after the grounds.
	11	My children like the school grounds.
	13	Nice school grounds give young people pride in their school.
	15	My child/children likes being outside at school.
Needs Met	20	We have a very attractive campus
	2	I think my children are safe on our school grounds.
	5	The school grounds have everything the children need.
	8	Litter is a big problem on our school grounds.
	9	The parking for parents is adequate on our school grounds.
	10	Parking for students is adequate on our school grounds.
	17	I would like to see our school grounds improved.
	18	The outdoor sports areas are ideal.
19	The outdoor play areas are ideal.	
Benefits	7	I use the school grounds with my children outside of school day hours.
	12	I think better school grounds would encourage my students to attend school.
	14	School grounds can be a place for teaching academic lessons.
	16	My child/children participates in after school activities on campus.
Demographics	22	This year I have a child or children entering the following grade/s:...
Qualitative	21	Are there any items that you would like to see added to our school grounds?

Figure 4.9

Experimental Group Student School Grounds Inventory Pre and post-Survey

FHS Students

Dear Students,

We would like to take a few minutes of your time to determine how you perceive your school grounds. As you may be aware, we have made some big changes to our campus in the last few years and we're hoping to make even more.

Please answer each question by first thinking of **how you perceived the school before any changes had been made** to the **school grounds (not the school building) AND THEN thinking of how you perceive it now**. Please answer each question to the best of your ability.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
School grounds= all outside areas					
1. I like our school grounds.					
Before any changes to the grounds-----	5	4	3	2	1
Now-----	5	4	3	2	1
2. I feel safe on our school grounds.					
Before any changes to the grounds-----	5	4	3	2	1
Now-----	5	4	3	2	1
3. I am proud of our school grounds.					
Before any changes to the grounds-----	5	4	3	2	1
Now-----	5	4	3	2	1
4. The grounds are an important part of the school.					
Before any changes to the grounds-----	5	4	3	2	1
Now-----	5	4	3	2	1
5. The school grounds have everything we need.					
Before any changes to the grounds-----	5	4	3	2	1
Now-----	5	4	3	2	1
6. It would be okay if no one looked after the school grounds.					
Before any changes to the grounds-----	5	4	3	2	1
Now-----	5	4	3	2	1

7. I use the school grounds outside of school day hours.					
Before any changes to the grounds-----	5	4	3	2	1
Now-----	5	4	3	2	1
8. There is usually a lot of litter on the school grounds.					
Before any changes to the grounds-----	5	4	3	2	1
Now-----	5	4	3	2	1
9. I would want to come to school more if the school grounds were better.					
Before any changes to the grounds-----	5	4	3	2	1
Now-----	5	4	3	2	1
10. Nice school grounds would make me proud of my school.					
Before any changes to the grounds-----	5	4	3	2	1
Now-----	5	4	3	2	1
11. School grounds can be a place for learning school lessons.					
Before any changes to the grounds-----	5	4	3	2	1
Now-----	5	4	3	2	1
12. I like being outside at school.					
Before any changes to the grounds-----	5	4	3	2	1
Now-----	5	4	3	2	1
13. I participate in after school activities on campus.					
Before any changes to the grounds-----	5	4	3	2	1
Now-----	5	4	3	2	1
14. I would like to see our school grounds improved.					
Before any changes to the grounds-----	5	4	3	2	1
Now-----	5	4	3	2	1
15. Our outdoor sports areas are good.					
Before any changes to the grounds-----	5	4	3	2	1
Now-----	5	4	3	2	1
16. Our outdoor play areas are good.					
Before any changes to the grounds-----	5	4	3	2	1
Now-----	5	4	3	2	1

17. We have very pretty school grounds.
- | | | | | | |
|--|---|---|---|---|---|
| Before any changes to the grounds----- | 5 | 4 | 3 | 2 | 1 |
| Now----- | 5 | 4 | 3 | 2 | 1 |
18. How useful are your school grounds for **learning school lessons**? (circle 1 answer/row)
- | | | | | | |
|---------|-------------------|---------------|-------------|-----------|------------|
| BEFORE: | Not useful at all | pretty useful | very useful | essential | don't know |
| NOW: | Not useful at all | pretty useful | very useful | essential | don't know |
19. How useful are your school grounds for **sports/physical activity**? (circle 1 answer/row)
- | | | | | | |
|---------|-------------------|---------------|-------------|-----------|------------|
| BEFORE: | Not useful at all | pretty useful | very useful | essential | don't know |
| NOW: | Not useful at all | pretty useful | very useful | essential | don't know |
20. How useful are your school grounds as a place to **play or hang out**? (circle 1 answer/row)
- | | | | | | |
|---------|-------------------|---------------|-------------|-----------|------------|
| BEFORE: | Not useful at all | pretty useful | very useful | essential | don't know |
| NOW: | Not useful at all | pretty useful | very useful | essential | don't know |
21. Which grades use the school grounds for learning most often? (circle 1 answer/row)
- | | | | |
|---------|-------------------|-------------|-------------|
| BEFORE: | Elementary school | junior high | senior high |
| NOW: | Elementary school | junior high | senior high |
22. Are your school grounds being used to teach any of these subjects? (circle all that apply)
- | | | |
|---------|-----------------------|--------------------------|
| BEFORE: | Moral education | Personal & social skills |
| | Environmental science | Social studies |
| | Technology | Mathematics |
| | Language | Drama |
| | Art and design | Music |
| | Physical education | Other_____ |
| | None of the above | Don't know |
| | | |
| NOW: | Moral education | Personal & social skills |
| | Environmental science | Social studies |
| | Technology | Mathematics |
| | Language | Drama |
| | Art and design | Music |
| | Physical education | Other_____ |
| | None of the above | Don't know |

23. Which of the following do you see as problems within your school grounds? Please place a star next to your biggest problem.

BEFORE:	Vandalism	Arson
	Not used enough for teaching	Maintenance
	Not enough types of play equipment	Noise
	Not enough supervision	Bullying
	Accidents	Theft
	Not enough space	Outsiders can easily come into our play areas
	Sports fields aren't nice	Other _____

NOW:	Vandalism	Arson
	Not used enough for teaching	Maintenance
	Not enough types of play equipment	Noise
	Not enough supervision	Bullying
	Accidents	Theft
	Not enough space	Outsiders can easily come into our play areas
	Sports fields aren't nice	Other _____

When answering questions 24-30 answer only about NOW.

24. What grade are you in?

25. How many minutes per week do you spend outside with a teacher (during the school day)?

26. Of that time outside, is some of it with a PE teacher?

Yes No

26.b. If yes, how many minutes per week are you outside with your PE teacher?

27. Do you think your school grounds are (circle 1 answer below)

Much too small, too small, about the right size, too big, much too big

28. Do you have separate areas on the school grounds for older and younger kids to play in?

Yes No

29. What would you like to see added to your school grounds?

Figure 4.10

Control Group Student School Grounds Inventory Post-Survey

DMS/LHS Students

Dear Students,

We would like to take a few minutes of your time to determine how you perceive your school grounds. Your school recently installed a few plants in the front of the school. This questionnaire deals with the **outdoor areas** of your school grounds **as they were before the front plants were added**. Please keep that in mind as you answer the following questions and answer them to the best of your ability.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
School grounds= all outside areas					
1. I like our school grounds. -----	5	4	3	2	1
2. I feel safe on our school grounds. -----	5	4	3	2	1
3. I am proud of our school grounds. -----	5	4	3	2	1
4. The grounds are an important part of the school. -----	5	4	3	2	1
5. The school grounds have everything we need. -----	5	4	3	2	1
6. It would be okay if no one looked after the school grounds. -----	5	4	3	2	1
7. I use the school grounds outside of school day hours. -----	5	4	3	2	1
8. There is usually a lot of litter on the school grounds. -----	5	4	3	2	1
9. I would want to come to school more if the school grounds were better.-----	5	4	3	2	1
10. Nice school grounds would make me proud of my school. -----	5	4	3	2	1
11. School grounds can be a place for learning school lessons. -----	5	4	3	2	1
12. I like being outside at school. -----	5	4	3	2	1
13. I participate in after school activities on campus. -----	5	4	3	2	1
14. I would like to see our school grounds improved. -----	5	4	3	2	1
15. Our outdoor sports areas are good. -----	5	4	3	2	1
16. Our outdoor play areas are good. -----	5	4	3	2	1
17. We have very pretty school grounds. -----	5	4	3	2	1

18. How useful are your school grounds for **learning school lessons**? (circle 1 answer/row)
Not useful at all pretty useful very useful essential don't know
19. How useful are your school grounds for **sports/physical activity**? (circle 1 answer/row)
Not useful at all pretty useful very useful essential don't know
20. How useful are your school grounds as a place to **play or hang out**? (circle 1 answer/row)
Not useful at all pretty useful very useful essential don't know
21. Which grades use the school grounds for learning most often? (circle 1 answer/row)
Junior high senior high
22. Are your school grounds being used to teach any of these subjects? (circle all that apply)
- | | |
|-----------------------|--------------------------|
| Moral education | Personal & social skills |
| Environmental science | Social studies |
| Technology | Mathematics |
| Language | Drama |
| Art and design | Music |
| Physical education | Other_____ |
| None of the above | Don't know |
23. Which of the following do you see as problems within your school grounds? Please place a star next to your biggest problem.
- | | |
|------------------------------------|---|
| Vandalism | Arson |
| Not used enough for teaching | Maintenance |
| Not enough types of play equipment | Noise |
| Not enough supervision | Bullying |
| Accidents | Theft |
| Not enough space | Outsiders can easily come into our play areas |
| Sports fields aren't nice | Other_____ |
24. What grade are you in? _____
25. How many minutes per week do you spend outside with a teacher (during the school day)?

26. Of that time outside, is some of it with a PE teacher??
Yes No
- 26.b. If yes, how many minutes per week are you outside with your PE teacher?

27. Do you think your school grounds are (circle 1 answer below)

Much too small too small about the right size too big much too big

28. Do you have separate areas on the school grounds designated for older and younger grades?

Yes No

29. Did you take the Exploratory class with Dr. Reese during the 2010-2011 school year?

Yes No

30. What would you like to see added to your school grounds?

Figure 4.11

Experimental Student School Grounds Inventory Internal Scales and Statements.

Scale	Item #	Statement
Pride	1	I like our school grounds.
	3	I am proud of our school grounds.
	4	The grounds are an important part of the school.
	6	It would be okay if no one looked after the school grounds.
	10	Nice school grounds would make me proud of my school.
	12	I like being outside at school.
	17	We have very pretty school grounds.
Needs Met	2	I feel safe on our school grounds.
	5	The school grounds have everything we need.
	8	There is usually a lot of litter on the school grounds.
	14	I would like to see our school grounds improved.
	15	Our outdoor sports areas are good.
	16	Our outdoor play areas are good.
	23	Which of the following do you see as problems within your school grounds? Please place a star next to your biggest problem...
28	Do you have separate areas on the school grounds for older and younger kids to play in?	
Benefits	7	I use the school grounds outside of school day hours.
	9	I would want to come to school more if the school grounds were better.
	11	School grounds can be a place for learning school lessons.
	13	I participate in after school activities on campus.
	18	How useful are your school grounds for learning school lessons?
	19	How useful are your school grounds for sports/physical activity?
	20	How useful are your school grounds as a place to play or hang out?
22	Are your school grounds being used to teach any of these subjects? (circle all that apply)...	
Demographics	21	Which grade use the school grounds for learning most often? (circle all that apply)...
	24	What grade are you in?
	27	Do you think your school grounds are (circle one answer below)...

Use	25	How many minutes per week do you spend outside with a teacher (during the school day)?
	26	Of that time outside, is some of it with a PE teacher?
	26b	If yes, how many minutes per week are you outside with your PE teacher?

Qualitative	29	What you would like to see added to your school grounds?
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Figure 4.12

Control Student School Grounds Inventory Internal Scales and Statements.

Scale	Item #	Statement
Pride	1	I like our school grounds.
	3	I am proud of our school grounds.
	4	The grounds are an important part of the school.
	6	It would be okay if no one looked after the school grounds.
	10	Nice school grounds would make me proud of my school.
	12	I like being outside at school.
	17	We have very pretty school grounds.
Needs Met	2	I feel safe on our school grounds.
	5	The school grounds have everything we need.
	8	There is usually a lot of litter on the school grounds.
	14	I would like to see our school grounds improved.
	15	Our outdoor sports areas are good.
	16	Our outdoor play areas are good.
	23	Which of the following do you see as problems within your school grounds? Please place a star next to your biggest problem...
28	Do you have separate areas on the school grounds designated for older and younger grades?	
Benefits	7	I use the school grounds outside of school day hours.
	9	I would want to come to school more if the school grounds were better.
	11	School grounds can be a place for learning school lessons.
	13	I participate in after school activities on campus.
	18	How useful are your school grounds for learning school lessons?
	19	How useful are your school grounds for sports/physical activity?
	20	How useful are your school grounds as a place to play or hang out?
	22	Are your school grounds being used to teach any of these subjects? (circle all that apply)...
Demographics	21	Which grade use the school grounds for learning most often? (circle 1 answer/row)...
	24	What grade are you in?
	27	Do you think your school grounds are (circle one answer below)...
	29	Did you take the Exploratory class with Dr. Reese during the 2010-11 school year?

Use	25	How many minutes per week do you spend outside with a teacher (during the school day)?
	26	Of that time outside, is some of it with a PE teacher?
	26b	If yes, how many minutes per week are you outside with your PE teacher?

Qualitative	30	What you would like to see added to your school grounds?
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CHAPTER FIVE

EXAMINATION OF STUDENT'S AND TEACHER'S EXPERIENCE OF A SCHOOL LANDSCAPE PROJECT

Abstract

This study tells the story of a small K through 12 school located in rural Fayetteville, AL that went from “dismal and depressing,” with only five trees on the entire 17 acre campus, to a beautiful campus landscape that’s utilized for education. Since 2009, the school has been working on a landscape project that involved two partners: Auburn University and an invested local business.

The purpose of this study was to examine the landscape project at Fayetteville School (FHS) and to answer the question of how the faculty, staff, and students experienced the landscape project. Another purpose was to garner advice for other schools interested in implementing a similar project. An intrinsic case study method was utilized and 13 semi-structured interviews were conducted with faculty and staff at FHS who’d been involved in the project to varying degrees. All interviews were recorded and then transcribed for analysis.

The data were reviewed for emerging themes and several preliminary categories were formed. After further review, the themes were combined to create seven categories: benefits, amount of use, excitement-level characteristics, the future, challenges, advice, and success stories. This case study was very helpful in determining many of the

successes from the landscape project at Fayetteville School. It also drew out many of the challenges encountered during the project.

Of the many benefits the project offered, perhaps the most significant was the increase in pride and ownership experienced by all the stakeholders and the increased use of the outdoor spaces to offer active learning opportunities, particularly for the elementary age students. Of the challenges identified in this project, maintenance, time to utilize the garden for education, and ideas for incorporating lessons into the garden were the greatest. Advice for addressing each of these challenges is included later in this chapter.

Introduction

In 2008, I was part of a design team for a landscape project at Fayetteville School, a small K through 12 school in Alabama. In January of 2009 I began working at Fayetteville to implement the landscape design and was there for nearly one year. After I'd been working at Fayetteville for about eight months I began brainstorming with one of my favorite elementary teacher's about how we might incorporate classroom lessons into the installation of the second phase of the children's garden. She mentioned they were studying wildlife that fall and suddenly it was decided: we would install the butterfly garden next. This teacher and I worked together with all the students in her grade to research butterflies native to the area. We studied their habitat and the plants they preferred and then narrowed down the plants that were most preferred (by the caterpillars, butterflies, and even us) and finally we determined how many plants we would need and how much it would cost. I worked with several students in small groups to determine the plant numbers as well as the total plant cost. I'll never forget at the end

of one math session with a group of students, I pointed out that we had just done math and one of the students looked up at me in amazement and said, “I’ve never had so much fun doing math before!” These students also had the opportunity to install the plants we chose and then to track and study the caterpillars and butterflies that visited the gardens in the following months.

This study examined the aforementioned Fayetteville School (FHS) Landscape Project. It was conducted as an intrinsic case study and is presented with a narrative approach. As such, the story of the landscape project will be presented, resulting in a very different presentation approach from the previous two chapters.

Case studies may be found across many disciplines, including education, sociology, psychology, social work, and even horticulture. One such horticulture study, conducted in 2006, involved 4-H youth as “children’s garden consultants” to provide feedback for children’s garden designs. Seven teenagers were given time to research children’s garden designs and educational programming and then were allowed to present recommendations to children’s garden experts. Surveys, interviews, and observations with both the youth and adults were conducted. The 4-H participants reported their experience as both fun and educational, while the adult attendees reported the event as successful and felt the youth had many great ideas to offer (Lekies et al., 2006). Another study involving youth assessed the Junior Master Gardener (JMG) Program in third grade classrooms. Students completed surveys with both open and close-ended questions. Teachers were also involved and were interviewed following the program for feedback. Students increased in agricultural knowledge and in positive attitudes towards agriculture. They also reported an enjoyment of the program and the desire to participate

in more JMG activities. Teachers reported satisfaction with the program and provided feedback for its further improvement (Dirks and Orvis, 2005). Many horticulture studies have been conducted using a variety of qualitative methodologies, from case studies to narratives. In a 2011 narrative study, Glover told the story of a struggling neighborhood, transformed by a community garden. Community garden participants reported, and demonstrated, a uniting of community and an increase in civility and security in the neighborhood as a whole (Glover, 2011).

This study, when viewed with the previous two chapters, provides an overall examination of the program at Fayetteville School. When viewed as a whole, it is a mixed-methods study. However, the methods presented in this chapter are qualitative. As the name of the school was revealed in chapter's three and four, it has not been changed for this chapter. However, to provide confidentiality, all participants in this study have been assigned pseudonyms (Appendix B).

The Story

In 2006, Mr. Jimmy Pursell, owner of FarmLinks Golf Course, a local Fayetteville, AL business approached Fayetteville School about the possibility of installing a football and softball field on the school grounds. By the fall of 2007, the football field opened, and the students of the small K through 12 school played their first home football game in 100 years. After the football and softball fields were installed, Mr. Pursell looked around the campus and came to the conclusion that it could use some help. As a 17-acre campus it had a surprisingly low number of plants, 5 trees in one area and the area formerly known as the swamp that was discovered during the athletic field installation to be a wetland. Still, Mr. Pursell thought the school grounds could use some

improving. He again approached the school, this time asking if they would be interested in a landscaping project. As Susan Hume, an administrator said,

- *I never will forget the day he came over and asked, 'was there any reason we couldn't do something to make the school,' I mean, he didn't use the word dismal, but I gathered from...the way he was describing it, he said, 'it needs more greenery, there needs to be shrubbery.' So I explained to him that there was no money in the school budget for landscaping but that I was sure the teacher's and parents would be interested. And he asked if we could bring some horticulture students up...and I said, 'that'll be fine with me.' That was the first little start....*

Following that meeting Mr. Pursell made contact with several people he knew in the Auburn University Department of Horticulture and asked if they would be willing to complete a landscape design for the new athletic fields. In the spring of the following year, 2008, a design team of five Auburn Horticulture graduate students, including myself, was selected to complete the design. The design for the athletic fields quickly blossomed into a design encompassing all of FHS' 17 acres. When designing the landscape we were told something we'd never been told before, "don't think in terms of a budget, dream big, think Disney." We took that phrase and ran with it, eventually coming up with a plan that included a tree grove with amphitheater, a boardwalk and outdoor classroom to go through the wetlands, two interactive children's gardens, and a bird sanctuary, all connected with walking paths throughout the campus. While one of our goals was to provide beautification to the currently bleak campus, our main goal was to incorporate educational opportunities throughout the design, that teachers and students might have multiple outdoor classrooms to utilize for education. In the fall of 2008 the design team presented the design to the faculty, staff and community in a PTA meeting. It was very well received but the general consensus was, "this is great and beautiful, but now what?" In November of that same year I was nearing the conclusion of my Master's

degree program and started wondering if there might be a way to follow through with the Fayetteville design on which my fellow students and I spent so many hours. I spent a couple of weeks pondering this and finally worked up the nerve to talk to one of my supervisors about it. I was standing outside his office when he returned from a meeting with Mr. Pursell. In that very meeting they'd been discussing the possibility of creating an internship to implement the design at Fayetteville School. I filled out my application that day and in January of 2009 headed to the tiny community of Fayetteville, AL. I spent one year at FHS as the landscape project coordinator. During that year I was in charge of developing a 10 phase plan, planning and preparing for each phase, organizing planting days, fundraising, securing in-kind donations (such as trees and equipment from local and state businesses), and general garden maintenance. I also worked as a liaison between the Auburn University Department of Horticulture, Fayetteville School, and FarmLinks Golf Course. My liaison work included brainstorming sessions, asking for volunteers from Auburn and Lakeside, and providing updates on the progress of the project.

During the summer of 2009 I supervised an intern who was an undergraduate student in Auburn's Department of Horticulture. His responsibilities were solely based on garden maintenance, which is especially high in the summer. While I loved many things about my job at Fayetteville, my favorite parts by far were involving the students in the garden implementation and helping the teacher's to utilize the gardens for education. During 2009, we hosted three planting days, two of which were open to the community, and the last was during the school day for the students. The two community days were huge successes, with the first community day in March garnering around 250 volunteers, even after a rainout the week before. The student planting day was hosted in April on

Earth Day and provided each of Fayetteville's 650 students the opportunity to be a part of the planting. The elementary grades began implementation of the children's garden, with each student planting a herbaceous perennial plant or shrub. The middle and high school grades worked on installing either trees or shrubs. Before any installation took place, each group was given a demonstration from Auburn University Department of Horticulture or FarmLinks Golf Course volunteers on how to correctly plant the flower, shrub, or tree. A few weeks after the Earth Day planting I remember being out in the garden doing some maintenance work and several group's of students walked by and pointed out the plant they planted, some had even named their plants.

Another activity I worked on with the FHS teachers and students involved my presenting a recycling and composting presentation to several classes in both middle and high school. Following those presentations a group of 7th graders worked to establish an environmental club. The club, which was sponsored by two middle school teachers began a recycling program throughout the school's halls and created signs educating the students about which items were recyclable and why they should recycle them. The club also began composting materials from the lunchroom. I served in an advisory role for the program but its formation was student led.

As mentioned earlier in this chapter I also worked with one of the elementary grades to establish a butterfly area in the children's garden. The student's teacher incorporated many educational subjects in the planning and implementation of this garden from the basic subjects such as science, math, and English, to the less common subjects and lessons such as art and logic.

Following the year I spent at Fayetteville two other Auburn Horticulture alumni worked as program coordinator. The first individual worked for the remainder of the 2009-10 school year and following summer and the second person worked during the 2010-11 school year and subsequent summer. During this year and a half, two more community workdays were held and the work on the children's garden continued, with the implementation of a themed vegetable garden. The tree grove was also further developed, with the addition of more trees and a decorative fence that replaced a chain-link one. Towards the conclusion of the two and a half years on Fayetteville's campus the final program coordinator gradually lessened her hours to transition management of the project to the faculty and staff at FHS. The coordinator also developed packets for each of the elementary school teachers, which provided activity and planting suggestions for the children's garden. The packet also included a maintenance schedule which divided the maintenance of the gardens up among each of the 13 grades.

Following the conclusion of my year of work at FHS, I began work on a Ph.D. at Auburn University where I was able to continue my involvement with the project. It was quickly decided that my research would examine the project at FHS and I began working to find a control school for parts one and two of my study. I conducted the research for those portions in 2011 and 2012 and began this portion of my study in 2013. Prior to beginning my qualitative research, I completed two classes in qualitative research methods, in which I conducted a pilot study. I ran a pilot study for this research and was surprised to find that I tended to have negative biases relative to the Fayetteville Landscape Project. In the two and a half years I was involved in the project I was privileged to witness many successes, but also looked for the things that needed to be

improved and completed. With a project of this size, there was never a shortage for this list. Realizing this bias helped me to position myself for completing this research and as I completed this study, I was careful to continually examine myself for bias in either direction, positive or negative.

Materials and Methods

Statement of the Research Problem: This three-part study utilized a mixed methods approach. Parts one and two were quantitative and part three was qualitative. This chapter will discuss part three and examine two research questions:

1. How did FHS students, faculty, and staff experience the landscape project at Fayetteville School?
2. How might other schools better implement a similar landscape project?

Design Selection: This portion of the study utilized qualitative methods, which were deemed an appropriate coupling with the first two quantitative portions of the study. Parts one and two incorporated large numbers of students, with data collection through the use of surveys. To provide a well-rounded examination of the Fayetteville School Landscape Project, a more in-depth study was desired for part three. Qualitative research is esteemed for the in-depth data it provides (Creswell, 2007; Denzin and Lincoln, 2011). It is considered especially appropriate for educational settings, where researchers can use rich data to explore and comprehend what is occurring, why it is occurring, and its meaning in that context, case, or situation (Freebody, 2003).

The philosophy and epistemology behind qualitative research has been debated for years, along with the issues of validity and reliability (Cresswell, 2007; Lincoln and

Guba, 1985). However, “qualitative research is a field of inquiry in its own right, crosscutting many disciplines” (Denzin and Lincoln, 2011).

As the overall purpose of this study was to assess the program at Fayetteville School, an intrinsic case study method was selected. This is the recommended qualitative method when assessing a program (Creswell, 2007). An intrinsic case study “resembles the focus of narrative research,” while setting the analytic procedures for the case within its context (Creswell, 2007). As a result, parts of this study are presented in a narrative format, telling the story of the student’s and teacher’s experience of the landscape project (research question 1). Following the telling of the story, conclusions and recommendations will be made for improving the project, that it might be better implemented by another school in the future (research question 2).

Participant Recruitment and Data Collection Procedures: In his book about case studies, Yin refers to six forms of data collection appropriate for case studies: archival records, direct observation, documents, interviews, participant observation, and physical artifacts (Yin, 2003). This study utilized three of those forms: direct observation, interviews, and participant observation. Direct observation was taken from notes and memories of my time spent at Fayetteville School. Interviews are the main form of data utilized for this study, while participant observations are those reported to me by faculty and staff during our interviews.

Maximum variation sampling was utilized in selecting participants for this study. For maximum variation sampling, some criteria is determined in advance that differentiates participants, then participants are selected that are quite different based on that criteria (Creswell, 2007). The pre-determined criteria for this study was level of

involvement and perceived excitement level, with participants selected to represent a range of levels of involvement from “very involved,” to “moderately involved,” to “barely involved.” Level of involvement was generally perceived to indicate level of excitement as well, with those that are very involved being the most excited, and so forth. Each faculty or staff member’s level of involvement was determined by my personal observation during the year I was at Fayetteville. As a result, this meant few faculty and staff were included in the initial sample list that weren’t present at Fayetteville during the year I was there. To offset personal bias and to account for new faculty and staff at the school, snowball sampling was also utilized. The snowball sampling was accomplished during a pilot study, where teachers involved in the pilot study were asked to list faculty and staff members they thought would be appropriate to include in the study. Teachers were asked to list individuals that represented involvement and excitement levels across the spectrum, without stating where the individuals fell in that spectrum. The pilot study data is not included in this dissertation as my interviewing skills, as well as the interview protocol, were greatly improved at the conclusion of the pilot study.

As a result of the pilot study, a list of 16 potential participants was made and, following Human Subjects approval, the potential participants were individually emailed. The e-mail included an explanation of the study and an invitation to participate in an interview during their planning period or after school. Thirteen of the 16 potential interviewees responded that they would be willing to participate and an interview time was then scheduled.

Interviews were then conducted at either Fayetteville School or at a location of the interviewee’s choice if the interviewee no longer worked at Fayetteville (some

interviewees worked at other schools in the county or had retired). For faculty, interviews were conducted in the teacher's classroom. For staff, interviews were either conducted in their office or in the school conference room. These locations allowed for relative privacy and few distractions. For faculty, the majority of interviews were conducted during their planning period, with a small number being conducted after school. Staff interviews were conducted during school hours if they were available, or after school.

Interviews were conducted using a semi-structured format with a pre-determined interview protocol developed (Figure 5.1). This allowed for a natural flow of conversation, as follow-up questions could be asked, but the protocol kept the interview on task and aided in avoiding value-laden terms. Several of the interview questions in the protocol included potential follow-up and clarification questions that were included as needed. An Auburn University professor with qualitative research expertise reviewed the protocol, which I developed (Henry, 2011). After review, several edits were made to ensure no bias was introduced in the questions asked. The protocol was developed with faculty in mind and was therefore altered slightly when staff were interviewed. Follow-up questions are not reported, as they varied with each interview, and no key questions emerged that required being addressed to the entire group. At both the beginning and end of each interview I assured the interviewee of confidentiality and told them they would be assigned a pseudonym, though Fayetteville School would not. I also opened each interview by stating that the goal of this research was to improve the current project at Fayetteville and to provide valuable advice for any future projects modeled after the Fayetteville Project. I stated that, because of this, I valued their honest feedback about the strengths and weaknesses of the program. Each interview lasted between 30 and 60

minutes and was electronically recorded for later transcription and analysis. Interviews were recorded, rather than notes taken, as I wanted to be able to focus all my energies on conducting a quality interview. The recordings also allowed for more in-depth analysis, as interviews could be reviewed verbatim. Data-saturation is the point at which no new themes emerge in data collection. At the point at which data saturation is suspected, one or two more interviews may be conducted and if no new themes emerge during those interviews, data collection may be concluded. Data-saturation for this study was achieved around the tenth or eleventh interview. Each of the 13 faculty and staff that agreed to participate were interviewed, though more would have been recruited had data-saturation not been achieved at this point. In accordance with Human Subjects Board regulations, all data will be kept in a locked filing cabinet for three years and then shredded and disposed of.

Data Analysis Procedures: The interview data in this study were analyzed using the systematic approach recommended by Miles and Huberman (1994), as developed by Glaser and Strauss (1967). While this is the basis for grounded theory analysis, it is utilized in many forms of qualitative analysis (Creswell, 2007). A holistic analysis of the entire case was conducted, with each interview being analyzed for emergent categories. Following the conclusion of interviews, all recordings were transcribed verbatim, with the omission of filler words such as “um” and “like,” as well as the omission of any off-track conversation. The transcripts were then reviewed several times before beginning analysis to provide a sense of the whole data before breaking it down. Memos were recorded in the transcript margins as well as in my audit trail. These memos included thoughts on emerging themes, as well as data and personal observations. Following initial

review, the transcripts were reviewed in detail, with units being coded into categories according to the recommendations of Creswell (2007) and Strauss and Corbin (2008). Units might represent a line, sentence, paragraph, or a story, that falls under one category. The following quote is an example of a single sentence that was assigned to one category, use:

- *Yeah, when it started getting warm and stuff we would go out and sit out there and let them read, it's kind of like a reward for them.* Meggin Eakes

Note: All data quoted directly from interviews are presented verbatim in the italic form and are indented and signified by a bullet point. Names within quotes have been altered or eliminated.

The following is a longer example of a single category:

- *Remembering to use it. For me to remember to use it when I'm being told I have to have, this done, this done, and this done...to always keep it in your mind that way you'll use it more.* Alana Anderson

In the above quote, the entire passage was coded under the category challenge, with the subcategory of time.

Finally, some units contain more than one assigned category:

- *So sometimes I'll be like, "is there anything we can weed today, I see that you're just swamped, we've got a few extra minutes and can go outside." Because we're always trying to help him cause it's a lot, it's a LOT for one person to maintain. And I feel like that's why some of the elementary teachers have kind of backed off because they feel like the more they do the more it puts on him instead of them saying, "okay, we're gonna plant this and we're gonna also be responsible for weeding this."* Leah Collins

This passage was assigned two categories: challenges and benefits, with the benefits subcategory of ownership. It is evident throughout the passage that maintenance is an issue. However, in this passage the speaker is also demonstrating ownership of the

gardens as they discuss bringing their class out to work in the garden and the desire for other teachers to demonstrate ownership as well.

Once all data had been analyzed and coded, 35 initial codes emerged. Those codes were combined into seven categories with subcategories representing some of those initial 35 codes. The data were then analyzed again, keeping these new categories and subcategories in mind. I also checked to make sure no new codes emerged, as suggested by Lincoln and Guba (1985). The families and their respective subfamilies are discussed in further detail in the findings and discussion section.

The term validity is often used in quantitative research to assess a study (Cresswell, 2007). Validity is an indication that the findings represented are certain, meaning that the findings are backed by evidence and there are no good reasons to doubt the findings (Schwandt, 2007). This term may be appropriate for quantitative studies where large amounts of data and an experimental design may be utilized. To evaluate the validity of qualitative research however, other terminology is more appropriate. Trustworthiness is the term most often used when assessing a qualitative study. It encompasses four criteria: credibility, transferability, dependability, and confirmability. Credibility (parallels internal validity in quantitative research) concerns representing the participants in a true way. Transferability (parallel to external validity or generalizability) refers to the ability to extrapolate the findings of one specific case to another. It is determined by the reader of the study, who decides whether the case they're reading is similar to their case. Dependability (parallels reliability) focuses on the inquirer's responsibility to ensure that their methodology is logical, traceable, and documented. Finally, confirmability (parallel to objectivity) requires the linking of conclusions,

interpretations, and so on, to the data in easily discernable ways. Credibility can be attained through including member-checks and outside coders, both of which were included in this study. Member-checks were incorporated during interviews, as I often summarized an answer to ensure I've understood the intended meaning. Member-checks were also done through follow-up questions and by giving participants the opportunity to provide feedback on their transcript and the categories and sub-categories assigned to the data, both of which were e-mailed to them individually. An outside coder was utilized as well, with two random interviews chosen for the coder to analyze. Codes were then compared, with an agreement of 0.81. This met the standard for agreement of 0.70 suggested by Creswell (2007). Transferability, dependability, and confirmability may be achieved by providing thick description of the research process. This was achieved for this study by providing examples and illustrations within the text to demonstrate the process that was followed. Numerous quotes were also included to allow readers to draw their own conclusions from the data and determine whether they align with this studies conclusions (Kvale and Brinkmann, 2009).

Epistemological Stance: In qualitative research, the researcher is viewed as the instrument. As such, it is important to address the views of the researcher and their relationship to the research. As was mentioned in “The Story” section, I was a part of the design team that developed the design for this landscape project. I also was the initial project coordinator and have been heavily involved in the project since its inception in 2008. My research area is also horticultural education and I plan to work in an education department at a public garden in the future. Clearly, I have a lot invested in the project and want to see it succeed. I also believe in the power of active learning and think a

garden is a great environment to incorporate many educational lessons. Because of my vested interest in the success of this project and in garden education programs in general, I was very careful to continually examine myself for bias. Early on in the analysis I was surprised to find that my bias leaned toward the negative. This is understandable, as during the year I was at FHS my job included constantly looking for ways to improve, meaning I noticed more of the challenges and drawbacks than an outsider may have. Once I realized this, I examined myself for bias in both the positive and negative direction. I also incorporated member-checks throughout the interview and analysis process to avoid this.

Findings and Discussion

During initial analysis 35 categories emerged. These categories were combined into seven larger category families with sub-categories. The seven categories are: benefits, amount of use, excitement-level characteristics, the future, challenges, advice, and successes. The categories, with each of their subcategories, are shown in Table 5.1.

Benefits: As benefits was the largest category, it was broken down into subcategories and in some instances, further broken down into sub-subcategories, as described by Creswell (2005). Subcategories are underlined and will be discussed in the order they are listed in Table 5.2. The sub-subcategories are not listed, but will be discussed with the subcategory under which they fall.

General benefits: One of the general benefits reported was beautification of the campus. Many interviewees reported this benefit. Two representative quotes are seen below.

- *I think the school looks better each time I pull in so I've been happy with that.* Alana Anderson
- *I know... as a baseball coach; it's (the beautification) made me want to redo our eyesore (the baseball field and surrounding areas) when you walk out to the front of the school.* Monte Cooper

Another general benefit related to enjoying the great outdoors. This included utilizing the gardens for activities other than education, such as a place to eat lunch, or a place to take kindergarten graduation pictures. The gardens were also used as a “place to get away, take a break.” One of the reasons for going out to the garden was “going out to enjoy and smell the plants.” The community also utilized the garden, with a cross fit group meeting in the children’s garden and several in the community using the campus to walk.

- *Yeah, when it started getting warm we would go out and sit out there and let them read, it's kind of like a reward for them. Meggin Eakes*
- *More of the classes have gone on a nature walk, even around the tree walk, which obviously we weren't doing beforehand. I think that I was observing more of those things and that just continues to grow as we expand, like when we do get a boardwalk. Susan Hume*

Another reported benefit came from getting kids into nature and allowing them to experience the benefits of being out in the sunshine:

- *One big benefit is getting kids into nature. I see a lot of depressed children in this office. Children. A lot dealing with serious depression, not just, "I'm sad today and I'm okay next week." I think a lot of it's because they're not outside anymore, you think about it when they go home they're watching TV or playing games. They're not outside riding their bikes.... Yeah, outside sunshine increases that serotonin. So even the kids that wouldn't deal with depression are dealing with that anyway because their serotonin is starting to decrease in their bodies. It's a huge thing, I think that's the biggest benefit (of the project), because if you're depressed then you're not gonna learn, you're not gonna live, you're not gonna do anything. Carolyn Miller*

Other benefits were reported related to using the vegetable garden. The first benefit was a willingness to try new foods, which often resulted in improved nutrition.

- *I actually saw some of the kids, when they'd go to the busses, they'd get vegetables and I remember a kid getting on the bus with an eggplant, and I'm thinking, "What the heck is that kid gonna do?" You know the kid loved eggplant and... was so excited about taking the eggplant home...
Ann: but do you think there was any interest in it before?
No and I think that's why I remembered it because I kind of pictured this child as a happy meal kind of kid so it was kind of odd too me. And there were other things there he could have taken.... And I know as a mother, if my kid had brought it home, regardless of whether I liked it or not I would have tried to cook it so I hope they did something with it. Meggin Eakes*

One group of students utilized the gardens for many things but reported that their favorite use of it was for a pepper-eating contest:

- *Every day when we'd come out of the lunchroom before going to the garden we would pass the pepper garden and there was a couple kids that just loved them and we'd pick a couple and eat them on the way back down to class.... habaneros and cayenne peppers, very very hot.... There was a couple of boys*

that were always like, “Oh this one was killer hot” and so we were like “Oh y’all are just pansies” ... Ms. Goodman, she and her husband love hot food, we would take them half of what we had picked and she’d take it home.... And so they told us to have a pepper-eating contest, me and Ms. Goodman. So there were yearbook cameras in our faces. We had to eat the reddest peppers that we could find over the period of that week and eat it all the way to the stem and eat all the seeds and swallow and not throw up for five minutes. The first one that was finished won but then we had to make sure we didn’t throw up.... You couldn’t have anything to drink.... You just had to sit there for five minutes. And it was miserable. I won! ... But you know the kids would do it all the time. But we just had a lot of fun while giving them the opportunity to learn, “oh this is gonna add flavor to this,” and “oh, we can use this bell pepper even though they don’t have any in the lunchroom” so even to and from the lunchroom we’d pick a few things and take them in there.
Ann: *Do you think any of them would have eaten a pepper beforehand?*
Probably not. Leah Collins

Other reported benefits included community members and staff learning how to care for plants. In fact, seven of the 13 interviewees reported a new or increased interest in plants. Students and teachers have also benefitted by taking food home from the garden.

- *Cause they’re like, “Gosh it just makes your hands smell,” and then you’re like, “not only does it smell but you can use it to cook.” So we’re trying to root some rosemary now. Because they were like, “Can we plant some of that at home?” So we’re trying to root a little bit at a time to send home with them.* Leah Collins

Increased teamwork among the elementary teachers was reported as another benefit.

- *And I’ll say this, whether it was this project or not, I have seen more teamwork on that hall among the teachers because we organize the garden by grade levels.* Susan Hume

Finally, enjoyment of and excitement about the garden, were reported as benefits.

- *There is a high level of excitement. Especially after lunch, they’re like, “Can we go look at the gardens?” It kind of wanes in the cold, I mean they still would, but my interest level’s not too high when it’s cold and rainy!* Hilary Lewis

- *We've come from generations where we used to plant gardens. I think the younger generations don't get into that as much as they used to but now that's kind of back, and they enjoy it. That's what amazed me is how much they've enjoyed being out there and being part of it.* Jeremiah Moore
- *By the third year, when I'd already gone a year past my retirement, I stayed one more year mainly because of the project, because it was so exciting. I didn't want to quit at that point and that was my only reluctance about retiring...* Susan Hume
- *On the way to the busses they'd walk right through the gardens and everyday they'd watch the peppers and they'd want to pick them and take them home and eat them... and they would ask me what species of butterfly something was. Then we'd go look it up. And they learned the difference between a swallowtail and some of the other species.* Kira Scott

Education: The second benefit subcategory was education. The garden was reported as a great place to implement Project Based Learning (PBL). PBLs utilize active discovery to encourage long-term learning. PBLs were reported as especially great for young students and kinesthetic learners. The following is an example of a school-wide PBL that was implemented in 2012.

- *Last year we did tulips as a... huge PBL project with all very involved. We looked at other areas of climates like Minnesota and places like that. We got data from them and our study was how our climate was affecting the same type of plant as in Minnesota.... We planted different areas and teachers would grade them (rate the tulips) and get measurements of the amount of growth over time.* Seth Williams

Even when not tied to PBLs, the garden was reported as a useful environment for active learning that provided students with hands-on experience and faculty with the opportunity to use “teachable moments.” Active learning was reported as the type of learning that “sticks.”

- *One of the most vivid things that I remember... was you teaching the kids about tickling the roots. The kids picked up on that because I even heard one of the high school students, the day we were doing the planting in the senior area, saying “Remember, we're supposed to tickle the roots.” So that's a*

good sign, if you remember it from three years earlier, and can quote it back exactly, that's learning. Permanently. Susan Hume

The garden was also reported to tie in with many existing curricula. For example, several teachers reported incorporating literature books, such as *Eating Through the Alphabet* and *Tops and Bottoms*, with work in the children's garden. The garden also ties in with lessons about plants and seeds that several grade levels are already teaching.

- *I think they liked the things that they were able to connect with and it made some of the lessons about growing seeds and plants, those are things that were always in the book, but it gave them a chance to do something a little different with hands-on. Susan Hume*

Many of the faculty I interviewed reported lessons students had learned in the garden. Areas utilized in the children's garden included the sensory garden, vegetable garden, butterfly garden, and stump seating-circle. Produce from the garden was used for cooking projects and one of the groups even created a sundial from the stumps in the seating circle. One teacher listed many lessons for which the garden was used:

- *We did things with habitats and talked about soils and the bark and how the soils can be a habitat. Little things too, like how to weed, "You don't just yank the top off, pull the whole weed." We talked about the different kinds of roots. And there was the sensory garden that we used for writing. Or the cash crop garden. That was a big thing in our grade because we grew the cotton, peanuts, and corn. Kira Scott*

Other lessons from the garden are listed below with a corresponding quote.

Learned environmental stewardship:

- *I think they started respecting it more. They didn't want to trample on it and started using the sidewalks. They would pay attention to plants and would notice, "Hey, that weed had a taproot" and make connections. Kira Scott*

Learned where food comes from:

- *One of my high schoolers, when we were out back and they had the cotton, corn, and peanuts growing, ... we talked about cash crop. I said, "Hey these*

are the things that grow in Alabama that we produce.” And they didn’t realize that. So that was pretty neat. Monte Cooper

- *The younger kids, they were just amazed as far as planting. Even though it’s a very rural community and a farming community, we were really amazed at the students, “oh yeah, I just thought they came from the grocery store.” And that it starts out as a seed and the growth process and the fact that you can’t plant just anything.... It was very much a teaching tool for them.... Laura Johnson*

Tree grove/dichotomous key example:

- *I use the tree grove to do dichotomous keys and they were all over that. They were serious about finding it.... They were in groups and they had 3 different trees assigned to them... and they would list out the path they used to get to what kind it was. I think that was probably the most engaged they have been. Ann: most engaged, like out in the garden? Right, like outside. They really enjoyed the planting because they get to dig in the dirt but I think that was so different, because a few of them have gardens at home, but a dichotomous key... was like a little mystery game and they really liked that. Meggin Eakes*

Okra activity:

- *They wanted to go pick the garden. Well, everything was dead so I was like, “okay we’ll go pick the okra.” So we picked the brown, hard stalks of okra, and they’re so proud, “We picked okra today!” Then I was like, “What do y’all want to do with this okra? It’s dead.” And they were like, “Well can we play with it?”... so we made it into a math activity and pulled all the dead seeds out and they grouped them into groups of 10. Then we did borrowing with re-grouping and we froze the seeds and we’ve used them to replant. That was something neat that they could take ownership for. They really had fun with it and we counted something like 500 okra seeds. It was a way for them to see, “okay we did this, and now we can reuse.” They got to see that whole cycle there and it was something they were just interested in. Leah Collins*

Butterfly garden:

- *I had my students research the butterflies of Talladega County and we got a map and listed them all. Then they had a chart and had to find out the species, what it ate as a caterpillar, as an adult, what kind of shelter it needed, and we drew a picture of it.... We came back together as a class and made a tally chart and we said, “What does your butterfly eat as a caterpillar?” And they listed them all and I wrote them down and we kept adding to the tally chart. When we were finished we did that with the adults as well. Then we said, “What plants really stick out?” “This one might have 10 butterflies and this one only has two.” We selected the ones that had the most on each one and*

then went to Google and looked up pictures and if it was a 60' tree, we ruled it out. If it was a weed, we eliminated that. So we picked out the ones we felt would be best.

Composting:

- *...we've kind of quit doing the green stuff for sanitary reasons in the cafeteria. But it helped the kids know what could go in there. Cause they'd pay attention when they were eating so if they saved an orange peel we'd break it up into small pieces and they learned that the smaller it was the easier it'd be to decompose. Hilary Lewis*

Ownership: The third benefit subcategory was ownership. One way ownership has been demonstrated at FHS is through a cleaner campus.

- *As far as cleanliness, I've noticed a difference there, with a lot less garbage laying all over and having to say, "You've got to clean that up." Carolyn Miller*
- *One of the things that we started was trash pickup and I used to say, "You know, if Mr. Pursell can walk along the road and pick up trash..." and I think that that's been a habit that had not been done beforehand but that's really stuck with it. Every time I'm down there, you see some group of students... out policing the grounds...
Ann: *do you think before, would it have been Jeremiah that would have been expected to do most of the trash?*
*Yeah, I don't think that there were any... teacher's just out automatically... during the time that I was a teacher myself, I didn't take them out. Susan Hume**

The 2013 senior class demonstrated ownership of the FHS campus by donating money for a new kiosk information sign on the grounds. The 2012 senior class also demonstrated ownership when they donated money towards the "Senior Garden". They also installed it and since it's installation, have been reported to sit out in the garden in the mornings before school:

- *I don't care how cold it is (they sit out there) and they talk.... They really enjoy that. Alana Anderson*

The elementary grades have shown ownership as well. One class “adopted” the wind chimes from the sensory garden and brings them in each day before school lets out. Other classes have brought gloves into class so they are prepared for any work in the garden. Other demonstrations of ownership and pride are listed below:

- *The kids that graduated have come back, you know after three years and pointed out their tree. You hear them talking about that all the time. I think they like that they had a permanent involvement in something that’s gonna be here for a while... and I’ve noticed they take care of whatever they did.... A lot of... the little ones... if we do our summer gardens before they get out of school... they’ll holler at me, “Make sure you water my plant!” “Make sure you....” I’ll get texts from their parents saying, my babies sitting here and she said, “I hope Mr. Moore’s taking care of my sunflowers!” And I’ll tell them, “Yes, I’m watering it....” Jeremiah Moore*
- *They talk about how pretty it is. Anytime we have to go out and take pictures they’ll say, “Let’s get in front of these rose bushes.”... I notice them sitting out at the picnic tables out here. I’ve heard the little ones when they walk by and things are growing, “oh, look at that!” So they’re very positive. Carolyn Miller*
- *I actually had one of my kids ask, and that’s why we decided we really needed to work on the sensory garden raised beds, because they were like, “Man it kind of looks bad, it doesn’t look as good as it did three or four years ago.” So I was like, “We’ll do that.” So I have eight seniors that decided to step up and we’re gonna do it. Leah Collins*
- *I have students, baseball athletes, who are wanting to take more care of the baseball field now because, “Hey, the rest of the campus is looking good.” Monte Cooper*

Finally, an increase in ownership and pride since before the project began has been shown.

- *I’m more aware of trying to keep things looking nice and I try to get my kids to take ownership with each new class. Hilary Lewis*
- *...I think we all take more pride in our campus now because of it. If it wasn’t for that...you don’t see as much trash laying around, you don’t see weeds get as bad out of shape as they used to. And I have seen teachers out here pulling weeds and helping out. I’d say that it’s made us take more pride in our campus. Monte Cooper*

- *Lots of them took on watering, “oh yeah we were here the other day and this needed watering.” Doing it just because it needed to be done. Taking initiative, sharing responsibility. Even though that’s not where they live, it was their school and they were there quite a bit during the day and after school. And taking that ownership. Laura Johnson*

Community involvement is the fourth subcategory of benefits. Many community members and local businesses have volunteered with this project. This includes the key sponsor, FarmLinks Golf Course and its owner, Jimmy Pursell, Home Depot, and several small local businesses. FarmLinks Golf Course has been instrumental in the development of this project, donating the use of their equipment, offering expertise, and even donating their labor. Jimmy Pursell, the owner of FarmLinks Golf Course has also been the key financial sponsor of the project. Home Depot recently “adopted” FHS and is helping them to revitalize the children’s garden and providing education for classes on planting days. A local plant nursery, Hanna’s Plant Nursery, has donated plants and aided in the planting of the senior garden. Another local businessman, Chris Rheed, built and donated outdoor trash cans and aided in building a new wooden fence at the school. Each year at Christmas, FHS’ “lighting of the tree grove” is largely attended and enjoyed. Planting days have attracted families and were reported as great successes, which encouraged community ownership. Below are some representative quotes:

- *Like daddies came out more... you’d see a whole family. Not just the mom. I took a lot of pictures of family’s planting a tree. That was good, cause normally you don’t see that. Kira Scott*
- *I know a lot of the students helped plant the trees cause I was out there with them doing it on community workdays. Casey Ross*
- *...some of the parents that I’ve noticed, I was gonna say don’t have full time jobs, but I’ve noticed some that have taken off work to help... Carolyn Miller*

- *There's a lot of stakeholders involved and I like that, because as a principal you always want your community involved. You're not isolated, you're just a mirror image of your community.* Seth Williams

Greatest benefit, the final benefits subcategory, involved three major benefits:

increase in ownership and pride, beautification, and permanent learning. Representative quotes are reported below:

Increase in ownership and pride

- *You'll hear them say, "We need to tell Mr. Williams we need pine straw back here." They notice when things need to be done. You see several kids picking up garbage and having that sense of school pride or saying, "Mr. Scott pruned the roses." Lots of people notice when things get done.* Leah Collins
- *...the sense of ownership and pride not only from the staff, the faculty, administration, the students, the parents, the community... that their school is important, their school has other teachable moments, other than what's inside, the outside is just as important.* Laura Johnson
- *I drive past the school every time I go anywhere and so you get to look and see how things look nice and enjoy taking part in it.* Casey Ross

Beautification

- *I think it's one of the prettiest campuses in Alabama. The whole campus itself has been enhanced by the project and we have people come for games that can't get over how pretty the campus is, not just the fields but also the entire campus.... it's enhanced it community wide, statewide. People know it. Recognize it.* Casey Ross
- *It's beautiful! It's talked about. Everybody talks about it. It's the most talked about thing. Everybody that comes in, people I don't even know that come in for assemblies say, "Y'all have got one amazing campus!"* Jeremiah Moore

Permanent learning

- *One of the most vivid things that I remember... was you teaching the kids about tickling the roots. The kids picked up on that because I even heard one of the high school students, the day we were doing the planting in the senior area, saying "Remember, we're supposed to tickle the roots." So that's a good sign, if you remember it from three years earlier, and can quote it back exactly, that's learning. Permanently.* Susan Hume

- *Adding to the educational experience...not everybody can say they've seen that. That's what makes us so unique. Leah Collins*

Amount of use: The second category relates to how the gardens have been used over time. Teachers were asked to report any change in use since the beginning of the project and since before the project began. Teachers were divided in their responses on change in use since the project began, with two reporting an increase, and three each reporting a decrease or the same amount of use. When asked about change in use since before the project, every teacher said use had increased.

- *We never went outside before the project. I mean we might have class outside but it was always just sitting in the grass.... Now there's more spaces for us to utilize and it's more friendly and appealing for us to have class somewhere else because when it gets warm they've got spring fever and want to be outside and there's more opportunities for us to incorporate something. What could we do before? Pick clovers? So I'm a fan. Leah Collins*
- *I would say we use it more...as far as the classroom. I didn't ever go outside before we started these....I think it's just being outside, getting the sunshine versus being in here and you feel clogged up all the time. Going outside for fresh air is always good, especially in the springtime. Monte Cooper*
- *In years past what is now the tree grove hadn't been used for very much.... It was just grass, it connected with the baseball field, it was there but really not used. After the tree grove got put in... we started to use that area more, not only as a teaching area... but you would see kids out there playing, throwing balls, families at ball games moving around in that area. They had not even been out there before. The area down by the ditch between the road and the tree grove... kids could go down there to be by the water and they used it for water sampling and different things in their classrooms.... And of course, towards the back of the school with the children's garden... there were logs and you would see kids after school sitting and just using it as a recreational area, and as a hang-out to sit and talk in between things... where instead of indoors, they'd be outdoors. And that was aside from the teaching. Because yes, you're out there when your teachers make you go out there, but those kids were outdoors of their own choice....The school is the hub of that community and there's always events going on there. And it's land that just wasn't being used before. Laura Johnson*

Excitement-level Characteristics: The third category relates to the characteristics of those involved in the project that were either most or least excited (Table 5.2). Related interview quotes are reported below.

Several faculty and staff reported that some of the most excited students were those that don't always excel in the classroom.

- *You know when you do classwork you normally have ones that are more standoffish, because they just don't have it like the other ones do. Well that was kind of a different environment, you know almost like no risk and they felt like it was okay to make mistakes, they didn't feel like it was a grade.... One time I went out and we were getting ready to plant and... this one boy in particular was kind of a bad attitude kid and he wound up being the one that was gathering all the weeds and hauling them off. But I remember he kind of took that leadership, "oh I can do this."
Ann: so you feel like... the ones that act up in class...
Yeah, they found a job they were successful at.... In my classroom he wasn't always successful in math or figuring out symbiotic relationships and then you go out there (to the garden) to figure out stuff and he's all over it because he was successful there to where the words in here are just that, words. Meggin Eakes*
- *I have noticed in the past... in some cases I've been surprised that somebody was getting it.
Ann: as in the ones that don't normally get it inside?
Yeah. Hilary Lewis*
- *In a classroom you have different kinds of learners, those that are visual, they see it and they've got it. But your kinesthetic learners...a lot of times it's the kids that misbehave, that tend to like doing stuff outside. They like to get in with the dirt and do what they're supposed to be doing. They can be more of the leaders then... sometimes those book smart kids don't really know what to do when they're outside doing it. Kira Scott*

The teachers most often reported to be excited were "those that buy into everything."

- *...this is a huge chunk of your life and they're the ones that want it to look good and want the kids to have more than just the paper and pencil education. Those were most excited. Kira Scott*

Finally, some of the most excited community members were those that like to garden or those that feel they have something to offer, such as bringing a tractor or shovel.

- *From my understanding and from the little bit I've been around her she loves to be outdoors. She doesn't mind pulling weeds, planting stuff, cutting grass, weed eating, you'll see her doing a little bit of everything.* Monte Cooper
- *A lot of times parents are stand-offish because they don't know how to help or they think, "I don't want to cut out laminating letters and run copies," but "Hey I can dig a hole or bring my shovel." So it brought out some different parents.* Kira Scott

Of the least excited students, several were those that don't like physical labor or are lazy in general.

- *I think they wanted things to look nice, they wanted to say that they were a part of this but they weren't willing to step up and put forth the physical effort that it took.* Laura Johnson
- *...there were a few that were sort of like, "Really? You think I'm gonna get down on my hands and knees and put stuff in the ground?" and I'm thinking, "okay maybe you could shovel mulch, or... rake?" And really he just wanted to sit. So it doesn't appeal to everyone but then very few things appeal to everyone.* Susan Hume

The teachers who were least excited were most often reported to be those not involved in anything, who consider their work, "just a job." Other times, teachers are involved with other big projects at FHS, so they're focused on something else. Finally, the teachers that don't like gardening tend to not be as excited about the landscape project.

- *...the ones that don't care about it are the naysayers that are just here for the paycheck. The grumps that don't get on board with anything.* Meggin Eakes
- *...at this school in particular there's a teacher here who's great but she has her thing, technology. So she's not interested in other projects.* Kira Scott

- *“Really, you want me to go out there and work in the yard? That’s just not me.” And I don’t think the project turned them off I think it’s just people that have that characteristic. Susan Hume*

The Future represents the fourth category, which is broken down into three subcategories: future plans, future desires, and still students.

Future plans: Many of the teachers, especially those in the secondary grades expressed excitement about the outdoor classroom pavilion that will be installed in the next phase of the design. One of the teachers expressed a need for a larger seating area in the garden and I think this may be part of the reason for the excitement about the pavilion. Currently there are two seating areas on the school grounds, the stump seating-circle and some small picnic tables. Both are in the children’s garden. Providing a seating area that will hold at least one classroom may encourage further use of the grounds for education. Two of the interviewees are currently working on a grant for the pavilion area with plans to tie in environmental studies and ecosystems. Quotes representative of the excitement about this area are below:

- *The outdoor pavilion that they’re working on next, I’m excited about because I feel like... when the pavilion is there that’ll be a place I can take a whole group of kids out, with a purpose in mind of “Write about this,” or “Look around you and create a poem about this.” Casey Ross*
- *We’re the only school that I know of that’s actually got a wetland on their own campus. We don’t have to bus kids to the wetlands, they’re here and that’s something that we can take advantage of. Seth Williams*

Another way faculty and staff are planning for the future is in brainstorming ideas to pull in more education. For example, one faculty member suggested the administration require at least one garden PBL every year. Reported below is another idea.

- *I wonder if they could do something like budget a garden? You know, if we’re gonna plant vegetables, here’s how much money we’re gonna spend... they could research what could be planted that time of year, how long it takes them*

to grow, how much they're gonna cost.... Other than the actual planting of things which I feel like a lot of them already know how to do because they grew up in the country. But you can still teach them things through that. Math through angles of how plants are laid out.... Casey Ross

FHS may transition to block scheduling soon and they're hopeful that will help the secondary grades in utilizing the garden more. The current principal hopes to add a science elective that would easily tie in with the garden.

- *...open up some opportunities to do PBL lessons. Which is what our 1st grade is doing and which I hope opens up with the longer 96-minute classes.... They can't do the same thing for 96 minutes, they'll fall asleep, much less the kids. So they'll have it broken up into thirds and one of those thirds might be, "Let's go out here and work in the community gardens, let's measure our growth here, let's water this. Let's go out here to the tree grove and see what's needed out there." And that will bring more interest, not only from the students, but from the teachers as well. Seth Williams*

Finally, a staff member suggested creating a volunteer e-mail list that could be asked for help on specific, small projects throughout the year. This would reduce the need for huge workdays.

- *They don't realize if they get the word out more, we'll get people to come and not have so much of a big community day. If there was some way you could send out a message... "It's time to plant the garden" we might have people volunteer for that thing. A lot of time people...show up when the weeds are bad. Jeremiah Moore*

Future desires: Many faculty and staff also spoke of the future in terms of things they wish for. For example, many expressed a desire for lessons for the garden that are in line with learning objectives as well as literature books they currently use. Another desire is to add water and electric hook-ups in the tree grove for easier maintenance. Finally, they would like to add a track around the grounds for exercise and easy access to the outdoor classrooms around campus.

Still students: Throughout the interviews, especially those with the administration, the interviewees asked many questions, showing that they are “still students” who are continuing to learn how to make this landscape project a success. During one of the interviews I was asked for advice on using rubber mulch versus bark mulch. I was also asked about installing rain barrels and the last time I visited the school they’d built and installed the types of barrels we spoke about. In my interviews with the administration they also expressed an interest in hearing the results of this study that they might now how to improve.

Challenges: The fifth category relates to the challenges of implementing, utilizing, and sustaining the landscape project. It is broken down into six subcategories: maintenance, administration changes, need for structure and accountability, increased demands with no increase in time, other, and biggest challenge.

Maintenance: Maintenance was a big concern among many of the interviewees.

Many expressed general concerns for maintenance:

- *The area the seniors helped with last year, my biggest concern with all that is that it’s not being kept up. You know, now it’s done, but I can’t take them out there everyday during class to weed.... Nor do we have the staff here to keep it up and so I don’t want to see all of these wonderful things happen and not be taken care of. Casey Ross*

In many of the interviews there appeared to be an expectation of the maintenance man to do all the maintaining. While the faculty and staff expressed ownership of the project, few expressed ownership of the maintenance associated with it. The following quote may provide a clue as to why:

- *In the beginning I was really in the know and in the heart of it and I really tried to help and... now its like, “which section is mine and I’ll take care of it” cause everybody else isn’t gonna take care of theirs. You know it got to be one of those things where it was only the handful doing it.... which kind of*

tends to happen around here on other things too...so I don't think it's the garden so much as it is things in general. Meggin Eakes

Another issue with maintenance is that often the campus gets cleaned up before big events, rather than being continually maintained. This results in the cleanup taking “three times as long as it would have taken if you’d been doing it all along.” The children’s garden, though it’s been reported as receiving the most use, also requires the most maintenance. This is because of the constant seasonal changes in the vegetable garden. Another difficulty has been in raising money for maintenance costs, as there are no grants available for maintenance. This is why it’s recommended to include maintenance costs in any initial budget. Unrealistic maintenance expectations also pose a problem as the maintenance man can’t complete everything in one hour, one day, etc.

- *Then those people that you asked, “I need to prune roses.” They’re like, “So that’ll take you five or six hours to get that done?” and I’m like “There’s 98 of these things!” ... and then you’re out there doing it and you need three days of just pruning. You can’t go out and prune for an hour and then go do something else and then go prune for another hour and then go back a week later.... Its just communication. When you say you’ve got to prune 98 roses, “Go prune them.” Or get volunteers. Jeremiah Moore*
- *Yeah, maintenance is the challenge...and I said the other day, “Aren’t we glad that when Ann and them... figured out these plants that they used low maintenance kinds...!” And Jeremiah said, “Really? Those knockout roses are not really all that low-maintenance.” But what other bang for your buck could you get for nine months out of the year. So yeah, it’s not “no maintenance” there’s no such thing as no maintenance unless you want artificial turf. Susan Hume*

Administration changes were often listed as one of the biggest challenges of the project. In four years the administration has changed four times. This has sometimes resulted in an administration that’s not as invested in the project, perhaps because they’re overwhelmed with their new job.

- *I think the overall plan is, great. I think it's kind of fallen off a little bit. I think some of that is due to the change in administration.* Meggin Eakes
- *That's one of the problems, is getting on the same page with everybody of what I do, what my job is....It's like having to get re-trained each time a new administration comes in, you know, "What are you doing this for?"* Jeremiah Moore

Need structure and accountability: Many of the faculty expressed the need for structure and accountability, stating that they weren't sure what was expected of them and how the responsibilities were divided. Many also expressed the need for a coordinator, or "head cheerleader." They wished for someone who knew what was going on across the grades who could provide direction for when to plant, when to weed, and so on.

- *You really need somebody that's over all of it even though you have volunteers.* Jeremiah Moore
- *And Ruth worked hard getting those booklets together and assigning people parts... but... you've got to have somebody saying, "Okay, have you looked at your part of the garden?" And you'd think that would become automatic for the next principal or whatever but there are some things that I can see overtime have been forgotten.* Susan Hume
- *I don't think the teachers that were involved want to let it go, they just don't have the wherewithal to know, "Who do I talk to, how do I do this?"* Susan Hume
- *Cause it seems like when we try to get things going... we've gotten people who say they want to participate but then when it actually comes to doing it they either had the plants and didn't plant....I don't want to say they didn't want to do it. It's just that they had good intentions but then got overwhelmed. Because it's not a priority, they don't make time. Or they're under the impression that they didn't need to take any initiative, we were just gonna do everything. And this is what we got into last year, nobody said "You have to participate," it was just an invitation. And then when people didn't do it, it was like, "Okay you didn't have to. We would have done something different instead of leaving it not looking good."* Hilary Lewis

Increased demands with no increase in time: This subsection relates to the increased demands of state testing requirements and a feeling of not having enough time in general.

Below is a representative quote:

- *We have that natural ability to use teachable moments and sometimes you can look at your class and know you're not getting anywhere with them; and sometimes a stroll outside for five or 10 minutes can make a world of difference. But I think our teachers right now feel so locked in that they don't feel they can do that. And they've got to keep moving. And I've even seen that in our kids. Even my own daughter says, "Mom I hate school." And I'm going, "You've always loved school! What's going on?" And she says, "They're going so fast I'm not learning, I'm just memorizing." And she has an A average so it's not that she's not making the grades, she's just not learning. So the kids are feeling that crunch too. We would love to pull in some of this stuff... but I think at the same time our teachers are so pressed and limited that they don't feel they can do that.* Carolyn Miller

Many of the faculty, especially those in the secondary grades stated that they didn't use the garden enough for education because the state curriculum requirements continue to become more demanding. Many expressed the frustration that testing is too valued.

- *And with the testing demands that they put on us, you're torn. You're like, "Okay, do I do the testing stuff? Or do I go do what kids really need to know?" But I have tried (to use the gardens for teaching) when I don't have that pressure of the testing....* Meggin Eakes
- *It's just... basically people not working with kids telling the people that are working with kids, "You've got to do more and more and more," and not taking anything away. And it's kind of like, when you're closet gets full and you go shopping and get something else and you just keep trying to put more stuff in but you've got to get rid of something if you're gonna get something new. Otherwise you'll be bursting at the seams.*
Ann: so what are the kinds of things? The extra stuff?
A lot of its paperwork. Accountability. Hilary Lewis

Finally, the secondary grades also expressed difficulty in making time to get out to the garden because they have each class for a short period of time.

- *What's been hard with high school is you have them for 49 minutes and by the time you get them in here, sitting down and quiet, started bell ringer or whatever, you're lucky if you have 40. So there's not time to go outside and do anything. But the block schedule probably would help.* Casey Ross

Other: This subcategory covers a broad range of challenges, from the reason the teachers don't use the garden to the need to showcase it. One of the challenges I observed when working at FHS was the location of the children's garden, which is located in a courtyard between two wings of classrooms and the lunchroom. This location is very convenient for the faculty and students, as they pass by it every day on their way to the lunchroom, but it's in an area seldom seen by the community. Because of this, FHS may have to work hard to showcase the project and ensure that the parents and community know how the garden is being used to educate the students. One of the teacher's suggested adding signage to explain the educational uses of each of the areas in the garden. FHS could also include garden updates in the school newsletter and on the website, sharing the lessons taught in the garden each month. Another challenge relates to the vegetable garden, which is difficult to schedule, because many plants that might be planted in the fall are ready for harvest during Christmas Break. This is also true of spring plants, which are often ready for harvest during summer break. Finally, teachers may not be using the garden because they've never gardened and are intimidated or because classroom management can be difficult in the garden.

- *I was very hesitant and scared and reserved at first but I think it's a great learning opportunity* Leah Collins
- *As a teacher, you don't want to look dumb and I didn't know everything about those trees, or the wetlands. And you have to be willing to ask how to do it.* Kira Scott
- *Classroom management (is a challenge). You don't want to be mean when you get out there and scream. You have to get them in an environment where they*

can be loud and active but not recess active. So you have to be able to manage that. That's a challenge. So sometimes they don't realize, "This is just as important as sitting at your desk." Kira Scott

Biggest challenge is the final challenge subcategory. Faculty and staff were asked what they thought the biggest challenge of the project was. Representative quotes for the top three challenges, maintenance, time, and education ideas, are provided below.

Maintenance

- *So sometimes I'll be like, "Is there anywhere we can weed today? I see that you're just swamped and we've got a few extra minutes we can go outside." We're always trying to help him, cause it's a lot. It's a LOT for one person to maintain and I feel like that's why some of the elementary teachers have kind of backed off because they feel like the more they do the more it puts on Mr. Moore instead of them saying, "okay, we're gonna plant this and we're gonna also be responsible for weeding this." Leah Collins*

Time: to teach in the garden and balance testing demand

- *A lot of people come up with ideas and a lot of people want to do a lot more, it's just time. Jeremiah Moore*

Education ideas: especially for math and English

- *I know there are certain teachers that aren't a fan of sacrificing classroom time but I think it's just because of the subject areas they may teach. An English teacher might go outside with lots of ideas, whereas a math teacher might go outside and wonder what to do. Maybe pick okra seeds! Leah Collins*

Advice: The sixth category is derived from the question, "if someone else were starting a project like this at their school, what would you tell them?" The advice they offered covered a broad range of topics that were divided into six categories: commit and seek accountability, plan ahead, find a partner, work in phases, involve stakeholders/give ownership, and showcase the project. Some of the advice presented below was based off of successes with the FHS Landscape Project, while some represents challenges encountered, and things "we wish we'd known."

Commit and seek accountability: Many faculty recommended only starting a project if you have a committed administration. They also recommended establishing both within-school, and outside, accountability.

Plan ahead: This subcategory relates to planning ahead in terms of design, finances, educational uses, and maintenance. Many interviewees recommended having an overall plan designed before ever beginning implementation. The overall plan would provide direction and help in setting priorities. They also recommended planning five years ahead for both maintenance and educational uses. Raising maintenance money beforehand was also highly recommended (aim for 1/3 of overall budget). Several interviewees expressed the need to find someone who'll be at the school long-term to manage the project.

Many recommended clarifying responsibilities from the beginning, for financing, maintaining, and using the gardens for education.

- *There was a lot of talk about raising money and there was a lot of effort in that area but it's still not clear about who's supposed to do what. Hilary Lewis*

In planning ahead for education, one faculty member recommended creating instructional videos and planned PBLs, as well as providing general lesson ideas for teachers. Several suggested encouraging each other to use the gardens for education through project sharing, which would provide a "good peer pressure." Finally, it was recommended to provide continuing education for teachers to constantly give them ideas for incorporating the garden into lessons

- *We had a packet of, "Here are some of the things that go along with this and ways to use it." You know I think with our students modeling is the key, but it needs to be modeled with the teachers in how to use it.... Via Internet, FaceTme... you can say, "Lets talk through that lesson and plan it together.*

Here's what we need. I'll be there on such-and-such day and you and I are gonna side-by-side teach this lesson." Laura Johnson

- *Continue professional development with it (using the garden for education), because you always have new teachers coming in. I know the turn around is not huge there but you still have new teachers coming in that weren't in any of the initial phases so they didn't get any of that.... It would be new to some but then it'd be a booster shot to those that had been around the whole time.*
Laura Johnson

Find a partner: The third subcategory relates to finding a partner, or partners, to work with on the project. Many recommended finding someone with expertise, who is willing to offer support, whether through finances or labor, and someone with contacts. You might find this in one sponsor, or may need to partner with several organizations to meet all these needs.

- *You've got to figure out some funding source other than the state. Having a partnership, like with FarmLinks Golf Course, with not only the expertise they brought to the table, but the contacts that they brought to the table, was great.*
Susan Hume

Work in phases: Many interviewees recommended working slowly and in phases. They also recommended not leaving a phase until you're sure it's under control, both in terms of maintenance and education. Below are the recommendations of one of the administrators:

- *To start off small... and also to work in phases and don't cut yourself off at the kneecaps if you don't make it to the next phase in the time frame that you set.... Set goals and time frames. Make them smart goals,... attainable.... Don't cut your throat if they're not done in that time but then you need to re-evaluate and then go from there and move on. Start slow, work in phases and with each phase set your goals. And I would even break it down for each phase into: goals for the phase as a whole, aesthetic goals, student goals, and... set goals for your teachers as far as the use of that phase.* Laura Johnson
- *...before you even start, have a plan prior to moving on, "Alright we've got this, we can do this, are we gonna be able to manage and sustain this next*

phase and if not, how can we?” Because the hardest thing is to have it and it be great and wonderful and then...backslide. Laura Johnson

- *I was trying to think back to those first drawings that were done. And we saw so many things that we wanted to incorporate and then funding becomes a huge issue and (we're asking) “How can we do it on a smaller scale but still have the same affect?” It's kind of like, “Think big, dream big, put it out there, and then be open to downsize” Make realistic goals. Back to that sustaining and maintaining. Laura Johnson*

Involve stakeholders/give ownership: The fifth subcategory contains advice for involving the school stakeholders, which will give them ownership of the project, greatly increasing the chance of the project succeeding.

First, involve the faculty, staff, students, and community more at the get-go and involve them as much as possible as you implement the project.

- *it was wonderful that Auburn came in and did what you did, and the Pursells, but I think that kind of took... the ownership away. I'm not sure the community has ever been involved like they should have been and... such a grandiose wonderful plan is maybe not as manageable as what we'd have done if we'd done each part ourselves. Wonderful plan, but not from stakeholders in the community. Hilary Lewis*
- *Child-center everything. It's about the student, not about the look of it, not about the teachers. If the kids can't learn from it, it's pointless. It's too much work for just beautification. Kira Scott*

Second, give your faculty and staff ownership. The following quotes demonstrate some of the challenges FHS has faced as a result of not having as much ownership of the project in the beginning:

- *I think if they can do it on their own, it'll help. Cause we leaned on y'all a lot but now that you're gone we're having to think about who's going to order the plants. I think we have enough invested in it now that if it started going down we'd be like, “Whoa, whoa we can't let this happen, I'll do it, I'll plant something.” Kira Scott*
- *Because it was great and wonderful while you were here because you kind of headed up everything, you kind of took care of everything. But then once you were gone it was like, “Oh my gosh, what do we do now?!” So I think... they*

need to realize that person's not going to (always) be there. And I think we knew that but at the same time we didn't. Carolyn Miller

Finally, brainstorm with faculty, staff, and students when designing a plan so that you design around activities and lessons already in use that meet education objectives.

- *It's great to have this but if it doesn't get used, what's the purpose in it? It's great to have the pavilion, but if it doesn't get used, what's the purpose in it? Have your purposes in mind, not necessarily every single activity you'll ever use, but have a few purposes in mind and then create the atmosphere around those types of activities....get input from, not just teachers, but even students too. Students will tell you real quick what they want. Even if it's for learning, they'll tell you what would help them or what would benefit them to learn. Ask the kids, especially high school kids.... You say, "okay we're gonna create an area where you could have class outside. What types of things do you think would benefit you learning in an outdoor environment?" They're creative. I mean they'll come up with stuff that some of us old folks would never think of.* Casey Ross

Showcase project: The final advice subcategory relates to getting the word out about your project so that people are informed about how the project's being used and interest is maintained. This would involve keeping the community and your county's Board of Education informed. Ways to showcase the project include: featuring the garden in newsletters, putting a video of a garden activity on the school website, and incorporating in the garden, signage and pictures of lessons completed.

- *Put it in newsletters... when the teacher is out there to invite parents to come out, "Hey I'm gonna be doing a lesson at 10:00, we'd love for you to come and be involved in one of our outdoor classroom lessons." Video it and upload it to the website and just continue to push, push, push so people don't think it's dwindled. Because it'll be another huge deal once the pavilion, the wetland project, is in place. That's gonna be another huge jump but I still don't want them to lose what can go on right there in the courtyard areas.* Laura Johnson

Create signage to inform others about educational use

- *It'd be nice to put pictures of them out there and talk about the standards that lesson met.* Kira Scott

Successes: The final category discusses successes experienced through the landscape project at FHS. Success stories include improvements in maintenance, the receipt of a national education award, the successful establishment of the Fayetteville School Foundation (FSF), and landscape projects some of the faculty have gone on to establish.

The current administration is excited about the landscape project and supportive of it. One of the staff stated that maintenance has improved since the administration has begun providing more accountability to teachers and has assigned areas to grades again.

- *I think it's got to come from this office right here, the importance of it. And I've tried to set that importance.... "I'd like to see this as part of your lesson plan... and if you do this with 1st grade lets move it on up to..." I looked at some plans (a teacher guidebook with lesson ideas and a maintenance schedule) that a teacher showed me where, when it was first developed they actually had grades assigned different areas... and I thought maybe we could generate this back.... We might not do the same crops and things of that nature but it'll give us a guide to what we can do. That's what I have a vision for, to see us bring those (gardens) back alive because I think the last few years it's been somewhat dormant. Seth Williams*

This year FHS received the “National Green Ribbon Award,” which is awarded to “schools that are exemplary in reducing environmental impact and costs; improving the health and wellness of students and staff; and providing effective environmental and sustainability education, which incorporates STEM, civic skills and green career pathways” (U.S. Department of Education, 2013). Much of the credit for this award goes to the landscape project. Interestingly, four Alabama school’s received this award and three of those school’s were located in Talladega County. Fayetteville was the first of the three school’s to implement a project like this, meaning it may have inspired the other projects.

The FSF was established in 2009 with the sole purpose of supporting the landscape project. Since its inception it has grown and been involved in raising funds and providing support for other needs of the landscape project. In 2012 the foundation established a college scholarship for students interested in Agriculture and known for community service rather than their GPA.

- *If it wasn't for our education foundation I really don't know how we'd keep things going like it is. Seth Williams*
- *The Fayetteville Foundation is still heavy on it. We had the foundation fundraiser Saturday night and I think their project is the outdoor classroom and the walkway. I kind of feel like if they can get that started it's really gonna maybe spark it again. I think if we had something else it'd kind of remind everybody, "This is what we were doing, and we haven't stopped." Meggin Eakes*
- *In 2009, we chartered the Fayetteville School Foundation, the three of us. And we're now up to nine board member's.... So we've steadily added board members and we've done two big fundraisers trying to still complete all the parts of that landscape design.... These two fundraisers we've done...I don't know of any single fundraiser Fayetteville's done that's raised \$20,000 in one night and we've done it two years in a row so I'm seeing now that there's more enthusiasm. But I think, in four years now... we have more people that have picked up the ball and are running with it. It's not just Mr. Pursell anymore. And the new principal has really embraced the whole idea and he hasn't missed a single board meeting. He's there and really sees the value of it. Susan Hume*

Two previous faculty members moved to other schools in Talladega County and started similar projects at their new schools. Both stated they were inspired by the FHS Landscape Project to start the project at their school.

- *Now that I don't have all the help that I had at Fayetteville, I realize, "Oh my Gosh, I had so much help, it was planned out and funded." You didn't realize how good it was. Kira Scott*

Finally, after involvement with the project, three teacher's expressed a new interest in gardening and four expressed an increased interest in it.

- *But I do think the project itself generated interest that maybe teachers didn't even know they had. That year of the butterfly garden and doing the research on that... even though Kira did the majority of that, I think the teachers around her also recognized, "Hey this is really good and the kids really learned." Susan Hume*

Conclusions and Recommendations

Faculty and staff of Fayetteville School (FHS) were interviewed about their experience of the landscape project at their school. They were also asked questions pertaining to advice for other school's hoping to implement a similar project. The results of these interviews were divided into seven categories, each with their own subcategories. These seven categories were: benefits, amount of use, excitement-level characteristics, the future, challenges, advice, and success stories. The seven categories were each divided into further subcategories. Each of the subcategories are discussed in the results and discussion section above and the categories, with some of the major subcategories, are summarized below.

Benefits:

Community involvement: Many community members and local businesses have been involved with this project. This includes the key sponsor, FarmLinks Golf Course and its owner Jimmy Pursell, Home Depot, and several small local businesses. Planting days have attracted families and were reported as great successes, which encouraged community ownership.

Greatest benefit: The three most reported benefits were: increased ownership and pride, beautification of the school grounds, and permanent learning that the students will remember for years to come.

Amount of Use: The second category relates to how the gardens and school grounds have been used over time. Teachers were asked to report any change in use since the beginning of the project and since before the project began. Their responses were tallied and when asked if use of the school grounds had changed since before the project began, all eight faculty reported it had increased.

Excitement-level Characteristics: Teachers were asked to describe the characteristics of students, faculty, and community members who were either the most or least excited about the project. For all three groups, the most excited were typically those that “buy into everything” and are usually involved. Also of note is that some of the most excited students were those that don’t normally excel in the classroom. This was true of many of the kinesthetic learners, who often took on leadership roles when out in the garden. Of the most excited teachers and community members, liking to garden and having a connection to the school (alumni, parent, etc.) were common characteristics. When asked about those that are least excited, for all three groups, “those that aren’t involved in anything” was listed. The least excited students also tend to be the ones that prefer to be indoors with a computer or video game. The least excited teachers were said to be those that don’t like to garden or those involved in other big projects with FHS. Finally, the least excited community members tended to be those busy with other things, especially those with young kids.

The Future: In this category, the interviewees shared future plans they have for implementing new phases of the project or improving it. Many of the teachers, especially those in the secondary grades expressed excitement about the outdoor classroom pavilion that will be installed in the next phase of the design. One of the teachers expressed a need

for a larger seating area in the garden and I think this may be part of the reason for the excitement about the pavilion. Currently there are two seating areas on the school grounds, the stump seating-circle and some small picnic tables. Both are in the children's garden. Providing a seating area that will hold at least one classroom may encourage further use of the grounds for education.

Another way faculty and staff are planning for the future is in brainstorming ideas to pull in more education. For example, one faculty member suggested the administration require at least one garden PBL every year. Another faculty member suggested that high school students budget a garden to learn math and science skills through a practical project.

Challenges: The fifth category relates to the challenges of implementing, utilizing, and sustaining the landscape project.

Administration changes were often listed as one of the biggest challenges of the project. In four years the administration has changed four times. This has sometimes resulted in an administration that's not as invested in the project, perhaps because they're overwhelmed with their new job.

Need structure and accountability: Many of the faculty expressed the need for structure and accountability, stating that they weren't sure what was expected of them and how the responsibilities were divided. Many also expressed the need for a coordinator, or "head cheerleader." They wished for someone who knew what was going on across the grades who could provide direction for when to plant, when to weed, and so on.

Biggest challenge: Faculty and staff were asked what they thought the biggest challenge of the project was. The top three challenges listed were: maintenance, time to teach in the garden and balance testing demands, and educational ideas, especially for math and English. Several interviewees expressed frustrations from trying to work to maintain the garden and discovering others weren't doing the same, at which point they gave up. Additionally, teachers may be hesitant to work in the garden because they don't want to create more work for the maintenance man. If FHS wants to utilize the gardens more, either the teachers will have to take on more ownership of the maintenance, the maintenance man will have to put in even more hours, or the school will have to come up with some other way of maintaining the gardens. The current stance of the administration seems to be a balance of maintenance, with the teachers taking on more responsibility than they have in the past but the maintenance man being given time to work in the gardens as well.

Advice: The sixth category is derived from the question, "if someone else were starting a project like this at their school, what would you tell them?" The advice they offered covered a broad range of topics that were divided into six categories: commit and seek accountability, plan ahead, find a partner, work in phases, involve stakeholders/give ownership, and showcase the project. Some of the advice presented below was based off of successes with the FHS Landscape Project, while some represents challenges encountered, and "things we wish we'd known."

Commit and seek accountability: many faculty recommended only starting a project if you have a committed administration. They also recommended establishing both within-school, and outside, accountability.

Plan ahead: this subcategory relates to planning ahead in terms of design, finances, educational uses, and maintenance. Many interviewees recommended having an overall plan designed before ever beginning implementation. The overall plan would provide direction and help in setting priorities. They also recommended planning five years ahead for both maintenance and educational uses. Raising maintenance money beforehand was also highly recommended (aim for 1/3 of overall budget). Several interviewees expressed the need to find someone who'll be at the school long-term to manage the project.

Many recommended clarifying responsibilities from the beginning, for financing, maintaining, and using the gardens for education. In planning ahead for education, one faculty member recommended creating instructional videos and planned PBLs, as well as providing general lesson ideas for teachers. Finally, it was recommended to provide continuing education for teachers to constantly give them ideas for incorporating the garden into lessons

Find a partner: the third subcategory relates to finding a partner, or partners, to work with on the project. Many recommended finding someone with expertise, who is willing to offer support, whether through finances or labor, and someone with contacts. You might find this in one sponsor, or may need to partner with several organizations to meet all these needs.

Work in phases: several interviewees recommended working slowly and in phases. They also recommended not leaving a phase until you're sure it's under control, both in terms of maintenance and education.

Involve stakeholders/give ownership: the fifth subcategory contains advice for involving the school stakeholders, which will give them ownership of the project, greatly increasing the chance of the project succeeding.

First, involve the faculty, staff, students, and community more at the get-go and involve them as much as possible as you implement the project. Second, give your faculty and staff ownership. Finally, brainstorm with faculty, staff, and students when designing a plan so that you design around activities and lessons already in use that meet education objectives.

Showcase project: the final advice subcategory relates to getting the word out about your project so that people are informed about how the project's being used and interest is maintained. Ways to showcase the project include: featuring the garden in newsletters, putting a video of a garden activity on the school website, and incorporating signage and pictures of lessons completed in the garden.

Successes: the final category discusses successes experienced through the landscape project at FHS. Success stories include improvements in maintenance, the receipt of a national education award, the successful establishment of the Fayetteville School Foundation (FSF), and landscape projects some of the faculty have gone on to establish.

This year FHS received the “National Green Ribbon Award,” which is awarded to “schools that are exemplary in reducing environmental impact and costs; improving the health and wellness of students and staff; and providing effective environmental and sustainability education...” (U.S. Department of Education, 2013). The landscape project was credited as the primary reason for the receipt of this award. Interestingly, three of the

four Alabama schools to receive this award were located in Talladega County. Fayetteville, as the first of the three schools to implement a project like this, may have inspired the other projects.

The FSF was established in 2009 with the sole purpose of supporting the landscape project. Since its inception it has grown and been involved in raising funds and providing support for other needs of the landscape project. In 2012 the foundation established a college scholarship for students interested in Agriculture and known for community service rather than their GPA.

Two previous faculty members moved to other schools in Talladega County and started similar projects at their new schools. Both stated they were inspired by the FHS landscape project to start the project at their school.

Finally, after involvement with the project, three teachers expressed a new interest in gardening and four expressed an increased interest in it.

Lessons learned: This case study was very helpful in determining many of the successes from the landscape project at Fayetteville School. It also drew out many of the challenges encountered during the project.

Of the many benefits this landscape project offered, perhaps the most significant was the increase in pride and ownership experienced by all the stakeholders and the increased use of the outdoor spaces to offer active learning opportunities. If another school were to implement a project similar to this, following the advice offered by the faculty and staff in this study, they would likely experience the same benefits.

Of the challenges discussed from this project, maintenance, time to utilize the garden for education, and ideas for incorporating lessons into the garden are challenges

likely to be faced by any school implementing a similar project. Again, following the advice offered by the interviewees in this study is likely to reduce some of those challenges. Planning ahead of time for maintenance and defining responsibilities before a project is begun will go a long way toward solving these problems. Above all else, giving ownership to the faculty, students, and staff at your school is the strongest factor in determining a project's success. Both from my experience working at FHS, and from the interviews, it appears that incorporating the garden into the curriculum is much easier for the elementary grades. The most prominent reasons for this are that elementary students are in the same classroom all day and there's more flexibility in the curriculum at this age, as there is less of an emphasis on testing. This is likely the reason most school gardens, and school garden studies, are at elementary schools. As FHS secondary grades are on a seven-period schedule, it will be interesting to see what happens if they transition to block scheduling.

Advice I would offer to FHS as they continue this project relates to the Fayetteville School Foundation (FSF). Before installing the outdoor classroom pavilion, I recommend they brainstorm with faculty, staff and students about what they need and want in that area. I would especially focus on the kind of seating they might use, the educational tools desired (such as a whiteboard), and any storage needed. The FSF could start out the brainstorming session by simply asking the faculty and students how they envision using the space for education. Adhering with their suggestions might add to the cost of the pavilion but if it also adds to its use for education then it's worth it.

As the FSF board has expanded to nine members, I would recommend assigning roles to some of the more active members. Two possible roles are someone to manage

maintenance and someone to manage fundraising. Neither of these roles would need to require hours of work, but it would provide a specific contact person when someone wants to volunteer in the garden or to make a donation for the project. The maintenance board member could be in charge of recruiting volunteers or planning workdays, while the member in charge of fundraising might search and apply for grants or meet with potential donors. Neither of these members would be solely responsible for either duty, but by providing an individual with ownership of a certain responsibility, you might accomplish even more.

Many of the faculty and staff of FHS would say they haven't used the gardens as much as they'd like for education. However, they have used them, are glad to have them, and have plans to use them more.

- *From an educational standpoint, it might not be utilized as much as it should be but we do have it and it's utilized more than the gravel was! It's enhanced the whole school environment. For example, when we saw the caterpillars it gave me an opportunity to explain to them the cycle of planting the plants for the caterpillars to eat, and the butterflies to get nectar from (the plants) and then the butterflies to lay their eggs on it, etc. Like one day we saw a cocoon out there and the next day we went back to check on it.... Hilary Lewis*

In the two years since the last Auburn University intern was on Fayetteville's campus they seem to have found their bearings. The first year, as expected, was harder than the second but it seems that the faculty and staff are settling into various roles. Before the last Auburn University intern completed her internship, she assigned several of the faculty and staff responsibilities. Two years later, some of those roles have changed but that means there is more ownership now, as they've chosen their own responsibilities.

The results of this study are encouraging, and suggest that incorporating a landscape project into a school offers many benefits. Improving a school's landscape can increase pride and ownership in the school grounds, while utilizing that landscape for education can result in long-term learning. There are challenges to be faced when incorporating a project such as this, however, the faculty and staff at Fayetteville School would say the benefits make it worth it. This study reported a specific, complex case. While not generalizable to all situations, the results and recommendations may be transferrable to other similar situations.

- *Because first of all it sounded like it was too good to be true. I loved the plan but I never in a million years dreamed that we would have accomplished in five years what has been accomplished... so the idea of Mr. Pursell saying "dream big" still resonates, because if he hadn't had the big dream, and y'all hadn't had the big dream.... And I do think we've come a long way towards making that happen. But if I were telling somebody else advice, it does take a huge team effort and you've got to have somebody in all of those roles. I think my role at the time is what really made me love staying as an administrator an extra year... I felt like my role was important to help keep it going at that particular time...and I do think it's gonna keep going. Because there are enough younger teachers on board, the new principal (is on board), and I think the superintendent is so enthusiastic about it.... But I think you have to be willing to take a risk at the beginning. Susan Hume*

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Table 5.1. Fayetteville High School (FHS) student, faculty, and staff experiences of the landscape project: the categories and their subcategories.

Benefits
General
Education
Ownership and Pride
Community involvement
Greatest benefit
Amount of Use
Change since project began
Change since pre-project
Excitement-level Characteristics
Most excited
Least excited
The Future
Future plans
Future desires
Still students
Challenges
Maintenance
Administration changes
Need structure & accountability
Increased demands with no increase in time
Biggest challenge
Other
Advice
Commit & seek accountability
Plan ahead
Find a partner
Work in phases
Involve stakeholders/give ownership
Showcase project
Successes
Success stories

Table 5.2. Fayetteville High School (FHS) student, faculty, and staff experiences of the landscape project: student, faculty, and community member excitement-level characteristics.

Participant		
Students	Most Excited	Those that buy into everything Excited teacher = excited students Some that don't excel in the classroom
	Least Excited	Those not excited in classroom either Just not their thing (they like video games, indoors, etc.) They don't like physical labor or are lazy in general
Faculty	Most Excited	Those that buy into everything Those that have some type of connection: live in community, alumni, parent, grandparent Those that like to garden
	Least Excited	The ones not involved in anything: "just a job to them" Those not from community Those that don't like to garden Those with other big projects: involved at FHS but focused on something else High school teachers: overwhelmed with objectives and testing
Community Members	Most Excited	Those that buy into everything Those that have some type of connection: alumni, parent, grandparent Those that like to garden Those that feel they have something to offer: will bring a tractor or shovel but don't want to laminate or run copies
	Least Excited	Those busy with other things: especially with young kids

Figure 5.1

Qualitative Interview Protocol

- Why I'm recording
 - Everything's confidential
 - Want to hear how the program went: its strengths & weaknesses so that we can improve
 - Share years teaching, grade taught
1. Tell me what you know about the landscape project?
 - a. Tell me about your level of involvement?
 - b. What did you do?
 - c. How has it affected your work in the classroom?
 - d. What has your role been during this school year?
 - e. What has been your role in the project in the school year's since the project started (Includes 2008-2009, 2009-2010, 2010-2011, and 2011-2012 school years)?
 2. Do you see any evidence that your kids talk about the landscape project?
 - a. What are some of the things they've done with the project?
 - b. What changes have you seen in your students as they've worked on the project?
 - c. Tell me about the kids who are most excited about this project?
 - d. What are their characteristics?
 - e. Tell me about the kids who are least excited about this project?
 - f. What are their characteristics?
 3. Tell me about the kinds of people (teachers, students, community members) who were most involved?
 4. Tell me about the kinds of people (teachers, students, community members) who were least involved?
 5. What do you do with the outdoor spaces?
 - a. Has your use of the spaces changed over time?
 - b. How?
 6. Can you give an example of a time one of your students "actively learned"?

7. If someone else were starting a project like this at their school, what would you tell them?
8. What do you feel is the greatest benefit of this project?
 - a. For the faculty
 - b. For the students
 - c. For the community
9. What do you feel is the greatest challenge of this project?
10. Is there anything I didn't ask you that you'd like to talk about?

Remind the interviewee that what was said is confidential and that all names will be changed for my dissertation and any articles/presentations.

Thank the interviewee for their time.

CHAPTER SIX

SUMMARY AND CONCLUSIONS

This study was conducted in three parts. Parts one and two compared students at Fayetteville School (FHS), Drew Middle School (DMS) and Lincoln High School (LHS). FHS comprised the experimental group, whereas DMS and LHS served as the control group. FHS participated in a landscape project prior to this study that involved planting over 400 trees and shrubs and installing a children's garden. Many FHS students were involved in planting exercises, with each of the 650 students having the opportunity to be a part of planting.

Part One

In part one, both the experimental and control groups completed the Children's Environmental Response Inventory (CERI) Survey, which assessed the students' environmental attitudes. The CERI examined two internal scales, environmental adaptation (EA) and pastoralism (PA). A lower EA score and higher PA score indicate a positive environmental attitude. When examining all study participants, the experimental group exhibited more positive attitudes than the control group in both internal scales, with the experimental group scoring significantly lower in EA and higher in PA. Many other studies reported similar findings when children participate in gardening programs (Bowker and Tearle, 2008; Cammack et al., 2002; Dirks and Orvis, 2005; Lohr and Pearson-Mims, 2005; Waliczek and Zajicek, 1999). Connections have also been found

between higher environmental attitudes and previous garden experience (Aguilar et al., 2008).

Following examination of the overall group, the experimental and control groups were then compared based on gender. While no significant differences were found for male participants, experimental and control group females were significantly different, with outcomes consistent with the overall results. As girls tend to mature more quickly than boys, especially emotionally, the experimental group girls may have benefitted more from the garden program (Blume and Zembar, 2007; CDC, 2011). As males tend to have lower environmental attitudes, future studies should focus on this population (Aguilar et al., 2008; Bunting and Cousins, 1985; Harvey, 1989; Waliczek and Zajicek, 1999).

Finally, the two groups were compared based on grade. When the middle school experimental and control groups were compared, no differences were observed. The high school experimental and control groups were then compared and significant differences were found in pastoralism, with the experimental group scoring higher. Maturity likely played a role in these results, as high school age children generally have a more developed ability for complex thought and a stronger moral compass than middle school children (Blume and Zembar, 2007; CDC, 2011). Future studies could focus solely on the middle school population to further examine the best ways to improve environmental attitudes at this age. Finally, in future environmental attitudes studies it would be advantageous to compare the results of different environmental education programs, perhaps comparing one where students spend part of their time in the garden and another where the students' time is spent solely indoors.

Part Two

In part two, FHS faculty, parent, and student perceptions were compared pre and post-project. FHS faculty, parent, and student school perceptions were also compared to the perceptions of faculty, parents, and students at DMS and LHS.

Both the experimental and control group completed the School Grounds Inventory (SGI) Survey, which assessed perceptions of the school grounds. Five internal scales were utilized for both faculty and students: pride, needs met, benefits, use, and total. For the parents' survey, four internal scales were used: pride, needs met, benefits, and total.

When examining the faculty experimental group, their post-test scores were higher than their pre-test scores in four of the five constructs: pride, needs met, use, and total. The experimental and control group faculty were then compared, and the experimental group scored significantly higher than the control group in pride and total. Next, parents SGI scores were examined, with increases from pre-to-post-test in each of the constructs: pride, needs met, benefits, and total. When comparing the experimental and control group parents, the experimental group scored significantly higher than the control group in three of the constructs: needs met, benefits, and total score. Finally, student SGI scores were examined. When comparing the experimental group pre-and post-tests, there were four significant increases in pride, needs met, benefits, and total. The experimental and control group students were then compared and the experimental group scored significantly higher than the control group in the same four areas. Plants and nature have been shown to provide many advantages, including improving people's perceptions of their environment. These improvements in perceptions may result in stress reduction (Bennett and Swasey, 1996; Kaplan et al., 1988; Kohlleppel et al., 2002),

improved health (Doxon, 1996; Fjeld, 2000; Kaplan et al., 1988; Lohr and Pearson-Mims, 2000), increased employee morale, increased productivity, and reduced absenteeism (Doxon, 1996; Pearson-Mims and Lohr, 2000). These results indicate that the experimental group experienced the benefits of being around plants and nature in an improved school grounds environment.

Interestingly, the faculty and students have opposing opinions about two of the constructs. While the experimental group parents increased in each of the constructs, the faculty increased in each construct but benefits and the students, in each construct but use. The differing opinion about use may be explained by the inclusion of the elementary teachers in the faculty group, as their use of the grounds did increase. When middle and high school faculty were examined, no increase in use was found, making the student results consistent with those reported by their teachers. This result is further examined in the following section. While the faculty did increase in the other constructs, they did not in benefits. This construct examined benefits offered by the grounds, especially the educational benefits offered. In part three of this study many faculty, including elementary, discussed the increased emphasis on testing and said this often took away from time to incorporate active learning. Perhaps the faculty did not report an increase in benefits as they felt they didn't have the time to utilize the grounds as much for education as they would like.

Additional Analysis

Faculty Pre-test Versus Post-test: Faculty were compared based on the grade level they taught. For three of the constructs, pride, needs met, and total, the results were consistent with the overall faculty results. When examining use, the middle and high

school faculty did not experience a significant increase from pre-to-post-test. This increase did occur for the elementary school faculty. These results may have occurred because elementary school faculty have more flexibility in their day, whereas middle and high school faculty teach seven 45 minutes periods each day, providing them with less time to complete outside activities once they've covered all their required material.

Next, the experimental group pre-test scores were compared to their post-test scores for three questions relating to the school grounds usefulness. The three questions were: "how useful are your school grounds as a curriculum learning resource?," "how useful are your school grounds as a resource for sports/physical activity?," and "how useful are your school grounds as a play resource?." Significant differences were found for each of the three questions with the post-test scores being higher than the pre-test scores in each instance. The improvements made to the school grounds have likely aided in the grounds being useful for learning, sports, and recreation. One way to improve a school climate is to include hands-on activities and a favorable environment (Kentz and Orman, 1998; Mitchell et al., 2010). School gardens can provide such an environment. In improving the school grounds and providing a school garden, the perceptions of the grounds improved. As school ground perceptions improved, faculty valued the grounds more for each of these areas.

Faculty Experimental Versus Control: The experimental and control groups were compared based on the grade level they taught. When examining middle school faculty only, significant differences were found in two additional constructs, meaning the experimental faculty scored higher in four constructs: pride, needs met, benefits, and total. High school experimental faculty results were consistent with the overall group

results, with significant differences in two of the five constructs, pride and total. When looking at middle school faculty, the experimental group may have scored higher in the two additional constructs because the middle school faculty have a little more freedom in their schedule than the high school faculty, providing them with more time to enjoy the benefits of the project.

The experimental group post-test scores were then compared to the control group post-test scores for three questions: “how useful are your school grounds as a curriculum learning resource?,” “how useful are your school grounds as a resource for sports/physical activity?,” and “how useful are your school grounds as a play resource?.” The experimental group scored higher than the control group for two of the questions. The questions pertaining to the grounds usefulness as a curriculum learning resource and a play source were both significant. The experimental group likely scored higher than the control group in these two areas because of their increased exposure to nature and the improvements made to their school grounds. Even viewing plants or nature has been found to reduce stress and increase positive feelings (Hartig et al., 2010; Ulrich, 1981). The faculty at FHS may have benefitted from, not only their involvement in the landscape project, but also from the improved view out their classroom window.

Faculty Frequencies: Faculty were asked “relative to your school enrollment, do you think your school grounds are: much too small, too small, about the right size, too large, or much too large.” From pre-test to post-test there was a 37% drop in the number of faculty that reported the grounds were too small and a very small increase in the faculty that said it was too large. The increase in the number of faculty being satisfied about the school ground size likely resulted from a better use of the school grounds and

an improvement in their appearance as well. The faculty who reported the grounds were now too large may have done so because of the increased maintenance required by the newly installed landscape. The control group results were similar to the experimental post-test results, with most faculty reporting that the grounds were about the right size.

When asked, “which students make the most use of the play areas of your school grounds for learning?,” for both the pre and post-test, the majority of the experimental group said elementary school. It is important to note, however, that from pre-test to post-test 11% more faculty reported that elementary used the grounds most. This may have occurred because use of the grounds increased overall and as the elementary grades have more flexibility in their lessons and more time in the same classroom each day, they increased in use of the grounds the most. When examining the control group answers, the choices were more scattered with the majority choosing either elementary school or junior high. These results may have been different from the experimental group as only middle and high school faculty were surveyed. Faculty may have been less inclined to choose elementary school since the elementary grades are not directly affiliated with their school.

The results from the faculty portion of this study are important because a faculty member’s perception of their work environment may contribute to their work performance and attitudes, potentially affecting student perceptions of their school environment (Mitchell et al., 2010). The significant increase in pride among the experimental group faculty may play an especially important role in a positive perception of the school, encouraging students to view it positively as well.

Parents' Pre-test versus Post-test: The experimental and control group were compared based on the grade level each parents child or children were in. Each of the four constructs increased for middle school parents, whereas elementary and high school parent scores increased in three constructs: pride, needs met, and total. Contact with nature, even images of nature, has been found to benefit people (Adachi et al., 2000). Additionally, viewing plants or nature has been found to reduce stress and increase positive feelings (Hartig et al., 2010; Ulrich, 1981). As parents of FHS students saw the campus improving, their perceptions of the school environment improved, thereby offering them some of the many advantages people experience when their perceptions of their environment improve (Bennett and Swasey, 1996; Kohlleppel et al., 2002; Pearson-Mims and Lohr, 2000).

Parents' Experimental versus Control: The experimental and control group were then compared based on the grade level each parents child or children were in. When examining middle school parents, the experimental group scored higher than the control group in needs met and benefits. The high school experimental parent results yielded no significant differences. Once the middle school experimental groups perception of their school grounds had improved, they were more satisfied than their control group counterparts that, as far as the school grounds were concerned, their child's needs were being met and their child was benefitting from the school grounds. Though the experimental group significantly increased in pride from pre-test to post-test, they did not score higher than the control group in this construct. This indicates that the control group has more pride in their school grounds than the experimental group had before the project, and that the experimental group has come a long way. The high school group

yielded no significant differences between the control and experimental group. These results may have occurred because FHS high school parent scores were lower than FHS middle school parent results. FHS high school parents may have scored lower because the high school classes offer less flexibility with their schedule, thereby preventing the high school students from using the school grounds as much as the other grade levels.

The overall parent results from this portion of the study are promising, as parent perceptions of a school can also affect their child's perception. As parents view a school in a positive light, they tend to be more involved (Wilson, 2004). Parent involvement is considered a key factor in a child's success in school (Epstein et al., 1997; Henderson et al., 1986; Hill and Tyson, 2009; Lindstrom, 1997), with children of involved parents benefitting both academically and psychologically (Henderson et al., 1986; Hill and Tyson, 2009; Lindstrom, 1997; Smith et al., 2011).

Students' Pre-test versus Post-test: The students' pre-and post-test scores were compared based on grade level. When examining middle and high school students, post-test findings were higher than the pre-test scores in the same four constructs as the overall group (pride, needs met, benefits, and total). The experimental group pre-test scores were then compared to their post-test scores for three questions relating to the school grounds usefulness. The three questions were: "how useful are your school grounds for learning school lessons?," "how useful are your school grounds for sports/physical activity?," and "how useful are your school grounds as a place to play or hang out?." Significant differences were found for each of the three questions with the post-test scores being higher than the pre-test scores in each instance.

These results support previous literature that claims that plants on a school campus improve student perceptions of schools. One such study, conducted in 2001 at a Texas school found that females participating in garden activities had significantly more positive attitudes toward school (Waliczek et al., 2001). No matter the grade, the improvements made to Fayetteville's campus have improved students' perceptions of the school grounds in multiple areas. One area that yielded no significant results in any of the age groups was the construct, use. From pre-to-post-test, the reported use of the school grounds changed very little. These results are consistent with faculty reports of use of the grounds, where elementary school faculty reported a significant increase in use of the grounds and middle and high school faculty reported an increase in use, but not a significant one. The student results support that while the improvements to the grounds have benefitted the middle and high school grades, their use of the grounds has not increased. This may be explained by less flexibility with school lessons and by the class period schedule, where each teacher has a class for only 45 minutes at a time, affording fewer opportunities to leave the classroom for less traditional forms of instruction.

Students' Experimental versus Control: The experimental and control group were compared based on the grade level of each student. When examining middle school students, the experimental group scored higher than the control group in two of the five constructs, pride and needs met. High school student results were consistent with the overall group results, with significant differences in the same four constructs (pride, needs met, benefits, and total score). The experimental group post-test scores were then compared to the control group post-test scores for three questions: "how useful are your school grounds for learning school lessons?," "how useful are your school grounds for

sports/physical activity?,” and “how useful are your school grounds as a place to play or hang out?.” The experimental group scored higher than the control group for two of the questions. These two questions pertained to the grounds usefulness as a place for learning school lessons and as a place to play. Finally, the experimental and control group post-test scores were compared based on whether control group students had taken a class offered at DMS during the 2010-11 school year. This class, titled the Exploratory Class, taught life skills to students, with each student working outside on a small landscape project for a portion of the school year. First, students who had taken the Exploratory Class were compared to the entire experimental group, with significant differences found in four of the five constructs. For three of those significant differences, pride, needs met, and total score, the experimental group scored higher than the control group. However, when examining use, the control group scored higher than the experimental group. Next, control students who had not taken the Exploratory Class were compared to the experimental group, with results consistent with the overall results. The experimental group scored significantly higher than the control group in four of the areas: pride, needs met, benefits, and total score.

Of the many benefits plants offer, one is improving people’s perceptions of their environment (Hartig et al., 2010; Ulrich, 1981). While the high school results were the same as the overall group results, the middle school was significantly different in just two areas, pride and needs met. Benefits and total, which were significant when examining the overall group and the high school group, were not significant when looking at middle school students. These results likely occurred because of the Exploratory Class, in which several of the control group students participated. When these students were included in

the control group no significant differences were found between the experimental and control group in these areas. However, when these students were taken out of the analysis, significant differences were found, with the experimental group scoring higher than the control group. The results when comparing the experimental group to the Exploratory Class participants indicate that the Exploratory Class participants used their grounds more than the experimental group and that they received benefits from their use of the grounds. While the control group did not score significantly higher than the experimental group in the benefits construct, the results, which otherwise have been significant in the experimental groups favor, were more similar with these two groups. Numerous studies have discovered the advantages of spending time outside and time working with plants. These results, along with the rest of the results of this study, support that (Adachi et al., 2000; Bennett and Swasey, 1996; Doxon, 1996; Kaplan et al., 1988; Kohlleppe et al., 2002; Pearson-Mims and Lohr, 2000; Waliczek et al., 2001)

Student Frequencies: Students were asked “do you think your school grounds are: much too small, too small, about the right size, too big, or much too big.” When examining the experimental group pre-and post-tests, the vast majority were satisfied with the school ground size. From pre-to-post-test there was little change in numbers, with the changes that did occur being a switch to the grounds being about the right size. The control group offered more variety in their selection with the majority reporting the grounds were about the right size and most of the other answers reporting that the grounds were too small.

When asked, “which grades use the school grounds for learning most often?,” the experimental group results were consistent with the faculty results, which indicated that

the elementary grades used the grounds for learning most often. As has been speculated before, this may be the case because the younger grades have more flexibility in their class schedules. The control group, though they had no elementary grade level to choose, did report the younger grade, junior high, as using the grounds most often. This may be related to the Exploratory Class using the grounds.

The results from the student portion of this study are very encouraging, as it has been demonstrated that when students perceive their school environment in a positive light they exhibit higher self esteem, lower delinquency rates, and better academic performance (Kuperminc et al., 2001, Wilson, 2004). As has been discussed, when children's attitudes towards school improve, their academic achievement improves as well (Waliczek et al., 2003). Additionally, students attending schools that offer more individual time in the garden demonstrate more positive attitudes towards school. (Waliczek et al., 2001). The improvements of the experimental students perceptions of the FHS grounds may offer them many more benefits, such as increased interest in school and improved grades (Lekies et al., 2006; Waliczek et al., 2003).

The results of part two of this study support previous literature claiming that plants on a school campus improve perceptions of school grounds, as well as students' attitudes toward school (Waliczek et al., 2001). These results indicate that the experimental group experienced the benefits of being around plants and nature in an improved school grounds environment. They may have benefitted from, not only their involvement in the landscape project, but also their improved view out their classroom window.

Part Three

The purpose of the third part of this study was to assess the landscape project at (FHS) and to answer the question of how the faculty, staff, and students experienced the landscape project. Another purpose was to garner advice for other schools interested in implementing a similar project. An intrinsic case study method was utilized and 13 semi-structured interviews were conducted with faculty and staff at FHS who'd been involved in the project to varying degrees. All interviews were recorded and then transcribed for analysis.

The results of these interviews were divided into seven categories, each with their own subcategories. These seven categories were: benefits, amount of use, excitement-level characteristics, the future, challenges, advice, and success stories. The seven categories were then divided into further subcategories. Each of the categories with some of the more important subcategories are discussed below.

Benefits: The first category relates to the benefits gleaned from the gardens and school grounds. Teachers were first asked about benefits in general and then were asked to list the greatest benefit.

Community involvement: many community members and local businesses have been involved with this project. This includes the key sponsor, FarmLinks Golf Course and its owner, Jimmy Pursell, along with Home Depot, and several small local businesses. Planting days have attracted families and were reported as great successes, which encouraged community ownership.

Greatest benefit: the three most reported benefits were ownership and pride, beautification of the school grounds, and permanent learning that students remember for years to come.

Amount of Use: The second category relates to how the gardens and school grounds have been used over time. Teachers were asked to report any change in use since the beginning of the project and since before the project began. Their responses were tallied and when asked if use of the school grounds had changed since before the project began, all eight faculty reported it had increased.

Excitement-level Characteristics: faculty and staff were asked to describe the characteristics of students, faculty, and community members who were either the most or least excited about the project. For all three groups, the most excited were typically those that “buy into everything” and are usually involved. Also of note is that some of the most excited students were those that don’t normally excel in the classroom. This was true of many of the kinesthetic learners, who often took on leadership roles when out in the garden. Of the most excited teachers and community members, liking to garden and having a connection to the school (alumni, parent, etc.) were common characteristics. When asked about those that are least excited, for all three groups, “those that aren’t involved in anything” was one of the characteristics. The least excited students also tended to be the ones that preferred to be indoors with a computer or video game. The least excited teachers were said to be those that don’t like to garden or those involved in other big projects with FHS. Finally, the least excited community members tended to be those busy with other things, especially those with young kids.

The Future: In this category, the interviewees shared future plans they have for implementing new phases of the project or improving it. Many of the teachers, especially those in the secondary grades expressed excitement about the outdoor classroom pavilion that will be installed in the next phase of the design. One of the teachers expressed a need for a larger seating area in the garden and I think this may be part of the reason for the excitement about the pavilion. Currently there are two seating areas on the school grounds, the stump seating-circle and several small picnic tables. Both are in the children's garden. Providing a seating area that will hold at least one classroom may encourage further use of the grounds for education.

Another way faculty and staff are planning for the future is in brainstorming ideas to pull in more education. For example, one faculty member suggested the administration require at least one garden PBL every year. Another faculty member suggested that students budget a garden, a project that would incorporate math and science into a practical project they would see come to life.

Challenges: The fifth category relates to the challenges of implementing, utilizing, and sustaining the landscape project.

Administration changes were often listed as one of the biggest challenges of the project. In four years the administration has changed four times. This has sometimes resulted in an administration that's not as invested in the project, perhaps because they're overwhelmed with their new job.

Need structure and accountability: many of the faculty expressed the need for structure and accountability, stating that they weren't sure what was expected of them and how the responsibilities were divided. Many also expressed the need for a

coordinator, or “head cheerleader.” They wished for someone who knew what was going on across the grades who could provide direction for when to plant, when to weed, and so on.

Biggest challenge: Faculty and staff were asked what they thought the biggest challenge of the project was. The top three challenges listed were: maintenance, time to teach in the garden and balance testing demands, and education ideas, especially for math and English.

Several interviewees expressed frustration from trying to work to maintain the garden and discovering others weren’t doing the same, at which point they gave up. Additionally, teachers may be hesitant to work in the garden because they don’t want to create more work for the maintenance man. If FHS wants to utilize the gardens more, either the teachers will have to take on more ownership of the maintenance, the maintenance man will have to put in even more hours, or the school will have to come up with some other way of maintaining the gardens. The current stance of the administration seems to be a balance of maintenance, with the teachers taking on more responsibility than they have in the past but the maintenance man being given time to work in the gardens as well.

Advice: The sixth category is derived from the question, “if someone else were starting a project like this at their school, what would you tell them?” The advice they offered covered a broad range of topics that were divided into six categories: commit and seek accountability, plan ahead, find a partner, work in phases, involve stakeholders/give ownership, and showcase the project. Some of the advice presented below was based off

of successes with the FHS landscape project, while some represents challenges encountered, and things “we wish we’d known.”

Commit and seek accountability: many faculty recommended only starting a project if you have a committed administration. They also recommended establishing both within-school, and outside, accountability.

Plan ahead: this subcategory relates to planning ahead in terms of design, finances, education uses, and maintenance. Many interviewees recommended having an overall plan designed before ever beginning implementation. The overall plan would provide direction and help in setting priorities. They also recommended planning five years ahead for both maintenance and education uses. Raising maintenance money beforehand was also highly recommended (try for 1/3 of overall budget). Several interviewees expressed the need to find someone who’ll be at the school long-term to manage the project. Many recommended clarifying responsibilities from the beginning, for financing, maintaining, and using the gardens for education.

In planning ahead for education, one faculty member recommended creating instructional videos and planned PBLs, as well as providing general lesson ideas for teachers. Finally, it was recommended to provide continuing education for teachers to constantly give them ideas for incorporating the garden into lessons

Find a partner: the third subcategory relates to finding a partner, or partners, to work with on the project. Many recommended finding someone with expertise, who is willing to offer support, whether through finances or labor, and someone with contacts. You might find this in one sponsor, or may need to partner with several organizations to meet all these needs.

Work in phases: many interviewees recommended working slowly and in phases. They also recommended not leaving a phase until you're sure it's under control, both in terms of maintenance and education.

Involve stakeholders/give ownership: the fifth subcategory contains advice for involving the school stakeholders, which will give them ownership of the project, greatly increasing the chance of the project succeeding. First, involve the faculty, staff, students, and community more at the beginning and involve them as much as possible as you implement the project. Second, give your faculty and staff ownership. Finally, brainstorm with faculty, staff, and students when designing a plan so that you design around activities and lessons already in use that meet education objectives.

Showcase project: the final advice subcategory relates to getting the word out about your project so that people are informed about how the project's being used and interest is maintained. Ways to showcase the project include: featuring the garden in newsletters, putting a video of a garden activity on the school website, and incorporating in the garden, signage and pictures of lessons completed.

Successes: the final category discusses successes experienced through the landscape project at FHS. Success stories include improvements in maintenance, the receipt of a national education award, the successful establishment of the Fayetteville School Foundation (FSF), and landscape projects some of the faculty have gone on to establish.

This year FHS received the "National Green Ribbon Award," which is awarded to "schools that are exemplary in reducing environmental impact and costs; improving the health and wellness of students and staff, and providing effective environmental and

sustainability education...” (U.S. Department of Education, 2013). Much of the credit for this award goes to the landscape project. Interestingly, four Alabama schools received this award and three of those schools were located in Talladega County. Fayetteville was the first of the three schools to implement a project like this, meaning it may have inspired the other projects.

The FSF was established in 2009 with the sole purpose of supporting the landscape project. Since its inception it has grown and been involved in raising funds and providing support for other needs of the landscape project. In 2012 the foundation established a college scholarship for students interested in Agriculture and known for community service rather than their GPA.

Two previous faculty members moved to other schools in Talladega County and started similar projects at their new schools. Both stated they were inspired by the FHS landscape project to start the project at their school.

Finally, after involvement with the project, three interviewees expressed a new interest in gardening and four expressed an increased interest in it.

Lessons learned: This study was very helpful in determining many of the successes from the landscape project at Fayetteville School. It also drew out many of the challenges encountered during the project.

Of the many benefits this landscape project offered, perhaps the most significant was the increase in pride and ownership experienced by all the stakeholders and the increased use of the outdoor spaces to offer active learning opportunities. If another school were to implement a project similar to this, following the advice offered by the faculty and staff in this study, they would likely experience the same benefits.

Of the challenges discussed from this project, maintenance, time to utilize the garden for education, and ideas for incorporating lessons into the garden are challenges likely to be faced by any school implementing a similar project. Again, following the advice offered by the interviewees in this study is likely to reduce some of those challenges. Planning ahead of time for maintenance and defining responsibilities before a project is begun will go a long way toward solving these problems. Above all else, giving ownership to the faculty, students, and staff at your school is the strongest factor in determining a project's success. Both from my experience working at FHS, and from the interviews, it appears that incorporating the garden into the curriculum is much easier for the elementary grades. The most prominent reasons for this are that elementary students are in the same classroom all day and there's more flexibility in the curriculum at this age, as there is less of an emphasis on testing. This is likely the reason most school gardens and school garden studies are at elementary schools. As FHS secondary grades are on a seven-period schedule, it will be interesting to see what happens if they transition to block scheduling.

Many of the faculty and staff of FHS would say they haven't used the gardens as much as they'd like for education. However, they have used them, are glad to have them, and have plans to use them more.

- *From an educational standpoint, it might not be utilized as much as it should be but we do have it and it's utilized more than the gravel was! It's enhanced the whole school environment. For example, when we saw the caterpillars it gave me an opportunity to explain to them the cycle of planting the plants for the caterpillars to eat, and the butterflies to get nectar from (the plants) and then the butterflies to lay their eggs on it, etc. Like one day we saw a cocoon out there and the next day we went back to check on it.... Hilary Lewis*

In the two years since the last Auburn intern was on Fayetteville's campus they seem to have found their bearings. The first year, as expected, was harder than the second but it seems that the faculty and staff are settling into various roles. Before the last Auburn intern completed her internship, she assigned several of the faculty and staff responsibilities. Two years later some of those roles have changed but that means there is more ownership now, as they've chosen their own responsibilities.

- *Because first of all it sounded like it was too good to be true. I loved the plan but I never in a million years dreamed that we would have accomplished in five years what has been accomplished... so the idea of Mr. Pursell saying "dream big" still resonates, because if he hadn't had the big dream, and y'all hadn't had the big dream.... And I do think we've come a long way towards making that happen. But if I were telling somebody else advice, it does take a huge team effort and you've got to have somebody in all of those roles. I think my role at the time is what really made me love staying as an administrator an extra year... I felt like my role was important to help keep it going at that particular time...and I do think it's gonna keep going. Because there are enough younger teachers on board, the new principal (is on board), and I think the superintendent is so enthusiastic about it.... But I think you have to be willing to take a risk at the beginning. Susan Hume*

The third part of this study was conducted to provide an in-depth exploration of the experience of those involved in the landscape project at FHS. Parts one and two offered perspectives on two potential benefits of the landscape project, improved environmental attitudes and improved perceptions of the school ground. Five categories were examined related to school ground perceptions: pride, needs met, benefits, use, and total. Much of the third part of this study confirms the results of parts one and two. During the interview portion of this study, no specific questions were asked relating to any of the categories examined in parts one and two. This was purposeful, as asking specific questions about these areas may have biased the results by encouraging interviewees to discuss a topic they wouldn't have brought up otherwise. It is

encouraging, therefore, that improvements in environmental attitudes and perceptions of the school grounds were reported. These reports included: increased environmental stewardship and appreciation for nature, increased pride and ownership of the grounds, benefits of the project, and increased use of the grounds, for both general and educational purposes.

It is recommended that future studies examine some of the questions unearthed in this research. For instance, in part one of this study differences were found when comparing environmental attitudes based on gender and grade level. Females scored higher than males and high school students scored higher than middle school students. A future study could examine environmental attitudes with a specific focus on responsiveness to environmental programs based on maturity level. Another study could compare two environmental programs, one conducted both in the classroom and outside, the other conducted solely in the classroom. Part two compared the school ground perceptions of faculty, parents, and students at two schools. Pre-data were only used in the experimental group. In similar studies in the future, it is recommended to utilize pre-data from both participating schools. This part of the study examined only one demographic, grade level. In future studies, examining other demographics such as race, age, and previous garden experience might reveal other trends. The third part of this study garnered much advice from the faculty and staff for future school landscape projects. It would be interesting to see the results of a similar project implemented following this advice. Additionally, interviewing other stakeholders involved in this project, such as the Auburn University faculty and students, FarmLinks Golf Course staff, and local businesses, would provide another perspective that might offer advice

related to involving a community in a landscape project such as this. Finally, as only faculty and staff perceptions were acquired, interviewing the students at FHS might provide further insight into the benefits and challenges of the project.

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Appendix A

IRB Approval E-mails

Parts one and two approval:

Dear Ms. Fleener,

As you know, your revisions to your protocol entitled "Growing in the Garden: A Study of the Landscape Project at Fayetteville School" were reviewed and your protocol received final approval as "Expedited" under 45 CFR 46.110(7).

This e-mail serves as official notice that your protocol has been approved. A formal approval letter will not be sent unless you notify us that you need one. By accepting this approval, you also accept your responsibilities associated with this approval. Details of your responsibilities are attached. Please print and retain.

Please note that you must use copies of the stamped consent documents when you consent participants, and provide a copy (signed or unsigned) for them to keep.

Your protocol will expire on July 31, 2012. Put that date on your calendar now. About three weeks before that time you will need to submit a final report or renewal request. (You might send yourself a delayed e-mail reminder for early next July.)

If you have any questions, please let us know.

Best wishes for success with your research!
Susan

Part three approval:

Dear Ms. Fleener,

Your protocol entitled " An Evaluation of Faculty and Staff Perceptions of the Landscape Project at Fayetteville School" has received final approval as "Exempt" under federal regulation 45 CFR 46.101(b)(2).

Official notice:

This e-mail serves as official notice that your protocol has been approved. A formal approval letter will not be sent unless you notify us that you need one. By accepting this approval, you also accept your responsibilities associated with this approval.

Details of your responsibilities are attached. Please print and retain.

Consent document:

Your approved, stamped consents will soon be sent by campus mail.

Please note that *you may not begin your research that involves human subjects until you receive the consent* with an IRB approval stamp applied. You must use copies of that document when you consent participants, and provide a copy (signed or unsigned) for them to keep.

Expiration – Approval for three-year period:

*****Note that the new policy for Exempt approvals is a *three-year approval*.**

Therefore, your protocol **will expire on February 1, 2016**. Put that date on your calendar now. About three weeks before that time you will need to submit a renewal request.

When you have completed all research activities, have no plans to collect additional data and have destroyed all identifiable information as approved by the IRB, please notify this office via e-mail. A final report is no longer required.

If you have any questions, please let us know.

Best wishes for success with your research!

Susan

Appendix B

Participant Pseudonyms

To provide confidentiality to interview participants, all interviewees in chapter 5 were assigned pseudonyms. The participants' pseudonyms and their relative positions are as follows:

Susan Hume: administrator

Laura Johnson: administrator

Seth Williams: administrator

Carolyn Miller: staff

Jeremiah Moore: staff

Alana Anderson: elementary teacher

Meggin Eakes: elementary teacher

Hilary Lewis: elementary teacher

Kira Scott: elementary teacher

Samantha Turner: elementary teacher

Leah Collins: 7th-12th grade teacher

Monte Cooper: 7th-12th grade teacher

Casey Ross: 7th-12th grade teacher

The following were not interviewed but are mentioned in this chapter:

Mary Goodman: elementary teacher

Ruth Kelley: third Auburn University intern

Chris Rheed: local businessman/sponsor

Jimmy Pursell: local businessman/primary financial sponsor

Hanna's Plant World: local plant business/sponsor

FarmLinks Golf Course: Jimmy Pursell's business/primary activity sponsor