THE EFFECTS OF THE LITERATURE IN THE GARDEN CURRICULUM ON LIFE SKILLS OF CHILDREN

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THE EFFECTS OF THE LITERATURE IN THE GARDEN CURRICULUM ON LIFE SKILLS OF CHILDREN

Ann Whitney Fleener

A Thesis

Submitted to

the Graduate Faculty of

Auburn University

in Partial Fulfillment of the

Requirements for the

Degree of

Master of Science

Auburn, Alabama
December 19, 2008

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Date of Graduation

VITA

Ann Whitney Fleener, daughter of Larry and Laura Fleener was born June 24, 1984 in Owensboro, Kentucky. She graduated from Grayson County High School in 2002. She then attended Murray State University, in Murray KY. Before graduating, she completed three summer internships- the first at Darrell's Lawn and Landscaping as a landscape manager, the second at Rare Earth Nursery and Garden Center as a nursery assistant, and the third at Opryland Hotel and Conference Center as a Horticulture Intern. She graduated *cum laude* with a Bachelor of Science in Horticulture in May 2006. After working as a counselor at Camp Marannook, she continued work at Camp Marannook as the camp horticulturist and then, in January, 2007 entered Graduate School at Auburn University.

THESIS ABSTRACT

THE EFFECTS OF THE LITERATURE IN THE GARDEN CURRICULUM ON LIFE SKILLS OF CHILDREN

Ann Whitney Fleener

Master of Science, December 19, 2008
(B.S., Murray State University, 2006)

117 Typed Pages

Directed by Carolyn W. Robinson

Contemporary children's gardening began in 1993 when the American Horticultural Society held its first symposium based on youth gardening. It was entitled "Children, Plants, and Gardens: Educational Opportunities." The focus of the symposium was to demonstrate ways in which children's gardens could support educational curricula. Much research has been conducted on the skills children need to have the social competence to achieve their goals successfully and appropriately. These skills include: life, interpersonal, anger control, and stress management skills. Each of these skills can be learned or practiced in the garden.

Children's gardens have recently been shown to increase life skills. This study focused on five life skills: teamwork, self-understanding, leadership, decision making skills, and communication skills. The purpose of this study was to assess the effects that gardening/plant activities from the Junior Master Gardener curriculum, *Literature in the Garden*, have on children's life skills. Approximately 130 third grade students from a Lee County, AL school participated in the study. The students were equally divided into control and experimental groups and each student was given the Youth Life Skills Inventory as a pre-and post-test. The experimental group participated in eight gardening/plant activities after the pre-test while the control group did not complete the activities.

No significant differences were found between mean gain scores for experimental and control group participants for overall life skills, self-understanding, decision making, communication, and teamwork. Significant differences were found between experimental and control groups on leadership skills. Experimental group leadership skills scores increased, while control group scores decreased. Also notable, is that differences between mean gain scores for experimental and control group overall life skills were approaching statistical significance at the $p=0.056$ level.

ACKNOWLEDGEMENTS

I would like to thank all those who made this accomplishment possible. To Dr. Carolyn Robinson, my committee chair, thank you so much for the opportunity to work with you. Thanks also for all your wisdom and support and for sometimes making me take the day off. To my committee members, Dr. David Williams and Dr. Marie Kraska, thank you for all your help and encouragement. I have learned so much from you both. Thanks also to Laureanne Bond, Matt Wilson, Sara Rogers, and Emily Wilson for all your help, advice, and encouragement.

Thanks to Smiths Station Elementary School and each of the participating teachers at Smiths Station for their willingness to participate and flexibility along the way. Without each of you this study would not have been possible or nearly as enjoyable.

Thanks also must be extended to my parents Larry and Laura Fleener. Thank you for all your support and encouragement through the years and for reminding me that education is a precious thing. I love and admire you both so much!

Style manual or journal used

American Society of Horticultural Science

Computer software used

Microsoft Word 2007, SPSS versions 16.1

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CHAPTER I

INTRODUCTION

Nature deficit/fear of nature

"I like to play indoors better, 'cause that's where all the electrical outlets are" Paul, a fourth grader in San Diego (Louv, 2005).

Nature is increasingly becoming more foreign to children, especially those in urban areas. Children's concepts of where their food comes from has changed as well as their concept of nature, which has become more intellectual as they watch programs about nature but rarely experience that nature. Children in the United States spend about thirty hours a week either in front of the TV or computer (Louv, 2005). This is apparently true in other countries as indicated by a British study in 2002 that noted most children in the study were better able to identify characters from the card trading game Pokemon than they were native species from their community.

Children are also becoming more afraid of nature. In a study conducted in 1994, workers at urban nature centers were asked to recall fears expressed by urban students who visited on school trips. The most common fears were expected such as fear of snakes, insects, and bears. However, students also expressed a fear of plants, as well as getting lost, though they were never away from the guide or their classroom. Some

children were reported to be afraid of just being in the woods with one child stating, “I’m afraid of big things” (Bixler et al., 1994).

Health issues

An issue related to less time spent outside by children is the exponential increase in average weight of the American child. Obesity statistics in the United States have been rising for years and continue to increase. In 1998, 25% of children and adolescents were either obese or at risk for becoming so, five times the amount of obese children reported in the late 1960’s (Thompson and Smolak, 2001; Louv, 2005). The Centers for Disease Control reported that the number of American adults who were overweight increased over 60 percent from 1991 to 2000 (Louv, 2005). Since obesity in childhood is a strong predictor for obesity as an adult, addressing this issue at an early age is necessary (Thompson and Smolak, 2001).

On the opposite end of the spectrum, efforts by children to achieve a perceived societal demand to obtain the perfect body is just as troubling as obesity. Some studies have found that children, especially girls, as young as nine years old are already dieting to lose weight (Field et al., 1999). Other studies have found that children as young as five are dissatisfied with their size (Davison et al., 2000). Attempts by some youth to deal with their weight concerns result in development of eating disorders such as anorexia nervosa or bulimia nervosa. Another drastic measure that some youth are taking to improve self image is plastic surgery. From 1994 to 1998 the number of persons under 18 who opted for plastic surgery increased 134%. In terms of weight, a 222% increase in

liposuction occurred while thigh lifts, tummy tucks and upper arm lifts are increasingly being performed on young girls (Sarwer et al., 1999).

Violence

Along with everyday decisions such as where to play and what to eat, many children are forced to make increasingly more significant decisions about their wellbeing, such as whether to join a gang or carry a gun to school, and they are having to make these decisions at surprisingly young ages. According to the Federal Bureau of Investigation's National Incident-Based Reporting System master files for the years of 2000 and 2001, juveniles were the victims in 10% of murders, 70% of sexual assaults, 11% of robberies, and 17% of aggravated assaults (Federal Bureau of Investigation, 2001).

In a 1993 national study conducted with high school students by the Youth Risk Behavior Surveillance System, approximately 4.4% of participating students felt too unsafe to go to school, 16.2% had been in fights, and 7.3% had been threatened or injured with weapons at school during the past year (US Department of Health and Human Services, 1995, in Gall and Lucas, 1996). In another study conducted that year by the Youth Risk Behavior Surveillance System, 22% of participants reported carrying a weapon at least once in the month prior to the survey (Gall and Lucas, 1996). Less serious forms of violence, such as bullying and physical fighting, were studied in a 1997-1998 US study, with 34.9% of participants admitting to sometimes engaging in bullying at school (Krug et al, 2002). These seemingly mild forms of violence can lead to more dangerous forms of violence such as those committed in gangs.

In 1996, 31,000 gangs operated in nearly 4800 U.S. cities and towns. In a study of nearly 1000 youth in New York, approximately 1/3 of participants were gang members, however, they accounted for around 70% of self-reported violent crimes and drug dealing (Krug et al, 2002). In a 1991-1992 poll, 192 large urban state prosecutors' offices were questioned about the prevalence of gang-related violence in their county (Krug et al, 2002). Though these figures do not account for all gang-related violence, they found that an average of 15.1 gang-related violent crimes were tried each month (Gall and Lucas, 1996).

Social skills

A seemingly less pressing issue than violence among youth is the general decline of face to face social interaction among individuals. However, as incidents of school violence, such as the 1999 Columbine shooting, were examined in the 1990's, the shooters' social statuses were often discussed. Generally, the perpetrators of these acts were viewed as outsiders by their peers, had few friends, and spent much of their time interacting with technology, rather than people. Though certainly not accounting for all the problems individuals, such as the Columbine shooters, experience, a lack of social skills was perhaps one contributing factor in their social isolation leading to their committing such extreme acts of violence.

Social competence refers to the social, emotional, and cognitive skills as well as behaviors that children need for successful social adaptation (Welsh and Bierman, 2008). Social competence is attained through several factors: social skills, social awareness, and self confidence. A child with good social skills is able to use many different social

behaviors and to use them in the appropriate context. A socially competent child also is able to understand other's emotions, perceive social cues, and exhibit understanding of others' motivations and goals. Social competence can help a child to establish positive relationships while avoiding negative treatment or victimization from others (Welsh and Bierman, 2008).

The Garden

Each of these issues: disconnect with nature, weight/body image struggles, violence, and social difficulties, are most effectively addressed at a young age. Most children are in school from the age of three to eighteen for around eight hours a day, a total of about 21,600 hours in fifteen years. Experiences gained in the early years are very important since many life skills and leadership abilities are developed at a young age (Gardner, 1987). Children need life, interpersonal, anger control, and stress management skills (Cowen, 1991) to have the social competence and ability to achieve their goals successfully and appropriately (Guralnick, 1990). Each of these skills can be learned in the garden. Interpersonal skills are learned as children "talk amongst each other to accomplish tasks, give reports on the garden, and write about their experiences" (Robinson and Zajicek, 2005). Another life skill that may be developed is teamwork, which can be obtained by seeking to achieve common goals. Other skills obtained in the garden are decision making, planning, and problem solving skills as children are challenged by the questions of what, where, and how to plant (Robinson and Zajicek, 2005).

The garden provides other benefits associated with emotional well-being, self image, and relating to other people and things. For example, research has shown that adults feel gardening increases a child's self-esteem and reduces stress (Waliczek et al., 2000). Research has also demonstrated that gardening increases a child's respect for nature and improves his or her environmental attitudes (Lohr and Pearson-Mims, 2005; Montessori, 1912). "Well-designed schoolyards not only contribute to the physical development, but also to the psycho-social development of young children, by providing spaces where children can practice new developmentally appropriate behavior and apply it to new situations, as evidenced by: performance and mastery of developmentally appropriate skills" (EDC, 2000). Part of the school yard may be a school garden. Research by Robinson and Zajicek (2005) documents benefits such as the relational skills of life, interpersonal, anger control, and stress management. This study focused on one of those benefits, life skills, by measuring the effects of plant activities on the following five life skill areas: teamwork, self-understanding, leadership, decision making skills, and communication skills.

Curriculum

The curriculum used in this study was the *Literature in the Garden* curriculum. This curriculum was developed by the Junior Master Gardener® (JMG) program. *Literature in the Garden* is a part of the Golden Ray Series which is a "stand-alone unit of study of the JMG Level One curricula" (JMGkids, 2008). The *Literature in the Garden* curriculum utilizes six children's literature books and provides activities for each

that follow the themes of that book. *Literature in the Garden* was developed for grades three to five.

Objectives

The aim of this study was to examine the effect of the *Literature in the Garden* curriculum on the life skills of participating children. The objective was to determine if completing Literature in the Garden activities 1) increased teamwork skills, 2) improved self understanding, 3) increased leadership skills, 4) improved decision making skills, 5) improved communication skills, and 6) increased overall life skills.

Null Hypothesis

The following null hypotheses were tested:

H_{01}: There is no statistically significant difference between the self-understanding scores of elementary school children who completed plant activities and those who did not.

H_{02}: There is no statistically significant difference between the leadership skills scores of elementary school children who completed plant activities and those who did not.

H_{03}: There is no statistically significant difference between the decision making skills scores of elementary school children who completed plant activities and those who did not.

H_{04}: There is no statistically significant difference between the communication skills scores of elementary school children who completed plant activities and those who did not.

H_{05}: There is no statistically significant difference between the teamwork skills scores of elementary school children who completed plant activities and those who did not.

H_{06}: There is no statistically significant difference between the overall life skills scores of elementary school children who completed plant activities and those who did not.

Definition of Terms

For the purposes of this study, the following terms have been operationally defined:

1. Communication skills: the ability to effectively communicate with others, including both listening, speaking, writing, and gestures (Robinson, 2001).
2. Decision-making skills: the ability to examine different choices and decide the best one based on previous experience or the experience of others (Robinson, 2001).
3. Horticulture: the cultivation of a garden, orchard, or nursery; the cultivation of flowers, fruits, vegetables, or ornamental plants; the cultivation of a garden, from hortus 'garden' + cultura (Lexico Publishing Group, 2007).
4. Leadership skills: the ability to inspire others to work towards a common goal (Robinson, 2001).
5. Life skills: defined by five different aspects: teamwork skills, self understanding, leadership skills, decision making skills, and communication skills.
6. Self-esteem: a person's value of themself (Robinson, 2001).

7. Self-understanding: a person's awareness of their own strengths and weaknesses (Robinson, 2001).
8. Teamwork skills: the ability to work with others to achieve a common goal (Robinson, 2001).

Basic Assumptions

It was assumed that all the respondents answered the survey honestly based on their true feelings. It was assumed that the survey was presented and administered to the students impartially. It was also assumed that each classroom completed the activities that required further action when the researcher was not present. Also, it was assumed that all students were present on the days of the survey administration and the activity days. Finally, it was assumed that one semester of plant activities is long enough to affect life skills.

Limitations

Sampling procedures of this study were not completely random because entire classrooms, not individuals, were examined. The study was also limited to students who voluntarily participated. Finally, the study was also limited to the third grade level at Smiths Station Elementary.

Delimitations

This study investigated the effects of plant activities on the life skills of third graders from Smiths Station Elementary School, located in Smiths Station, AL, who voluntarily participated in the research study during the spring of 2007-2008 school year

CHAPTER II

REVIEW OF LITERATURE

The literature reviewed in this chapter is focused on the subject of people-plant interactions, more specifically school gardens effects on children. The human issues in horticulture and school garden sections cover both the history and benefits of those areas. Six life skills, addressed in terms of youth development, are discussed in this study. The literature is grouped into the following categories:

1. Human Issues in Horticulture
2. School Gardens
3. Middle Childhood
4. Life Skills Development
5. Summary of Literature

Human Issues in Horticulture

Overview

Horticulture can be defined as, "the art and science of growing flowers, fruits, vegetables, trees, and shrubs, resulting in the development of the minds and emotions of individuals, the enrichment and health of communities and the integration of the garden in the breadth of modern civilization (Relf, 1992)." By this definition horticulture includes plants, which are essential for human survival. Unlike many definitions

however, this definition includes people, whose active and passive involvement with plants provide benefits to them, their communities, and their cultures (Relf, 1992).

A growing focus in the broad discipline of Horticulture is the study of how plants affect people, also known as Human Issues in Horticulture (HIH). HIH is also designated by terms such as socio-horticulture, people-plant interaction's, and human dimensions in horticulture. The purpose of HIH is to understand the impact of plants on people in every aspect of their life. It can be divided into the following major subareas: enabling or accessible gardens, children's and school gardens, healing landscapes, garden/plant therapy, and horticultural therapy. Lesser known subareas of HIH also include economic issues, physical and environmental improvement by plants, food and nutrition, and the role of horticulture in art, music, drama, and philosophy. (Relf and Dorn, 1995).

Studies on the positive effects of HIH are needed because intuitive arguments supporting the impact of plants on people are seldom effective with local or state governments facing budgetary constraints, or with contractors concerned about the bottom line. Compared to problems such as homelessness and crime rates, plants are likely to be viewed as unwarranted luxuries. Settings such as the workplace, health-care facilities, and apartment complex developers have not been encouraged to include landscaping in their budget, as little research has been conducted on the benefits of plants and landscaping (Ulrich and Parson, 1992, in Relf, 1992).

Benefits of Human Issues in Horticulture

Gardening can affect many aspects of a persons' life including: social, educational, psychological, personal, and even spiritual areas (Dunnett and Qasim, 2000;

Relf, 1992). It can also offer economic benefits. Groups such as the Partners for Livable Communities claim that plants are the most efficient instrument for changing negative perception of an area. They state that plants can improve economic and social conditions, as well as the psychosocial health of those exposed to them (Partners for Livable Communities, 2004). Landscaping and gardening can increase the value of your home, reduce grocery bills (Hassan and Mattson, 1993), and lower heating and cooling costs. Individual home owners estimate that a beautiful landscape increases the market value of their homes by 15%. (Weyerhaeuser, 1986). Landscaping also can reduce crime and vandalism when correctly presented and installed. Reduced crime can lead to a nicer area, which leads to more development in the area, which can ultimately have economic benefits to the community (Doxon, 1996). Businesses also can receive economic benefits from plants. In a study by Evans and Malone (1992), the economic benefits of plants to Opryland Hotel, located in Nashville, TN, were examined. The hotel houses 12 acres of indoor space with approximately 18,000 plants. The cost of the plants and the horticulture budget for each year adds to 2.2 million dollars. Rooms overlooking the gardens are an extra $30 per night, yet they still have a high occupancy rate of 85% and these rooms bring in 7 million additional dollars annually (Relf, 1992).

Popularity of gardening: "Private gardens are the most heavily used type of outdoor space and represent the most frequent contact with nature for most people" (Dunnett and Qasim, 2000). According to the National Gardening Association (1999) 80% of Americans participate in some type of gardening activity. Moreover, the number of gardeners under the age of 50 who purchase gardening products is rising at a rate of

11% per year (Hamilton and DeMarrais, 2001). Concerning Finnish households, 49.2% have some kind of place for growing plants (Evers et al., 2000), while 90% of Brittish home owners/renters desire private garden space. In addition, discontentment with Brittish public housing projects has been reported to be mainly due to a lack of garden space. (Kellet, 1982).

Gardening is also common internationally, with the British market in plants and garden-related equipment being a multibillion pound market. With over 10 million avid gardeners, it is one of the most popular leisure activities in Britain (Dunnett and Qasim, 2000). In UK cities, private gardens can occupy a considerable fraction of the total surface area of a city, often encompassing an area larger than that of all the parks and nature areas combined (Jeffcote, 1993).

Gardening is not just growing in popularity as a private hobby; its public use is becoming more and more common. Schools are using plants as a tool for educating students (DeMarco et al., 1999). Hospitals, rehabilitation centers, and correctional facilities are incorporating horticulture into their treatment programs (AHTA.org, 2008; Kwack and Relf, 2002). Even universities are recognizing the value of horticulture with an increasing number offering courses and degrees in the study of horticulture for health or therapy (Kwack and Relf, 2002).

Stress reduction: Human Issues in Horticulture is a quickly growing field, especially in the city, where there seem to be many stressors that HIH can address. When cities began to form, the hope was that things would be more convenient and that people would be freed of the labor required with living in more isolated areas (Appleton, 1986).

Modern cities, despite all their conveniences, are often considered stressful environments in which to live. People are forced to try to filter out numerous stimuli as they are bombarded daily with noises from traffic, construction, people, and information sources. Dealing with all these stimuli is known to cause mental fatigue (Lewis, 1996). The garden has been reported to be a welcomed relief from the concrete and tarmac of the city environment (Dunnett and Qasim, 2000).

One such relief that is readily available to city dwellers is a public garden, which urban residents may visit as an approach to cope with the stress of the city (Bennett and Swasey, 1996; Dunnett and Qasim, 2000). In 1996, Bennett and Swasey conducted a study with residents from the five boroughs of New York City who visited one of two New York botanical gardens. Of the visitors who responded, 91% reported some level of perceived stress reduction and most visitors reported coming to the garden to relax, reduce stress, or receive inspiration. These reasons all can be connected to feelings or affective responses elicited by the visit (Bennett and Swasey, 1996). Relf (1992) reports that the restorative value of participation with nature, particularly wilderness experiences, can produce positive effects. One effect is the feeling of being away, which may distract the individual from thinking about the causes of their stress. When viewing nature, involuntary attention is often utilized. Involuntary attention does not require conscious focus on what is being done, while voluntary attention requires effort and is difficult to maintain (Kaplan, 1973). This can allow recovery from the intense concentration required by more stressful work. These effects are not limited by physical, but rather

conceptual size. A tiny garden, or even a house plant may restore one person in the way acres of gardens or natural settings restore another (Relf, 1992).

Involuntary attention is also used by city dwellers when they see nature within the city. A study by Dwyer et al. (1991) revealed that urban trees and forests were esteemed by urban residents because of their ability to reduce stress (Dwyer et al., 1991). It has also been found that nature can have a restorative effect on a fatigued mind (Kaplan and Kaplan, 1982) and views dominated by vegetation may give relief from stress (Ulrich, 1979; Ulrich et al., 1993; Ulrich and Parsons, 1992).

Benefits of viewing or being around nature: Doxon (1996) comments on the powerful effect of proximity to nature on people, "landscaping is created not for physical survival but for psychological and social survival. The landscapes of yards, parks, and offices are the easiest access to nature most of us have and may be as important as our relationship with our spouse". Contact with nature, even images of nature, has been found to benefit people in numerous ways (Rohde and Kindle, 1997). One benefit of simply viewing images of nature is that it helps to speed up recovery from stress (Ulrich and Simmons, 1986, in Wineman et al., 1986). Another benefit found by Ulrich (1981), is that viewing nature scenes produced higher alpha brain wave amplitudes than viewing urban scenes. Higher alpha brain waves are linked to lower levels of physiological excitement and higher levels of relaxation. Another mental benefit was found by Lohr, who discovered that nature slides held subjects' attention better than slides with other comparatively nice backgrounds, though all slides had similar informational content. (Lohr and Relf, 2000).

Of more benefit to people than viewing images of nature is being around nature. Plants in the vicinity of where we live perhaps have the strongest effect on us. Fried (1982) claims 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. This observation is supported by Relf (1992). A study conducted in Sheffield, England surveyed residents of Sheffield with private gardens. Most participants reported that their favorite characteristics of a 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 the experience of being close to nature were also listed (Dunnett and Qasim, 2000). In a 1992 study, 99% of residents of retirement communities indicated that they believe that pleasant, landscaped grounds were either important or essential. They also indicated that a window view of the grounds was three times more important than a view of activity areas (Browne, 1992, in Relf, 1992).

Emotional benefits: Contact with plants also has many therapeutic aspects for people (Kaplan and Kaplan, 1982; Relf, 1992; Ulrich and Parsons, 1992). It has long been proposed that we have an inherent connection with nature that can affect our health and emotions (Conklin, 1972; Kaplan and Kaplan 1982). Gardening may even provide spiritual renewal as individuals interact with plants (Relf, 1992; Hamilton and DeMarrais, 2001).

Public gardens have been noted as a place to escape mentally, to relax, to interact with others, and to experience emotional rejuvenation. They also provide a place for

gardeners to enhance their physical and mental well being and increase their gardening knowledge and skill (Hamilton and Demarrais, 2001).

Another Horticulture area that daily brings the garden to millions of people is the floral industry. Flowers are a customary gift when someone is ill or a loved one has passed away. They are seen as an important part of the mourning process and provide comfort and warmth to help deal with grief (Adachi et al., 2000). People customarily give flowers to the ill, who report feeling happier in the presence of plants (Lohr and Relf, 2000).

A relatively new way of bringing horticulture to the public is the use of horticultural therapy in hospitals. Horticultural therapy is growing in recognition as an effective therapeutic tool to develop memory, socialization, self-esteem, and a new attitude of daily life for stroke patients (Kwack and Relf, 2002). A restorative effect of horticultural therapy has been demonstrated through the strengthening of language and recognition function (Na et al., 1999) and has been shown to positively affect depression, self-esteem, orientation, and language skills of dementia patients (Chung, 1995; Song, 1997).

Another emotional benefit associated with horticulture is increased life satisfaction which can be defined as contentment or acceptance of one's life or the fulfillment of one's wants and needs for life as a whole. Although life satisfaction is an idea most everyone finds appealing, Americans appear to be struggling to obtain it as statistics indicate that about 25% of Americans suffer from mild depression at any given time (Seligman, 1994). A study conducted at Texas A&M examined life satisfaction of

gardeners versus non-gardeners. Gardeners had significantly higher overall life satisfaction scores than non-gardeners and reported higher energy levels, more optimism, more zest for life, and better physical self-concept than non-gardeners (Waliczek et al., 2005).

Plants have been also connected to a better ability to endure stressful situations. One study that examines this was conducted by Lohr. Participants who were placed in an office room with decorative plants in it were better able to endure discomfort. In a room with plants present, significantly more subjects were willing to keep a hand submerged in ice water for five minutes compared to individuals placed in a non-plant, decorative objects room or a typical office room. In addition, in a room assessment survey the room with plants was more connected with positive characteristics, such as "cheerful," "calming," and "attractive" while the control room was associated with feeling "fearful". Also, before exposure to the ice water treatment most people in the room with plants reported higher levels of positive emotions, such as feeling carefree or friendly and after exposure to the ice water continued to feel happier compared to participants in the control group (Lohr and Relf, 2000).

Finally, several studies have demonstrated that plants can reduce levels of violence. In correctional facilities, horticultural activities are often practiced by prisoners (Korea Department of Law, 1993, in Kwack and Relf, 2002) and training programs are frequently offered to provide a certificate which can lead to professional work (Kwack and Relf, 2002). Horticultural therapy has been reported to improve behavior of prisoners, alcoholics, and probationers. Growing plants has had the effect of reducing

violence, mental instability, and irritability of prisoners (Park and Gee, 2000). Horticulture reduces violence outside of the prison walls as well. The presence of greenery within urban environments has been shown to improve social communication and provide residents with a greater feeling of safety (Kuo and Sullivan, 2001; Waliczek et al., 1996). In poor inner-city areas vegetation is generally minimal to reduce the amount of hiding places and potentially reduce crime (Kuo and Sullivan, 2001). However, within inner-city areas crime occurs at a higher rate (Snelgrove et al., 2004). It has been shown that vegetation may lead to safer environments (Kuo and Sullivan, 2001) and a previous study done by Kuo and Sullivan (1996) supports this. In their 2001 study, Kuo an Sullivan surveyed apartment complex residents in public housing who couldn't choose the area in which they were placed. Some complexes were surrounded by trees while others had little vegetation. In the low vegetation areas 22% of respondents reported they had engaged in violence and 14% had hit their children compared to 13% and 3%, respectively, in the tree surrounded apartments (Lohr and Relf, 2000). Another significant study was conducted by Snelgrove and others in 2004. The study assessed crime level, income level, and amount of greenness interactions in the city of Austin, Texas for the year of 1995. The amount of greenness of the entire study area was determined using color infrared aerial photography. The total Austin area has an average greenness of about 34%. However, areas with a greenness value of less than 34% accounted for 83% of all crimes.

A study done by the University of Reading found that participants who viewed a video about the University in a room with flowers in it had increased feelings of

confidence, composure, and relaxation compared to their feelings before-hand, which were measured by the BI-Polar Form of the Profile of Mood States (POMS-BI) (Adachi et al., 2000).

A study conducted with master gardeners that looked at their reasons for becoming a master gardener found that they may experience a sense of validation through teaching, socializing with others who have like interests, and engaging in activities they enjoy. (Boyer et al., 2002). It has also been found that volunteering can improve a person's perceived well-being, life satisfaction, and self esteem (Wilson and Musick, 1999).

Gardening seems to have many qualities that capture the fascination of countless individuals. "… it calls on the basic informational processes that humans do so well and presumably care so deeply about. It not only permits, but actually invites recognition, prediction, control, and evaluation It does this by both providing knowledge and requiring it" (Kaplan, 1972).

Health Benefits: Physical health has also been shown to be improved by plants. In 1984 Ulrich completed a study on hospital patients recovering from gallbladder surgery. Those who had a view of nature instead of a view of a brick wall were reported to require less strong pain medicine and spend less time in the hospital (Lohr and Relf, 2000). Moore (1982) reported inmates who had a view of nearby farmlands and forests had fewer sick call reports than those with a view of the prison yard (Moore, 1982).

Along with reducing sickness, gardening can serve as a form of exercise. In fact, gardening has been classified as a moderate physical activity (Nykamp, 1999; Taylor,

1990, in Waliczek et al., 2005). Taylor (1990) cited several sources to illustrate the physical value of gardening, reporting one can burn as many calories in 45 minutes of gardening as in 30 minutes of aerobics. Additionally, one hour of weeding burns 300 calories (same as walking or bicycling at a moderate pace) and manual push-mowing of the lawn burns 500 calories/hour which is the same rate as playing tennis (Relf, 1992). Gardening also can improve a person's eating habits as it may lead to an increased consumption of home-produced foods which aids in better nutrition and increased overall well-being (Schlettwein-Gsell et al., 1991).

In addition to physiologically improving our health as we view nature and physically improving our health as we exercise in the garden, plants also improve our environment to reduce some of the environmental causes of sickness. In 2000, Fjeld conducted a study to assess the effect of foliage plants, or a combination of foliage plants and exposure to full-spectrum fluorescent lamps, on self-reported health and discomfort complaints in three different work environments: an office building, an X-ray department in a Norwegian hospital, and a junior high school. Health and discomfort symptoms were found to be 21% to 25% lower during the period subjects were in the presence of plants, or plants and full-spectrum lighting, compared to a period without plants or lighting. Neuropsychological symptoms, such as fatigue, dizziness, and concentration problems, seemed to be positively affected, as well as mucous membrane symptoms, such as dry and hoarse throat, irritated eyes, stuffy nose, and cough. Participants also regarded the plants as a positive element for feelings of well-being with the great majority of office workers wanting plants in their office in the future. In the school, the students felt that

the air quality was better in biological classrooms and the majority said their well-being was better in a biological classroom and hoped to have biological classrooms in the future (Fjeld, 2000).

Mental health has been shown to be improved by contact with plants/nature. In 1988 it was found that workers with a view of natural elements, such as trees and flowers, when compared with those who either had no outside view or could only see manmade elements from their windows, experienced less job pressure, were more satisfied with their jobs, and reported fewer ailments (Kaplan et al., 1988). Ulrich and Simons claim that even brief visual contact with plants could be valuable in relieving mild stress. In their 1986 study they found that when participants had a view of nature, physiological changes related to recovery from stress such as lower blood pressure and reduced muscle tension were shown. These effects occurred within 4-6 minutes (Relf, 1992). Owen, in 1994 found similar results by measuring the blood pressure of visitors to the Witchita (Kansas) Gardens before and after they spent time in the garden. Visitor's systolic blood pressure decreased significantly after their visit. In another related study, Kohlleppel and others found that most visitors (who participated in the study) to three Florida botanical gardens reported a reduction in stress. Visiting a botanical garden was seen as an important coping strategy, falling behind only self-esteem and health, and was considered more important than even life events and time pressures (Kohlleppel et al., 2002). The elderly may also benefit from exposure to nature. Mooney and Nicell in 1992 found elderly adults with cognitive impairments such as Alzheimer disease had "reduced incidents of aggressive behavior and contributed significantly to a risk management

program" when they were surrounded by a properly designed outdoor environment and took walks in the garden (Lohr and Relf, 2000).

Environmental benefits: Plants have been shown to have a great impact on the environment. In an interior envrionment, dust accumulation has been found to be less when plants are present (Lohr and Pearson-Mims, 1996). Plants also improve air quality by removing such contaminants as formaldehyde, benzenes, trichloroethylene, nitrogen dioxide, and carbon monoxide (Wolverton et al., 1989, in Fjeld, 2000). Outside, plants also purify the air, moderate temperatures through shade or wind blocks, reduce glare and noise, screen unpleasant sights, and increase relative humidity (Nighswonger, 1975).

School Gardens

History: With the growing popularity of children's gardens in the United States, one might think gardening for education a relatively new concept; however, it has existed in the United States since at least the nineteenth century. In Europe, its use can be traced as far back as the sixteenth century when, in 1525, a Botanical garden was established at an Italian University for the purpose of education. Later in the 16th century Comenius stated "A school garden should be connected with every school where children can have opportunities for leisurely gazing upon trees, flowers and herbs and are taught to enjoy them." One century later, school gardens began to spread throughout Europe (Virginia Tech Horticulture Department, 2002). Gardening for education continued to gain popularity through the 18th and 19th centuries. The first compulsory school system that included gardening was developed in Prussia, and in 1869 using school gardens became a

law in all of Europe (Subramaniam, 2002). The first step in the growth of school gardens in the United States may be considered to be in the late 1800's when Henry Lincoln Clapp established America's first school garden at George Putnam School in Roxbury, Massachusetts (Subramaniam, 2002). Next, Van Evrie Kilpatrick, director of the School Garden Association of New York said, "School gardens should be maintained by the city, the city owes it to the children whom it has deprived of breathing places and beauty spots through want of foresight" (Sealy, 2001, in Subramaniam, 2002). Therefore, school gardens were, at that time in America, established for their aesthetic benefits rather than educational ones (Sealy, 2001, in Subramaniam, 2002). However, the beginnings of using gardens for their benefits as well as their beauty occurred when, in 1897, a Boy's Garden was established by the National Cash Register Company to instill "good work ethic". By 1918, every state in America and every province in Canada had at least one school garden (Sealy, 2001, in Subramaniam, 2002). The valuing of school gardens declined quickly after World War I but had a brief resurgence during World War II when Victory Gardens became popular. They quickly declined in popularity and the next wave of school gardens in the US did not arise until 1954 as an outgrowth of the educational reform strategy for the "war on poverty" (Meyer, 1997, In Subramaniam, 2002). This trend lasted a bit longer than its predecessor, the Victory Garden, and did not die out until 1975. In the 1970's the first formal research to document the effects of plants on people began to appear as social and medical scientists began to publish papers. Another resurgence of school gardens emerged with the birth of the environmental movement. As popular as gardens were in the 1970's, the conservatism of the 1980's weakened the

school garden movement yet again (Yamamoto, 2000, in Subramaniam, 2002). Contemporary children's gardening began in 1993 when the American Horticultural Society held its first symposium based on youth gardening entitled "Children, Plants, and Gardens: Educational Opportunities." The focus of the symposium was to demonstrate ways in which children's gardens could support educational curricula. (Sealy, 2001, in Subramaniam, 2002). Another symposium that played an important part in horticulture was "The Role of Horticulture in Human Well-being and Social Development" (Lohr and Relf, 2000). Symposia are now held every two years and have led to many of the current endeavors in research, teaching, and practice in the United States (Lohr and Relf, 2000).

History of education philosophy: Over the years, the philosophy of how to teach a child has evolved with perhaps the first major change in this philosophy beginning when, the educational philosopher Jean-Jacques Rousseau, in the eighteenth century, pointed out the flaw in teaching a child "about" things instead of actually teaching the child the things themselves. He stated, "You think you are teaching what the world is like; he is only learning the map." (Sealy, 2001, in Subramaniam, 2002). Rousseau asserted the importance of nature in education, stating that nature was the child's greatest teacher and that "his knowledge of the natural world serves as a foundation for his later learning" (Sealy, 2001, in Subramaniam, 2002). Later that century, Johann Heinrich Pestalozzi, having studied Rousseau's teachings, emphasized observation and activity in learning rather than learning mere words. He started a school, after working with orphans, that used gardening, farming, and home skills as applied education. Pestalozzi imagined a balance between the three elements, "hands, heart, and

head" (Sealy, 2001, in Subramaniam, 2002). The father of Finnish public schools, Uno Cyganeus (1810-88), studied and emulated the educational ideas of Rousseau, Pestalozzi and F. Frobel. He believed that gardening and school gardens were great tools for teaching the natural sciences and practical horticultural skills. He also believed school gardens aided in a child's physical and mental development and could benefit a child such that society ultimately benefited (Evers et al., 2000). In the twentieth century Maria Montessori, founder of the Montessori method of education, also found that gardening was ideal for applying the hands-on learning of which Rousseau spoke. She demonstrated this when she stated, "first education of the senses, then the education of the intellect." Montessori believed gardens encouraged children's moral development and treasuring of nature. She's quoted as saying "When he [the student] knows that the life of the plants that have been sown depends upon his care in watering them... without which the little plant dries up... the child becomes vigilant, as one who is beginning to feel a mission in life" (Montessori, 1912). A few years later, John Dewey, in agreement with his predecessors, asserted his belief that school gardens provide opportunities for reproducing life situations (Dewey, 1920). Near the end of the twentieth century, Tuan (1978) proposed that children need to be taught about the environment by adults because "nature is an inarticulate teacher".

There are several theories of how knowledge is gained, two of which are experience and intelligence theories. Kolb, who held to experience theories, believed knowledge, skill, and values are best attained through direct experiences. His experiential model asserts that experiences lead to observation and reflections which then

become abstract concepts and generalizations of these concepts. The learner then obtains the ability to test the concepts in other environments (Weatherford & Weatherford, 1987). Gardner, who discussed theories of intelligence, proposes that people possess at least eight kinds of intelligence: linguistic, logical-mathematical, musical, spatial, bodily, kinesthetic, interpersonal and intrapersonal. He says, however, that only two of those are purposely addressed in the classroom, logical-mathematical intelligence and linguistics intelligence (Gardner, 1999). Yet, when all the types of intelligence are addressed in the way students are taught, a student will learn more completely (Drake, 1998). Though these two theories and the ideas of the education philosophers mentioned above may each differ slightly or greatly, they each support the idea that experience is needed for learning. One way that experience can be gained is through time spent in the garden.

Benefits

Nature Deficit: Not only is children's gardening growing in popularity, but the benefits of it are being increasingly discovered. Emphasis on studying the benefits of nature comes at an opportune time as most of America's youth have little, or in some cases, no exposure to plants with the average child spending 30 hours in front of the television or a game each week and less time outside (Louv, 2005). Many Cooperative Extension systems, arboreta and botanic gardens, and non-profit groups are beginning to address this issue (Relf and Dorn, 1995). Even in schools, children who are learning about elements of nature are often not being exposed to the nature they are studying. Most elementary, middle, and high schools are located in large cities (Kwack and Relf, 2002). Sim (1985) found that trees and shrubs planted by school buildings are often

considered the "garden" for the school. Internationally, children in many developed countries are experiencing the same nature deficit. In Finland, most schools are in urban areas with many school grounds being congested and paved, with very little greenery. "They [school grounds] seem to be planned not for education, nor for recreation, but first and foremost for easy maintenance" (Evers et al., 2000).

Early gardening's effects: Gardening at a young age has been found to encourage gardening as an adult and is often a source of fond memories for those who were exposed to the garden as a child (Hamilton and DeMarrais, 2001). An individuals' idea as an adult about gardening also is greatly affected by the individuals' who are most important in their life during childhood, such as parents or a teacher (Hamilton and DeMarrais, 2001). "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). When children garden they are able to see life as it occurs. They also are able to aid in growing a plant through all its stages; seed, seedling, flower, and sometimes re-seeding and death. Through watching a plant grow they are able to experience, in a short time frame, the concept of reaching a goal. This can be have a motivating effect and should be considered by educators, since a motivated child is an interested child and interest is a vital element in learning (Green, 1994). Horticultural activities in schools are intended for more than just education. They are also used to encourage emotional development, increase student teamwork, and provide a quality environment for studying (Kim, 1998, in Kwack and Relf, 2002). Gardening in school also provides the teacher the opportunity

to help a child realize their needs and grow in self-understanding. By naming things and growing in sensory awareness through observing, smelling, tasting and touching natural and living materials a child will expand their language range and their understanding of the world. As they obtain these new skills they will grow in their ability to communicate with others and develop healthy relationships (Green, 1994). From gardening, a child can also realize that 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. Everywhere, but especially in inner city schools, if we desire for 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). Gardening can reveal a child's thoughts and feelings about themselves and others which may aid in them seeing similarities and differences between themselves and their peers. As a child gardens he or she can see that each person is a unique individual, just as each flower is unique (Green, 1994). McGuinn (1999) conducted a study at an alternative education program for youth on probation. He found that the delinquents' connection with society was increased and that the youth began to think more practically about the future and their potential career (Lohr and Relf, 2000).

Educational application: "Well-designed schoolyards not only contribute to the physical development, but also to the psycho-social development of young children, by providing spaces where children can practice new developmentally appropriate behavior and apply it to new situations, as evidenced by performance and mastery of

developmentally appropriate skills" (EDC, 2000). School gardens provide a context for teaching memory skills through the concrete, hands-on experiences they provide (Green, 1994). 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. Other benefits involve understanding how plants work; that different parts have different functions essential for the survival of a plant and the parts of some plants can change to meet the immediate needs of the plant (Green, 1994). The appeal of nature can be a great basis for "an introduction to the pleasures and later on the necessity for nurturing our living things" (Montessori, 1964). Many studies have demonstrated that gardening increases a child's respect for nature and improves their environmental attitudes (Lohr and Pearson-Mims, 2005; Skelly and Zajicek, 1998; Montessori, 1912). As a child nurtures a plant they are "initiated into the virtues of patience and into confident expectation which is a form of faith and philosophy of life" (Montessori, 1964). The goal of formal education is to produce creative, inventive, and interested individuals who can think critically and will search for answers on their own. Such learning is achieved by active work and growing in self-understanding, which are both characteristics that can be learned in the garden (Piaget, 1948, in Minuchin, 1977). The garden also offers a hands-on environment which aids in the learning process. This point is further demonstrated by the "Cone of Experience" based on Educational Psychologist, John Dewey's philosophy of learning which says that you remember ten percent of what

you read, twenty percent of what you hear, seventy percent of what you say and write, and ninety percent of what you say and perform as a task or experience (Payne, 2000).

Popularity of school gardens and benefits: As the many benefits of children's gardening have recently been discovered, an explosion of the number of school gardens and school garden programs across the world has occurred. A couple of these are: Play-garden programs and Auntie Green. In Asia, play-garden programs have started. These programs include outdoor gardening activities and excursions, games based on horticulture crops, horticulture-themed crafts, and nature-based art (Kwack and Relf, 2002). Benefits of the play garden programs include a decrease in degree of withdrawal, physical complaints, uneasiness, and depression. Also, vocabulary was improved in the areas of life (human, mind, body, spirit, etc), plants (lemon balm, pineapple mint, cosmos, rosemary, etc), and use of plants (cooking, herbal tea, pot-pourri, etc) (Choi and Son, 2000, in Kwack and Relf, 2002). "In Helsinki, Finland, a community gardener began a program called Auntie Green which teaches young children to enjoy, respect and nurture plants. The program is very popular with many excited children and parents and the program is now expanding to have more "aunts" and "uncles" (Horelli, 1997, in Evers et al., 2000).

Middle Childhood

Overview- Middle childhood is the stage between early childhood and adolescence; and according to Blume and Zembar (2007), it occurs between the ages of 8 and 12. Just before middle childhood, at around 6 or 7, children are able to handle more

complex intellectual problems and to form deeper friendships than in early childhood. This is because of new cognitive capacities. The psychologist Arnold Gesell believed that middle childhood was a distinct segment of life development, in between childhood and adolescence. He proposed that middle childhood is a period of intermediate biological and cultural development. The biological event of losing a tooth occurs around the same time as beginning school, a sociological event (Gesell and Ilg, 1946, in Blume and Zembar, 2007). The transition between children and adolescents, according to many scholars, is a gradual change (Montemayor and Flannery, 1990, in Montemayor et al., 1990). Many changes occur during middle childhood but they can generally be categorized into one of four categories: physical, cognitive, affective, and social development.

Physical development includes both biological growth, the refinement of perceptual and motor skills and physical health (Blume and Zembar, 2007). Generally between 8 and 12, physical development is characterized by steady growth (Blume and Zembar, 2007). In this stage of development, the average child gains 2 to 3 inches in height and 4 to 6 pounds per year (Tanner, 1990). Motor skills also improve exponentially during middle childhood with vast improvements in gross motor skills such as running, jumping, throwing, and balancing. Fine motor skills, which require controlled and precise use of the hands and fingers, improve as well. Examples of this skill are playing piano, sewing, and handwriting. A stronger connection between the senses occurs at this time, with school-age children beginning to use information coming in from multiple senses to improve their motor skills (Blume and Zembar, 2007). Often

at this age lateral dominance is established with children realizing which hand, foot, and eye they prefer (Ozturk et al., 1999).

Cognitive development involves development of the intellect and language abilities, increase in logic, and an improvement in memory. There is much change, even during the middle years, with the early middle-years child changing from pre-operational, intuitive thought to more concrete operations. Later, the preadolescent child may even begin to take on formal-operational thought.

The pre-operational child is egocentric, cannot follow a logical problem, such as the rules of a game, and fact and fiction are generally one and the same in their mind. At the beginning of middle childhood preoperational thinking may linger in some areas but their thinking is generally becoming more organized and systematic and their ideas less egocentric. They can handle categories such as being an American and boy at the same time. They can also understand reciprocal relationships such as the distance from me to my friend being the same as the distance from my friend to me. At this time, children are able to understand and follow sequences and can see that there can be alternative means for arriving at the same answer.

Classification and conservation are areas that also improve during middle-childhood. Classification is the ability to classify a group of people by some shared characteristic such as all being female or European. Classification also implies that others are different and therefore don't share those characteristics such as being male or Asian. Conservation involves understanding a situation so that even if it undergoes

change, all the elements are still understood. The classic example of this was done by Piaget when he showed a child two glasses of water the same size with the same amount of water in each glass. The water from one glass was then poured into a shorter, wider bowl and the child was asked if the amount of water was the same. The age at which the child is able to conserve varies but generally occurs during middle childhood. Humor is very important for the school-age child and because of greater language development, humor changes in this period. The child is able to understand when common knowledge has been violated, a sound reversal said, or when a play on words is done such as the difference between cell and sell (Minuchin, 1977).

Affective development consists of personality and emotional development as well as self-esteem and motivation changes (Blume and Zembar, 2007). As a child grows affectively they grow in their self understanding. Three terms very connected to self understanding are self-concept, self-competence, and self-worth. Self-concept is a person's knowledge of who they are, self-competence is what a person can do, and self-worth is a person feeling they are valued as an individual. During middle childhood, a child develops the ability to have "bi-dimensional thought" which is having both positive and negative self-evaluations (Harter, 1998). During middle childhood, school-age children begin to compare themselves to others and by 7 or 8 children frequently compare themselves to their peers. As they mature, their comparisons become more accurate because they use environmental information to make more realistic evaluations. At this age, their self-competence ratings become more based on the opinions of others. Social acceptance, however, is more important to 6th through 8th graders than it is to elementary

school students. Another aspect of affective development is motivation, which can be divided into two categories, intrinsic and extrinsic. Intrinsic motivation involves the doing of activities for their own sake. Extrinsic motivation involves doing activities for an external reward. Positive feelings about school are connected to intrinsic motivation but are not with extrinsic. In addition, anxiety over school performance is linked to extrinsic motivation but not intrinsic (Harter et al., 1992). Self-determination, which is the degree to which a school age child feels autonomous in their schooling, has been associated with intrinsic motivation (Grolnick et al., 2002, in Wigfield and Eccles, 2002). Helping children form short-term goals has also been shown to promote intrinsic motivation (Schunk and Pajares, 2002). The final part of affective development is emotional development. During middle childhood, a child receives a greater understanding of their emotions, a better interpretation of their relations with others, and a better control of their emotions. Children at this age learn how to manage a negative feeling, such as frustration, and then focus on something positive instead (Salovey et al., 2000, in Lewis and Haviland-Jones, 2000). Emotional intelligence is gained during these years and while a child under 7 can know that their parents are proud or ashamed of their actions, an 8-year-old can feel proud or ashamed of themselves (Harter and Whitesell, 1989, in Blume and Zembar, 2007). By this age, children have learned how to portray an emotion other than the one they are feeling. For example, they can pretend to like a gift so that their friends feelings aren't hurt (Saarni et al., 1998, in Eisenberg, 2006). They also can deal with multiple emotions at once, such as feeling happy and sad at the same

time ("I'm glad I get to see grandma, but I'm sad grandpa is too sick to come") (Whitesell and Harter, 1989).

Social development can include a deepening of relationships, better moral and ethical understanding, increased social skills, and an interpersonal understanding (Blume and Zembar, 2007). As a child's social environment expands, they are socially integrated and develop positive relationships with both children and adults who aren't in their family (Larson, 1994, in Silbereisen and Todt, 1994). The family is still a haven to which they can return, but time spent with other children becomes continually more important and more frequent (Minuchin, 1977). A study conducted on 6, 8, and 10 year old boys showed a change from egocentric to more objective descriptions of others. Six-year-old descriptions of their peers were general and usually described the person in terms of their effect on the child with descriptions like: "he's nice to me" or "he helps me". Eight-year-olds more often used non-egocentric terms and described the other child separate from their relationship to them. Finally, ten-year-olds were able to describe their peer more generally with responses such as "he's smart" or "he's nice" (Scarlett et al., 1971). By middle childhood, a child is better able to empathize with someone and to understand the long-term effects of a person's problem (Minuchin, 1977). Much research has demonstrated that children in middle childhood are more likely to share and help others if they see examples of it and are then given the opportunity to do so as well (Bryan, 1975; Elliot and Vasta, 1970). Rewards for sharing and helping others also may be less motivating than seeing the pleasure someone else receives from the same behavior (Bryan, 1975, in Hetherington, 1976). During middle childhood, rules and games are

truly understood for the first time. In Piaget's "rules of the game" study, younger children were found to see the rules as examples, not something that must be strictly followed. The children in the next stage of understanding, which went up to age 9 or 10, viewed rules as an untouchable law that could never be changed. Children in the final stage, starting at around age 10, viewed rules as something to be followed but that could be changed with the consent of the group (Piaget, 1948).

Life Skills Development

Overview

Many life skills and leadership abilities are developed at a young age, making the early years very important (Gardner, 1987). Children in middle childhood are still very affected by their relationships with adults, especially their parents. However, they are also beginning to be affected by other children, who they are spending more time with during and after school (Minuchin, 1977). Schools, which provide children with both peer and adult contact, can affect a child's development profoundly. In a 1990 study with fifth and sixth grade girls, activities that provided a context for sociability, concern for achievements, integrity of self, and opportunities for instruction and learning were preferred (Zarbatany et al., 1990).

It's widely accepted that nature and plants contribute to human well-being (Relf and Dorn, 1995). Nature encourages individual creativity, social interaction (Browne, 1992, in Relf,1992) and the building of relationships with other people (Lewis, 1996; Stine, 1997). In a 1991 study, it was shown that strong people-tree bonds can be formed, especially when children, parents, and grandparents work together to plant trees (Dwyer

et al., 1991). In another study that looked at relationships, more positive interactions were found in elderly housing units with trees planted in their common outdoor space than those with a paved common space (Kweon et al., 1998). Waliczek and others, in 2002, conducted a study with a number of Texas Master Gardeners. Significant improvements were found in the master gardeners' perceptions of their quality of life after becoming master gardeners. Consistent increases were found in four life categories, with improvements in perceptions of physical and social activity, self-esteem, and nutrition (Waliczek et al., 2002). The truths found from these studies can be applied to the different levels in Maslow's hierarchy of needs. The lower, physiological needs are met when a person is outside appreciating nature, possibly producing food. The midlevel, esteem and societal needs can be met when a gardener beautifies their community. Finally, using creative expression to represent oneself, can meet the more complex need of self-actualization (Waliczek et al., 2005).

"Well-designed schoolyards not only contribute to the physical development, but also to the psycho-social development of young children, by providing spaces where children can practice new developmentally appropriate behavior and apply it to new situations, as evidenced by: performance and mastery of developmentally appropriate skills" (EDC, 2000).

Since school's can greatly affect many aspects such as a student's social and intellectual development and garden's can affect many aspects such as social, emotional, and creative development, gardening in school is to be commended.

Self-Understanding

Self-understanding is a person's awareness of his or her own abilities and weaknesses while self-esteem is a person's value of himself or herself (Blume and Zembar, 2007). The two terms are inextricably connected as self-esteem generally comes from a confidence in one's abilities. Self-confidence is another important term and refers to a person's belief in their abilities (Leonetti, 1980, in Robinson 2001). Middle childhood is a time of great change in self-understanding with children seeing themselves and their abilities more realistically than ever before. As school age children have more positive self-experiences they begin to develop positive self-regard. At this age, positive regard from others, such as parents, teachers, and peers, becomes much more important (Blume and Zembar, 2007). In terms of this study, self-understanding is a combination of self-esteem and self-confidence. A student with positive self-understanding knows their strengths and weaknesses, while having self-value.

The school-age years, which start around age seven or eight, are said to be a "sensitive period" in terms of a student's self-understanding of their competence (Ruble, 1987, in Blume and Zembar, 2007). The extent to which a child's self-understanding becomes internalized depends, at least in part, on the support and feedback of others (Blume and Zembar, 2007). A child's self-understanding at this age is also affected by their comparison of themself to others, as social comparison begins at this age (Harter, 1998, in Blume and Zembar, 2007). As children grow into adolescence (sixth to eighth grade), the approval of other's may actually come to precede their self-worth. A good foundation for self-understanding must therefore be established at an early age, both in

the home and at school. If a child is self-confident they are more likely to be positively viewed by other's, which could be helpful during the more difficult years of adolescence (Fuchs-Beauchamp, 1996, in Robinson, 2001). Additionally, high self-esteem during childhood has been connected to satisfaction and happiness later in life, while low self esteem has been connected to just the opposite, depression and maladjustment in school and life (Beane and Lipka, 1987). School's must provide children with the opportunity to build their self-esteem. This can be achieved by providing children the opportunity to take on responsibilities, accomplish tasks, and be successful (Leonetti, 1980 in Robinson, 2001). One such way that children can be provided this opportunity is gardening. Studies have shown that as students are successful with their gardening their self-confidence and self-worth grow (Hamilton and DeMarrais, 2001).

Leadership Skills

A person with leadership skills has the ability to motivate others to achieve a common goal. They may do this through organization, persuasion, and example (Ordover, 1997, in Ackerman, 1997). Good academic skills, problem-solving skills, and relationship skills are needed to be an effective leader (Ordover, 1997, in Ackerman, 1997). Other skills needed to be an effective leader are communication skills, the ability to compromise, and the ability to see other's points of view. Each of these skills can be taught in the classroom.

As children grow into adults the leadership skills they attain during their school years will be applicable to many areas of their life including, social and vocational. However, "our conception of the child as egocentric, morally immature, uninterested in

the social and political world, and unable to understand it has effectively deprived young people of the kind of contact they need to make society and politics salient" (Berman, 1997). As young people grow through their childhood and adolescence, they are formulating ideas of how society works and are negotiating their relationship with society. A child who feels connected to society will have a sense of usefulness and therefore an interest in participation in that society (Berman, 1997).

The school environment is an excellent place to form a connection between children and their society. Since individuals make up society, by teaching children to be connected to one another we are connecting them to society (Berman, 1997).

Decision-making

Decision-making skills include the ability to look at different choices and determine the best one based on previous experience or the experience of others. Logical decisions generally follow this pattern: 1) identify the options, 2) determine the consequences of those options, 3) consider the consequences, 4) evaluate the likelihood of the consequences, and 5) make a decision based on the previous steps (Haynie et al., 1997). Teaching a child to be able to make good decisions can seem an overwhelming task. However, this skill can be learned but to be obtained must be "overlearned", or internalized to the extent that it becomes automatic (Elias and Butler, 1999). The social-emotional and cognitive skills needed to make clear decisions are like any other complex and integrated skill area, such as reading, driving a car, or riding a bike (Elias and Arnold, 2006). Social-emotional skills that will be used throughout life need to be

practiced enough that they become internalized. Once they become internalized children will be able to apply the skills they've acquired to any situation.

As children develop, the opinions they've formed about the world, which have been shaped and molded by their family and peers, become more concrete, and therefore harder to change. In the classroom, good discussions about controversial topics can help students to think about why they hold certain beliefs (Blume and Zembar, 2007). These discussions can help students to become more critical thinkers and to grow in communication skills, interpersonal skills, and self-confidence (Leonetti, 1980, in Robinson, 2001).

Communication skills

Communication skills involve the ability to effectively communicate with others, including both listening and speaking (Robinson, 2001). Social connectedness and compliance later in life are strongly associated with language skills at the ages of three and eight (Herbert-Myers, et al., 2006). Additionally, social acceptance as a child is related to competent communication, while poor communication has been linked to social rejection (Odom et al., 2006). The decline of egocentrism during middle childhood can improve communication skills, (Cole and Cole, 1993) which are some of the most important skills needed for groups to succeed (Yost and Tucker, 2000). To effectively communicate, people involved in a conversation must be able to see the other's point of view (Fish, 2000, in Robinson, 2001). Another skill required for effective communication is the ability to understand both verbal and nonverbal communication. A child's family background can play a significant role in their ability to do this since some

family's place a strong emphasis on nonverbal communication while other's use it very little (Brown et al., 2008). Communication skills can also be taught in the classroom through discussions which require seeing another's point of view, or perhaps even arguing a point of view that one does not agree with. Verbal communication can be taught through language arts and other subjects while nonverbal can be addressed in class discussions and then practiced in the classroom each day.

Teamwork

Teamwork skills may be defined as the ability to work with others to achieve a common goal. According to Strom and Strom (1996), in the emerging global marketplace, teamwork will be the key to success. A part of learning and maturing is gaining the ability to work with other's (EDC, 2000). Educators believe that teamwork should begin as early as possible so that children will gain the social skills needed for a team-based society (Strom and Strom, 1996). Teamwork can teach communication, decision-making, and problem solving skills which will all aid children as they grow up and eventually enter the workplace (EDC, 2000). Cooperative learning is increasingly being used in the classroom (Strom and Strom, 1996) and is an excellent way to equip students with the skills they will need for the rest of their life. Teamwork in schools has been reported to improve problem-solving skills, communication skills, relations among peers, and to increase self-esteem and provide a sense of belonging (Strom and Strom, 1996).

Summary of Literature

Jean Jacques Rousseau was an avid supporter of hands on, experiential learning.

He demonstrates this in his statement, "You think you are teaching what the world is like; he is only learning the map." (Sealy, 2001, ln Subramaniam, 2002). Rousseau supported the use of nature in educating a child, stating that nature was the child's greatest teacher and that understanding nature would give a child a platform on which to build future knowledge (Sealy, 2001, In Subramaniam, 2002). Gardening in school is an excellent way to incorporate nature into a curriculum and teaching through gardening is not limited to subjects such as horticulture, environmental attitudes, and science. In fact, in a survey of teachers who received gardening grants, those teachers used the garden to teach the typical subjects but also to teach language arts, ethics, and art (DeMarco et al., 1999). Teachers also use school gardens for more than just academics but also for social, recreational, and therapeutic growth (Lohr and Relf, 2000).

Research has demonstrated that gardening and interaction with nature can provide many psychological benefits including: reduced stress and violence, increased self esteem, and increased social interaction with others involved in gardening. (Kuo and Sullivan, 2001; Waliczek et al., 1996; Cammack et al., 2002; Kaplan, 1973; Lewis, 1979; Patel, 1991). Interpersonal skills, teamwork, decision making, planning, and problem solving skills are a few more skills that can be learned in the garden (Robinson and Zajicek, 2005). As much social skills development occurs during middle childhood, life skills building activities and tasks should be performed at this stage. Children just beginning middle childhood already have a good foundation for their social skills yet many of their skills will be refined as they socialize more and more with people outside

their family (Minuchin, 1977). The garden provides an excellent tool for teaching the skills children need to grow into healthy, confident adults.

Gardening has long been believed to have more than just aesthetic and sustenance benefits, yet scientific evidence of this belief, until recently was not documented. Many studies conducted in the past thirty to forty years have shown that gardening can improve environmental attitudes, nutrition choices, life skills, emotions, and much more. However, more research is needed in this area to further validate the results and encourage more funding of school garden programs.

CHAPTER III

METHODOLOGY

This study was designed to test the effectiveness of the Junior Master Gardener$_{sm}$ curriculum, *Literature in the Garden*, on life skills development in children. In this chapter the curriculum will be discussed, as well as the participating school, and the instrument utilized in this study. Auburn University Institutional Review Board approval was granted before the project began in the spring of 2008. Copies of the parental consent forms and the student assent forms are included in Appendix A.

Objectives

The aim of this study was to examine the effect of the *Literature in the Garden* curriculum on the life skills of participating children. The objective was to determine if completing *Literature in the Garden* activities 1) increased teamwork skills, 2) improved self understanding, 3) increased leadership skills, 4) improved decision making skills, 5) improved communication skills, and 6) increased overall life skills.

Sample

This study was conducted at Smiths Station Elementary School in Smiths Station, AL. The study was conducted during the spring semester of the 2007-2008 school year. Participants were third graders from twelve participating classrooms, six experimental and six control. A total of 73 students participated in the experimental group and 54 in the control group. Demographic information about the participants was taken from the

first page of the survey they completed (Appendix C). Of the 127 participants 53% were female and 47% were male. The racial distribution of the students was characterized as follows: 79% Caucasian, 17% African American, 3% Hispanic and 1% other. The percentage of students who lived in the city was 49%, while 51% lived in the country, whether a student was from the country or city was based on their perception of the area.

The school demographic information was obtained from the school vice principal (Harris, 2008). The percentage of free and reduced lunches is an indication of the socio-economic status of the school. To qualify for reduced lunches in the 2007-2008 school year, a single parent family with one child had to make less than $25,327 annually. To qualify for free lunches the same family would have to make less than $17,797 annually. For each additional family member, $6,438 is added to the base number to qualify for reduced lunches and $4,254 is added to the base number for free lunches. Smiths Station Elementary School is made up of second and third graders. During the 2007-2008 school year 869 children were enrolled in grades two and three with 46% of those children receiving free or reduced lunches. Of the 869 children, 51% were female and 49% were male. The ethnic breakdown of the school was 78% Caucasian, 18% African American, 3% Hispanic, 1% Asian, and less than 1% Native American.

Three schools were recruited to participate in this study. Two of the school's were located in Auburn, AL. One of the Auburn schools was going to be a control group and the other an experimental group. This would have included about 150 more participants and provided a different demographic from Smith's Station, with a larger percentage of African American and Asian students and a lower percentage of students

on the free/reduced lunch program. Unfortunately, the experimental group school was unable to participate at the last minute which meant that neither Auburn school could be included in the study.

Treatments

The control and experimental classrooms completed a pre-test at the beginning of the study. The experimental group then completed, with the researcher, eight activities. Six of the activities corresponded with one of six children's literature books and two corresponded with the life skills chapter in the *Literature in the Garden* curriculum. One activity was completed every two weeks. One week after the eight activities were completed, the experimental and control groups completed a post-test. Upon completion of the study, each of the twelve classrooms received a copy of the curriculum and two sets of the six accompanying children's books, which were donated to the school library.

Curriculum

The Junior Master Gardener$_{sm}$ (JMG$_{sm}$) program is a youth gardening program of the Texas Cooperative Extension and Texas A&M University. The program is based on the Master Gardener program which provides adults the opportunity to learn about horticulture in exchange for a prescribed amount of volunteer service. JMG$_{sm}$ is a program for youth that provides them an opportunity to learn about gardening and nature through hands-on group and individual activities. These activities include horticultural and environmental education as well as community service and life skill activities. The mission of JMG$_{sm}$ is "to grow good kids by igniting a passion for learning, success and service through a unique gardening education" (JMGkids, 2008).

The curriculum used in this study was the *Literature in the Garden* curriculum. *Literature in the Garden* is a part of the Golden Ray Series which is a "stand-alone unit of study of the JMG Level One curricula" (JMGkids, 2008). There are three curricula in this series: *Wildlife Gardener, Nutrition in the Garden,* and *Literature in the Garden*, each of which focuses on a specific theme. The *Literature in the Garden* curriculum utilizes six children's books and provides activities for each that follow the themes of that book. *Literature in the Garden* was developed for grades three to five. It includes eight chapters: Chapter 1- Garden Basics, Chapter 2- *Plantzilla*, Chapter 3- *Miss Rumphius*, Chapter 4- *Brother Eagle, Sister Sky*, Chapter 5- *The Gardener*, Chapter 6- *Tops & Bottoms*, Chapter 7- *Weslandia*, and Chapter 8-Life Skills and Career Exploration. The six books that accompany this curriculum are highlighted in chapters two through seven. The books are: *Plantzilla* by Jerdine Nolen, *Miss Rumphius* by Barbara Cooney, *Brother Eagle, Sister Sky* by Susan Jeffers, *The Gardener* by Sarah Stewart, *Tops and Bottoms* by Janet Stevens, and *Weslandia* by Paul Fleischman. In this study, one activity that accompanied each book was completed, as well as two activities from the life skills chapter. The activities completed were: Chapter 8: What Do You See?, Chapter 2: Growing Clean Air Neck Pet, Chapter 3: Garden Life Strings, Chapter 4: The Wild Side of Me!, Chapter 8: Growing Skills, Chapter 5: Cracked Teacups and Bent Cake Pans, Chapter 6: Overhead Roots, and Chapter 7: A New Staple (JMGkids, 2008; Junior Master Gardener, 2005).

Research Design

This project was a pretest-posttest control group design. The participants selected were an intact group. Both the control and experimental groups took a pre-test at the beginning of the spring semester of 2007 (January, 2007). The experimental group then completed eight gardening activities from the *Literature in the Garden* curriculum. The control group did not use the *Literature in the Garden* curriculum. At the end of the school year (May, 2007) both groups took the post-test.

Instrumentation

The instrument used for this study included a biographical information section and the Youth Life Skills Inventory.

Biographical Information Section

The Biographical Information Section of the survey included eleven questions pertaining to student demographics such as gender, ethnicity and their place of residence. Questions were also included about their daily activities after school such as how much time they spend outside each day, how many books they read each day, and whether they had gardened before.

Youth Life Skills Inventory

The Youth Life Skills Inventory (YLSI) was developed by Robinson (2001). The YLSI is based on the Life Skills Inventory (LSI) which was created at Iowa State University in 1980. The LSI, in its original form, included 99 statements with ten internal scales (Townsend and Carter, 1983). After refinement, the survey was reduced to 21 statements that coincide to five internal scales. The internal scales are: 1)

understanding self, 2) leadership, 3) making decisions, 4) communicating, and 5) working with groups (Robinson, 2001). The instrument was tested on high school FFA leaders across the U.S. The following Cronbach's coefficient alphas were calculated for the five internal scales: 1) understanding self (.35), 2) leadership (.62), 3) making decisions (.65) 4) communicating (.78), and 5) working with groups (.72). The YLSI was taken from the abbreviated LSI and expanded to thirty-one statements to make the statements appropriate for a third grade reading level. The original and revised LSI were based on a five-point Likert-type scale (Likert, 1967, in Robinson, 2001). To make the survey appropriate for children, the YLSI utilized a three point Likert-type scale where: 0= no, 1= maybe, and 2= yes.

Table 1. The Leadership Skills Inventory internal scales and statements

Scale	Item #	Statement
Working with Groups	1	I can cooperate and work in a group.
	2	I get along with the people around me.
	4	I believe in dividing the work among group members.
	8	I listen carefully to opinions of group members.
	12	I believe that group members are responsible persons.
Understanding Self	3	I feel responsible for my actions.
	5	I understand myself.
	13	I am sure of my abilities.
	17	I accept who I am.
	18	I feel responsible for my decisions.
Communicating	10	I can lead a discussion.
	14	I am a good listener.
	19	I can give clear directions.
	20	I can follow directions.
Making Decisions	7	I consider all choices before making a decision.
	11	I use past experiences in making decisions.
	15	I use information in making decisions.
Leadership	6	I feel comfortable teaching others.
	9	I am respected by others my age.
	10	I can lead a discussion.
	16	I feel comfortable being a group leader.
	19	I can give clear directions.
	21	I can run a meeting.

[1](Townsend, 1983).

Data Collection

Pre-tests were administered to both the control and experimental groups in January of 2007 by the teachers. The teachers also administered the post-tests in May of 2007. Both times the test was given it included a cover sheet (Appendix E), biographical information section (Appendix C), and the Youth Life Skills Inventory (Appendix D). To ensure confidentiality, the surveys were collected and then coded so that each student's pre and post test could be matched to be compared for changes in life skills. Students who did not return a signed consent form (Appendix B) did not complete the questionnaire.

The parental consent and participant assent forms, cover sheets, and coded surveys were all stored in a locked office in the Auburn University Department of Horticulture. Participants who did not complete both a pre-test and post-test were dropped from the study.

Data Analysis

The data from the biographical and Youth Life Skills Inventory sections of each test were entered into Microsoft Excel© 2003 for Windows™ (Microsoft Excel, 2003) for scoring.

All data were then entered into the Statistical Package for the Social Sciences (SPSS®) for WindowsXP™ Release 16.1 (SPSS, 2007) 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 each of the five internal scales of the YLSI.

The SPSS® procedure "Frequencies" was conducted to ascertain descriptive statistics, including central tendencies and percentages.

Independent samples t-tests were conducted to compare the gain scores of the experimental group to the gain scores of the control group. The alpha level was set at 0.05.

CHAPTER IV

FINDINGS AND DISCUSSION

This chapter contains data regarding the life skills of elementary school students who participated in the *Literature in the Garden* program study. The aim of this study was to examine the effect of the *Literature in the Garden* curriculum on the life skills of participating children. This study's objectives were to determine if completing *Literature in the Garden* activities 1) increased teamwork skills, 2) improved self understanding, 3) increased leadership skills, 4) improved decision making skills, 5) improved communication skills, and 6) increased overall life skills.

Null Hypothesis

Based on the goals and objectives of this study, the following null hypotheses were tested:

H_{01}: There is no statistically significant difference between the self-understanding scores of elementary school children who completed plant activities and those who did not.

H_{02}: There is no statistically significant difference between the leadership skills scores of elementary school children who completed plant activities and those who did not.

H_{03}: There is no statistically significant difference between the decision making

skills scores of elementary school children who completed plant activities and those who did not.

H_{04}: There is no statistically significant difference between the communication skills scores of elementary school children who completed plant activities and those who did not.

H_{05}: There is no statistically significant difference between the teamwork skills scores of elementary school children who completed plant activities and those who did not.

H_{06}: There is no statistically significant difference between the overall life skills scores of elementary school children who completed plant activities and those who did not.

Sample Description

Participants in this study were third graders attending Smiths Station Elementary School in Smiths Station, AL. They were from twelve participating classrooms, six experimental and six control. A total of 73 students participated in the experimental group and 54 in the control group. The SPSS procedure "Frequency" was conducted to determine gender, ethnicity, and other distributions of the sample group. Slightly more of the participants were female than male, with females representing 53% of the sample and males representing 47% (Table 2).

Table 2. Sample demographics: Gender of respondents.

Treatment	Gender	N	Percentages
Experimental	Female	37	30%
	Male	36	28%
Control	Female	30	23%
	Male	24	19%
Total		127	100%

Ethnicity was also examined, and the racial distribution of the participants was characterized as follows: 79% Caucasian, 17% African American, 3% Hispanic and 1% other. Students were asked where they had lived most of their life. The responses were nearly even, with 49% living in the city and 51% living in the country, (whether a student was from the country or city was based on their perception of their area).

Students were asked if they had a garden at home (Table 3), if they had gardened before (Table 3), and, if so, where they had gardened (Table 4). These questions were asked on both the pretest and posttest.

Table 3. Sample demographics: "Do you have a garden at home?" and "Have you ever gardened?"

Group	Questions	Pretest Answers	N	Percentages	Posttest answers	N	Percentages
Experimental	Garden at home?	Yes	33	46%	Yes	49	67%
		No	38	54%	No	24	33%
Control		Yes	28	52%	Yes	31	58%
		No	26	48%	No	22	42%
Experimental	Garden before?	Yes	55	75%	Yes	60	82%
		No	18	25%	No	13	18%
Control		Yes	40	74%	Yes	45	85%
		No	14	26%	No	8	15%

Table 4. Sample demographics: "Where have you gardened?"

Group	Locations	Pretest N	Percentages	Posttest N	Percentages
Experimental	Home	36	49%	44	60%
Control		27	50%	39	72%
Experimental	School	13	18%	16	25%
Control		11	20%	10	19%
Experimental	A relative's	34	47%	38	52%
Control	house	19	35%	17	31%
Experimental	Neighbor's	8	11%	7	96%
Control	house	4	7%	7	13%
Experimental	I have not	3	4%	1	1%
Control	worked in a garden before.	4	7%	1	2%
		Total- 159		Total- 180	

Finally, the students were asked in both the pretest and posttest about their reading habits. The questions asked were about how much time the students read each day (Table 5), how many books they read for fun each week (Table 6), what kind of books they like to read (Table 7), and if they like to read books about plants and gardens (Table 8).

Table 5. Sample demographics: "How much time do you read each day?"

Group	Time	Pretest N	Posttest N
Experimental	No time	7	11
Control		6	5
Experimental	One hour	45	46
Control		39	35
Experimental	Two hours	11	4
Control		1	4
Experimental	More than two	10	12
Control	hours	8	10

Table 6. Sample demographics: "How many books do you read for fun each week?"

Group	Number of books	Pretest N	Posttest N
Experimental	None	6	8
Control		12	9
Experimental	One to two	27	27
Control		19	21
Experimental	Three to five	20	22
Control		14	8
Experimental	More than five	19	16
Control		9	16

Table 7. Sample demographics: "What kinds of books do you like to read?"

Group	Kind of book	Pretest N	Posttest N
Experimental	Funny	56	47
Control		41	45
Experimental	Mystery	43	46
Control		37	35
Experimental	History	31	26
Control		15	12
Experimental	Biography	21	12
Control		10	9
Experimental	Fiction	42	29
Control		28	27

Table 8. Sample demographics: "Do you like to read books about plants or gardens?"

Group	Answer	Pretest N	Posttest N
Experimental	Yes	43	53
Control		31	33
Experimental	No	30	19
Control		23	21

Findings Related to Hypothesis One

Analysis and Results

T-tests for independent samples were used to test H_{01}: There is no statistically significant difference between the self-understanding scores of elementary school children who completed plant activities and those who did not. Seven questions

comprised the self-understanding subcategory, including questions three, six, nine, ten, twenty, twenty-three, and twenty-nine (Appendix D). A Chronbach's alpha reliability test revealed the self-understanding subcategory to have a reliability of 0.35. T-tests for independent samples were used to compare the self-understanding gain scores of the *Literature in the Garden* participants to the gain scores of the control group (Table 9).

Table 9. T-test for independent samples analyses comparing the self-understanding score gains of the *Literature in the Garden* program participants to self-understanding score gains of the control group.

Treatment	N	Mean Score	Standard Deviation	Mean Difference	Df	T	2-tailed Sig.
Experimental Gain	73	-0.41	3.162	0.071	125	0.149	0.882
Control Gain	54	-0.48	1.691				

The experimental and control group's mean gain scores were both negative and were similar. The scores were not statistically significant at p=0.05, t (125) =.149, p=.882.

Discussion

Comparisons were made between the control and experimental group's self-understanding scores. Independent sample t-tests revealed that both group's mean scores decreased, though there were no significant differences between the groups. One reason that may explain the decrease is that one semester is not long enough to change a child's life skills. It has been reported that changes in life attitudes in children occur over a period of time (Speelman, 1985). Because the experimental and control group mean gain scores were not significantly different, we fail to reject the null hypothesis.

Findings Related to Hypothesis Two

Analysis and Results

T-tests for independent samples were used to test H_{02}: There is no statistically significant difference between the leadership skills scores of elementary school children who completed plant activities and those who did not. Six questions comprised the leadership skills subcategory, including question four, twelve, sixteen, twenty-one, twenty-five, and thirty (Appendix D). A Chronbach's alpha reliability test revealed the leadership skills subcategory to have a reliability of 0.62. T-tests for independent samples were used to compare the leadership skills gain scores of the *Literature in the Garden* participants to the leadership skills gain scores of the control group (Table 10).

Table 10. T-test for independent samples analyses comparing the leadership skills score gains of the *Literature in the Garden* program participants to leadership skills score gains of the control group.

Treatment	N	Mean Score	Standard Deviation	Mean Difference	Df	T	2-tailed Sig.
Experimental Gain	73	0.84	2.333	1.447	125	3.701	0.000
Control Gain	54	-0.61	1.947				

*Significant at the $p<0.001$ level

The experimental group's mean gain score was positive (0.84), while the control group's mean gain score was negative (-0.61). These scores were statistically significantly different at $p=0.001$, $t(125) = 1.447$, $p=.000$.

Discussion

Comparisons were made between the control and experimental groups' leadership skills scores. Independent sample t-tests revealed that the experimental group's mean score

increased while the control group's score decreased. Exposure to nature has been shown to restore individuals, reduce stress (Bennett and Swasey, 1996; Dunnett and Qasim, 2000), and increase concentration (Lohr and Relf, 2000). As students are better able to concentrate they are more likely to be able to discuss, compromise, and respect other's opinions (Elias and Arnold, 2006). As children experience more, their problem-solving skills tend to increase, which may increase their leadership skills (Knight et al., 1982). This increase in leadership skills is also supported by Robinson (2001) who found that gardening at school increased leadership skills.

Findings Related to Hypothesis Three

Analysis and Results

T-tests for paired samples were used to test H_{03}: There is no statistically significant difference between the decision making skills scores of elementary school children who completed plant activities and those who did not. Five questions comprised the decision-making skills subcategory, including question seven, fifteen, seventeen, twenty-six, and twenty-eight (Appendix D). A Chronbach's alpha reliability test revealed the decision-making skills subcategory to have a reliability of 0.65. T-tests for independent samples were used to compare the decision-making skills gain scores of the *Literature in the Garden* participants to the decision-making skills gain scores of the control group (Table 11).

Table 11. T-test for independent samples analyses comparing the decision-making skills score gains of the *Literature in the Garden* program participants to the decision-making skills score gains of the control group.

Treatment	N	Mean Score	Standard Deviation	Mean Difference	Df	T	2-tailed Sig.
Experimental Gain	73	0.14	1.774	0.304	125	0.960	0.339
Control Gain	54	-0.17	1.746				

The experimental group's mean gain score was positive, while the control group's mean gain score was negative. However, these scores were not statistically significantly different at p=.05, t (125) =.304, p=.339.

Discussion

Comparisons were made between the control and experimental group's decision-making skills scores. Independent sample t-tests revealed that the experimental group's mean score increased while the control group's score decreased. These differences were not significantly different. While these results were not the expected, it is true that psychological variables are very complex and difficult to influence (Pope et al., 1988). Because the experimental and control group mean gain scores were not significantly different, we fail to reject the null hypothesis.

Findings Related to Hypothesis Four

Analysis and Results

T-tests for paired samples were used to test H_{04}: There is no statistically significant difference between the communication skills scores of elementary school children who completed plant activities and those who did not. Six questions comprised

the communication skills subcategory, including question eight, eleven, thirteen, eighteen, nineteen, and twenty-seven (Appendix D). A Chronbach's alpha reliability test revealed the communication skills subcategory to have a reliability of 0.78. T-tests for independent samples were used to compare the communication skills gain scores of the *Literature in the Garden* participants to the communication skills gain scores of the control group (Table 12).

Table 12. T-test for independent samples analyses comparing the communication skills score gains of the *Literature in the Garden* program participants to the communication skills score gains of the control group.

Treatment	N	Mean Score	Standard Deviation	Mean Difference	Df	T	2-tailed Sig.
Experimental Gain	73	0.22	2.329	0.164	125	0.429	0.668
Control Gain	54	0.06	1.806				

The experimental and control group's mean gain scores were positive, however, these scores were not statistically significantly different at p=.05, t (125) =.164, p(.668).

Discussion

Comparisons were made between the control and experimental group's communication skills scores. Independent sample t-tests revealed that both the experimental and control group's mean scores increased. These differences were not significantly different. One semester may not be long enough to change a child's life skills as it has been reported that changes in life attitudes in children occur over a period of time (Speelman, 1985). Because the experimental and control group mean gain scores were not significantly different, we fail to reject the null hypothesis.

Findings Related to Hypothesis Five

Analysis and Results

T-tests for paired samples were used to test H_{05}: There is no statistically significant difference between the teamwork skills scores of elementary school children who completed plant activities and those who did not. Seven questions comprised the teamwork skills subcategory, including question one, two, five, fourteen, twenty-two, twenty-three, and thirty-one (Appendix D). A Chronbach's alpha reliability test revealed the communication skills subcategory to have a reliability of 0.72. T-tests for independent samples were used to compare the teamwork skills gain scores of the *Literature in the Garden* participants to the teamwork skills gain scores of the control group (Table 13).

Table 13. T-test for independent samples analyses comparing the teamwork skills score gains of the *Literature in the Garden* program participants to the teamwork skills score gains of the control group.

Treatment	N	Mean Score	Standard Deviation	Mean Difference	Df	T	2-tailed Sig.
Experimental Gain	73	0.33	1.930	0.384	125	1.156	0.250
Control Gain	54	-0.06	1.742				

The experimental group's mean gain score was positive, while the control group's mean gain score was negative. However, these scores were not statistically significantly different at p=.05, t (125) =.384, p=.250.

Discussion

Comparisons were made between the control and experimental group's teamwork skills

scores. Independent sample t-tests revealed that the experimental group's mean score increased while the control group's score decreased. These differences were not significantly different. As psychological variables are very intricate, they are difficult to impact (Pope et al., 1988). Because the experimental and control group mean gain scores were not significantly different, we fail to reject the null hypothesis.

Findings Related to Hypothesis Six

Analysis and Results

T-tests for paired samples were used to test H_{06}: There is no statistically significant difference between the overall life skills scores of elementary school children who completed plant activities and those who did not. The students completed thirty-one statements related to life skills. Their answers to the statements reflected their perception of how closely they related to each statement. The possible scores ranged from 0 to 62. High scores ranged from 47 to 62, good scores from 31-46, poor scores from 15-30, and negative scores from 0-14. Cronbach's alpha reliability tests were conducted on the instrument and it was found to have a reliability of 0.85. T-tests for independent samples were used to compare the overall life skills gain scores of the *Literature in the Garden* participants to the overall life skills gain scores of the control group (Table 14).

Table 14. T-test for independent samples analyses comparing the overall life skills score gains of the *Literature in the Garden* program participants to the overall life skills score gains of the control group.

Treatment	N	Mean Score	Standard Deviation	Mean Difference	Df	T	2-tailed Sig.
Experimental Gain	73	1.11	7.912	2.369	125	1.926	0.056
Control Gain	54	-1.26	5.070				

The experimental group's mean gain score was positive, while the control group's mean gain score was negative. The difference between these scores, though not statistically significantly different, at p=.05, t (125) =2.369, p=.056, it was approaching significance.

Discussion

Comparisons were made between the control and experimental group's decision-making skills scores. Independent sample t-tests revealed that the experimental group's mean score increased while the control group's score decreased. These differences were not significantly different. However, it is notable that this difference was nearly statistically significant. Waliczek et al. (2001) found that garden programs have significant effects on interpersonal skills and Robinson (2001) found that school gardens increase overall life skills. Exposure to nature doesn't always have to come in the form of being outside. It has been shown that just viewing or studying nature provides benefits as well (Rohde and Kindle, 1997). This study provided students with the opportunity to explore nature as well as the opportunity to perform hands-on activities. As students participate in hands-on activities, they are more involved in the learning process and therefore tend to understand the material more fully and benefit more from it (McCormick et al., 1989). While these results were not significant, the increase in overall life skills may have been affected by the afore-mentioned findings.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Purpose of the Study

The goal of this study was to examine the effect of the *Literature in the Garden* curriculum on the life skills of participating children. This study's purpose was to determine if completing *Literature in the Garden* activities 1) increased teamwork skills, 2) improved self understanding, 3) increased leadership skills, 4) improved decision making skills, 5) improved communication skills, and 6) increased overall life skills.

Summary of the Review of Literature

As children's gardens continue to grow in popularity, it may seem that they are a relatively new concept, however gardening for education has been around for centuries (Virginia Tech Horticulture Department, 2002). The recent popularity of children's gardening began in 1993 when the American Horticultural society held its first symposium based on youth gardening entitled "Children, Plants, and Gardens: Educational Opportunities." The focus of the symposium was to demonstrate ways in which children's gardens could support educational curricula. (Sealy, 2001, in Subramaniam, 2002). Symposia such as this, as well as years of previous research have demonstrated the multiple benefits of gardening. Some of the benefits are: stress

reduction (Ulrich and Simons, 1986; in Wineman et al., 1986), violence reduction (Snelgrove et al., 2004; Lohr and Relf, 2000), the building of relationships (Kweon et al, 1998), the building of life skills (Waliczek et al., 1996), improved emotions (Chung, 1995; Song, 1997), and environmental improvement (Nighswonger, 1975).

Children are in school for approximately forty hours every week. Their development, therefore, is affected by their experiences in school. The idea of educating children through hands-on learning is not a new concept. The educational philosopher Jean-Jacques Rousseau, in the eighteenth century, pointed out the flaw in teaching a child "about" things instead of actually teaching the child the things themselves. He stated, "You think you are teaching what the world is like; he is only learning the map." (Sealy, 2001, in Subramaniam, 2002). School gardens are an ideal environment for hands-on learning. Gardening in school provides the teacher the opportunity to help a child realize their needs and grow in self-understanding (Green, 1994). 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. Everywhere, but especially in inner city schools, if we desire for 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).

Middle childhood is the stage between early childhood and adolescence and according to Blume and Zembar (2007), it occurs between the ages of 8 and 12. Many

changes occur for children at this stage. One of those changes is affective development, which consists of personality and emotional development as well as self-esteem and motivation changes (Blume and Zembar, 2007). As a child grows affectively they grow in their self understanding. During middle childhood, a child receives a greater understanding of their emotions, a better interpretation of their relations with others, and a better control of their emotions. Children at this age learn how to manage a negative feeling, such as frustration, and then focus on something positive instead (Salovey et al., 2000, in Lewis and Haviland-Jones, 2000). Also at this stage, rewards for sharing and helping others may become less motivating than seeing the pleasure someone else receives from the same behavior (Bryan, 1975, in Hetherington, 1976). School gardening programs can address these areas of development and aid children in much positive development during these years.

Methodology

This study was designed to test the effectiveness of the *Literature in the Garden* research program in regards to life skills development. The experimental group participated in the *Literature in the Garden* research program for one semester while the control group did not participate in the program at all. The experimental and control groups both took a pre-test at the beginning of the spring semester (January, 2008) and a post-test at the end of the semester (May, 2008).

Sample Group

This study was conducted at Smiths Station Elementary School in Smiths Station, AL. Participants were third graders from twelve participating classrooms, six

experimental and six control. A total of 73 students were in the experimental group and 54 were in the control.

Instrumentation

The instrument used for this study contained a biographical information section and the Youth Life Skills Inventory. The biographical information section of the survey (Appendix C) contained questions pertaining to student demographics such as gender, ethnicity and the students place of residence. Questions were also included about participants daily activities after school such as how much time they spend outside each day, how many books they read each day, and whether they've gardened before or not.

The Youth Life Skills Inventory (YLSI) was developed by Robinson (2001). The YLSI is based on an adult leadership survey, the Life Skills Inventory (LSI) (Townsend, 1983). Thirty-one statements are listed in the YLSI for children to identify how closely they relate to each statement. The possible range of scores is 0-62. The original LSI was based on a five-point Likert-type (Likert, 1967, in Robinson, 2001) scale but to make the survey simple for children, the YLSI utilized a three point Likert-type scale where: 0= no, 1= maybe, and 2= yes.

Conclusions

The following conclusions are based upon the research and results presented in the previous chapters. The overall life skills, including self-understanding, leadership skills, decision making skills, communication skills, and teamwork abilities are discussed. The following is a summary of the results:

Hypothesis 1

H_{01}: There is no statistically significant difference between the self-understanding scores of elementary school children who completed plant activities and those who did not. We failed to reject the null hypothesis that experimental and control group participants mean gain scores would not be significantly different. There was not a statistically significant difference between these two groups. One reason that may explain this is that one semester is not long enough to change a child's life skills. It has been reported that changes in life attitudes in children occur over a period of time (Speelman, 1985).

Hypothesis 2

H_{02}: There is no statistically significant difference between the leadership skills scores of elementary school children who completed plant activities and those who did not. Experimental and control group mean gain scores were statistically significantly different at the p=0.000 level. The experimental group's mean score increased while the control group's score decreased. Exposure to nature has been shown to restore individuals, reduce stress (Bennett and Swasey, 1996; Dunnett and Qasim, 2000), and increase concentration (Lohr and Relf, 2000). As students are better able to concentrate they are more likely to be able to discuss, compromise, and respect other's opinions (Elias and Arnold, 2006). As children experience more, their problem-solving skills tend to increase, which may increase their leadership skills (Knight et al., 1982).

Hypothesis 3

H_{03}: There is no statistically significant difference between the decision making

skills scores of elementary school children who completed plant activities and those who did not. We failed to reject the null hypothesis that experimental and control group participants mean gain scores would not be significantly different. There was not a statistically significant difference between these two groups. While these results were not the expected, it is true that psychological variables are very complex and difficult to influence (Pope et al., 1988).

Hypothesis 4

H_{04}: There is no statistically significant difference between the communication skills scores of elementary school children who completed plant activities and those who did not. We failed to reject the null hypothesis that experimental and control group participants mean gain scores would not be significantly different. There was not a statistically significant difference between these two groups. One semester may not be long enough to change a child's life skills as it has been reported that changes in life attitudes in children occur over a period of time (Speelman, 1985).

Hypothesis 5

H_{05}: There is no statistically significant difference between the teamwork skills scores of elementary school children who completed plant activities and those who did not. We failed to reject the null hypothesis that experimental and control group participants mean gain scores would not be significantly different. There was not a statistically significant difference between these two groups. This result may have occurred because psychological variables are very intricate and therefore difficult to impact (Pope et al., 1988)

Hypothesis 6

H_{06}: There is no statistically significant difference between the overall life skills scores of elementary school children who completed plant activities and those who did not. We failed to reject the null hypothesis that experimental and control group participants mean gain scores would not be significantly different. There was not a statistically significant difference between these two groups though it is notable that this difference, at the p=0.056 level was approaching statistical significance. The experimental group's mean gain score was positive, while the control group's mean gain score was negative. Robinson, in 2001 found that school gardens increase overall life skills. Exposure to nature doesn't always have to come in the form of being outside. It has been shown that just viewing or studying nature provides benefits as well (Rohde and Kindle, 1997). This study provided students with the opportunity to explore nature as well as the opportunity to perform hands-on activities. As students participate in hands-on activities, they are more involved in the learning process and therefore tend to understand the material more fully and benefit more from it (McCormick et al.,1989). While these results were not significant, the increase in overall life skills may have been affected by the afore-mentioned findings.

Additional Discussion

A few notable observations were made during the completion of this study. As data were being entered into Microsoft Excel© it was noted that the experimental group pre-surveys had a greater tendency than post-surveys to have the first bubble circled for each answer. The first answer, for all but three questions, was worth two points which would have resulted in a higher score. The experimental group participants may have

cared more during the post-survey and therefore answered the survey more truly, resulting in a lower score. Also, during team activities, the children did not enjoy, nor work well as a team. Many groups complained about the teamwork and stated that they did not work well as a team. The experimental participants may have realized they were poor at teamwork during these activities, which resulted in lower teamwork scores.

Programmatic Implications

The following recommendations for action are based on the findings and conclusions of this study.

1. The results of this study indicate that the garden program did not have a statistically significant impact on the experimental group's overall life skills. Previous research has found that longer time periods are needed for life skills development (Robinson and Zajicek, 2005; Speelman, 1985). It is therefore recommended that the program be extended to the entire school year, not just one semester and that more time be allotted for activities to allow for more outside activities.
2. A mission of the *Literature in the Garden* program is to increase self-understanding. Experimental participants' self-understanding scores decreased from pretest to posttest. It is therefore recommended that the program re-evaluate its self-understanding component.
3. Another mission of the *Literature in the Garden* program is to increase teamwork abilities. Experimental participants' teamwork scores did not increase from pretest to posttest. It is therefore recommended that the program incorporate more teamwork

activities and that the activities be discussed afterwards to determine how they went and how the students could do better.

Recommendations for Additional Research

The following recommendations were made based on the findings of this research:

1. It is recommended that students be tested over multiple years of exposure to the garden program to determine if scores that did not initially improve begin to significantly improve over a longer time period.
2. It is recommended that the curriculum be tested for life skills increases among other youth settings such as after-school programs and summer camps.
3. It is recommended that a follow-up study be conducted with the teachers to determine their perception of how the activities changed the students if at all and how they have used the curriculum since the end of the study when they received it.

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APPENDICES

APPENDIX A

Recruitment Scripts

Principal Recruiting Letter

Hello Mr. Clark,

I am a master's student at Auburn University in the Horticulture department. I am doing my research on children's gardens and am using a curriculum called "Literature in the Garden". "Literature in the Garden" is a new curriculum that combines both science and literature in a fun and interesting way. Because Alabama schools focus on reading, this curriculum is ideal in that it includes reading but also involves the students in various science activities. I hope to work with 200 3rd graders in Lee County. 100 of those students would be in the control group and would only receive a pre and post survey to measure their life skills (which are skills such as confidence, working in groups, and leadership). The experimental group would receive the pre-test and then would read 6 six children's books related to gardening and complete 1-2 activities to go along with each book. After they've completed the activities they will also take the post-test. I would like to use one school as the control group and one as the experimental. I am hoping to speak to the 3rd grade teachers from each school to see how many are interested in this curriculum. I was wondering if you could tell me if there is anything else I can do to be able to do research in these schools. I would love an opportunity to talk to you about this more and am available by phone at 334-844-3040 or at this address. I also would be happy to come speak to you at your office.

Thanks so much,
Ann Fleener

Class Recruitment Script

Good morning boys and girls, my name is Miss Ann. I'm a student at Auburn University. I'm doing some research through Auburn and was hoping you would participate in it. I am trying to figure out if doing children's gardening activities makes children better at things like working with others, teaching someone else how to do something, and feeling good about themselves. I would like to give you guys a survey that asks you a few things about how much time you spend outside, if you ever work in a garden, how good you think you are at working with others, if you think you can teach someone how to do something, etc. (The following part would be said only to experimental groups: then I'll be coming back every two weeks and we're going to read a fun book and do an activity after we read each book. All the books and activities will have something to do with gardening.) I'm going to give you this same survey again in a few months. I have a letter for you to give your parents that explains a little more about what we're going to be doing. I also have a permission form for you so that you're parents can sign it if they'd like you to participate in this study. Everyone who brings back a signed permission form will get a prize. You don't have to fill out the survey or do any of the activities if you don't want to and not doing them will not affect your grades in any way. If you do fill out a survey I'll need you to put your name on it because I want to be able to match your second survey with your first. Only I and one other person will see which survey is yours. Once I've matched the surveys your name will be erased from the survey.

APPENDIX B

Parental Consent/Assent Form

Experimental Group

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(NOTE: DO NOT AGREE TO PARTICIPATE UNLESS AN APPROVAL STAMP WITH CURRENT DATES HAS BEEN APPLIED TO THIS DOCUMENT.)

PARENTAL PERMISSION/CHILD ASSENT
for a Research Study entitled
"The Effects of Children's Gardening Activities on Life Skills of Elementary School Children"

Your child is invited to participate in a research study to determine the effects of gardening activities on five life skills. The study is being conducted by Ann Fleener, Graduate Assistant, under the direction of Dr. Carolyn Robinson, Assistant Professor in the Auburn University Department of Horticulture. Your child was selected as a possible participant because he or she is in a participating 3rd grade classroom. Since your child is age 18 or younger we must have your permission to include him/her in the study.

The Auburn University Institutional Review Board has approved this document for use from 12/12/07 to 12/11/08 Protocol # 07-292 EP 0712

What will be involved if your child participates? If you decide to allow your child to participate in this research study, your child will be asked to complete two surveys and participate in reading six books and completing gardening/nature activities related to each of them. The surveys your child completes will be the same survey, one given at the beginning of the semester and the other given at the end. It will ask your child their perception of their life skills such as confidence, ability to work in a group, leadership abilities, and communication skills. Between the first and second survey your child will complete eight activities, six of which will pick up on the themes of the book they accompany and two that focus on life skills specifically. Your child's total time commitment will be approximately 10 hours.

Are there any risks or discomforts? The risks associated with participating in this study are a possible social risk of feeling peer pressure to complete the activities and surveys if the other students are. To minimize these risks, we will ensure the children that it is fine if they don't participate and that they will not be treated any differently if they don't. It will also be explained that their grades will not be affected whether they participate or not.

Are there any benefits to your child or others? If your child participates in this study, your child will be exposed to stories and activities that encourage gardening, spending time outdoors, and all associated benefits. I cannot promise you that your child will receive any or all of the benefits described.

Parent/Guardian Initials_____
Participant Initials_____

101 FUNCHESS HALL
AUBURN, AL 36849-5408

TELEPHONE:
334-844-4862

ATTNET:
334-844-4862

FAX:
334-844-3131

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Will you or your child receive compensation for participating? To thank your child for participating, your child will be offered a pencil, stickers, or folder to encourage the return of their consent form. Also, your child's school will receive a copy of the curriculum and six books used in the study.

Are there any costs? If you decide to allow your child to participate, you will incur no costs.

If you (or your child) change your mind about your child's participation, your child can be withdrawn from the study at any time. Your child's participation is completely voluntary. If you choose to withdraw your child, your child's data can be withdrawn as long as it is identifiable. Your decision about whether or not to allow your child to participate or to stop participating will not jeopardize your or your child's future relations with Auburn University, the Department of Horticulture or your child's elementary school.

Your child's privacy will be protected. Any information obtained in connection with this study will remain confidential. The data collected will be protected by coding the survey's after your child's second survey. The name information will then be destroyed. Information obtained through your child's participation may be used in a thesis as well as published in a professional journal and presented at a professional meeting.

If you (or your child) have questions about this study, please ask them now or contact Ann Fleener at 334-844-3040 or Dr Carolyn Robinson at 334-844-3031. A copy of this document will be given to you to keep.

If you have questions about your child's rights as a research participant, you may contact the Auburn University Office of Human Subjects Research or the Institutional Review Board by phone (334)-844-5966 or e-mail at hsubjec@auburn.edu or IRBChair@auburn.edu.

The Auburn University Institutional Review Board has approved this document for use from 12/13/07 to 12/11/08 Protocol # 07-245 MR 0712

HAVING READ THE INFORMATION PROVIDED, YOU MUST DECIDE WHETHER OR NOT YOU WISH FOR YOUR CHILD TO PARTICIPATE IN THIS RESEARCH STUDY. YOUR SIGNATURE INDICATES YOUR WILLINGNESS TO ALLOW YOUR CHILD TO PARTICIPATE. YOUR CHILD'S SIGNATURE INDICATES HIS/HER WILLINGNESS TO PARTICIPATE.

______________	Ann Fleener 1/21/08
Participant's signature Date	Investigator obtaining consent Date
______________	Ann Fleener
Printed Name	Printed Name
______________	______________
Parent/Guardian Signature Date	Co-Investigator Date
______________	______________
Printed Name	Printed Name

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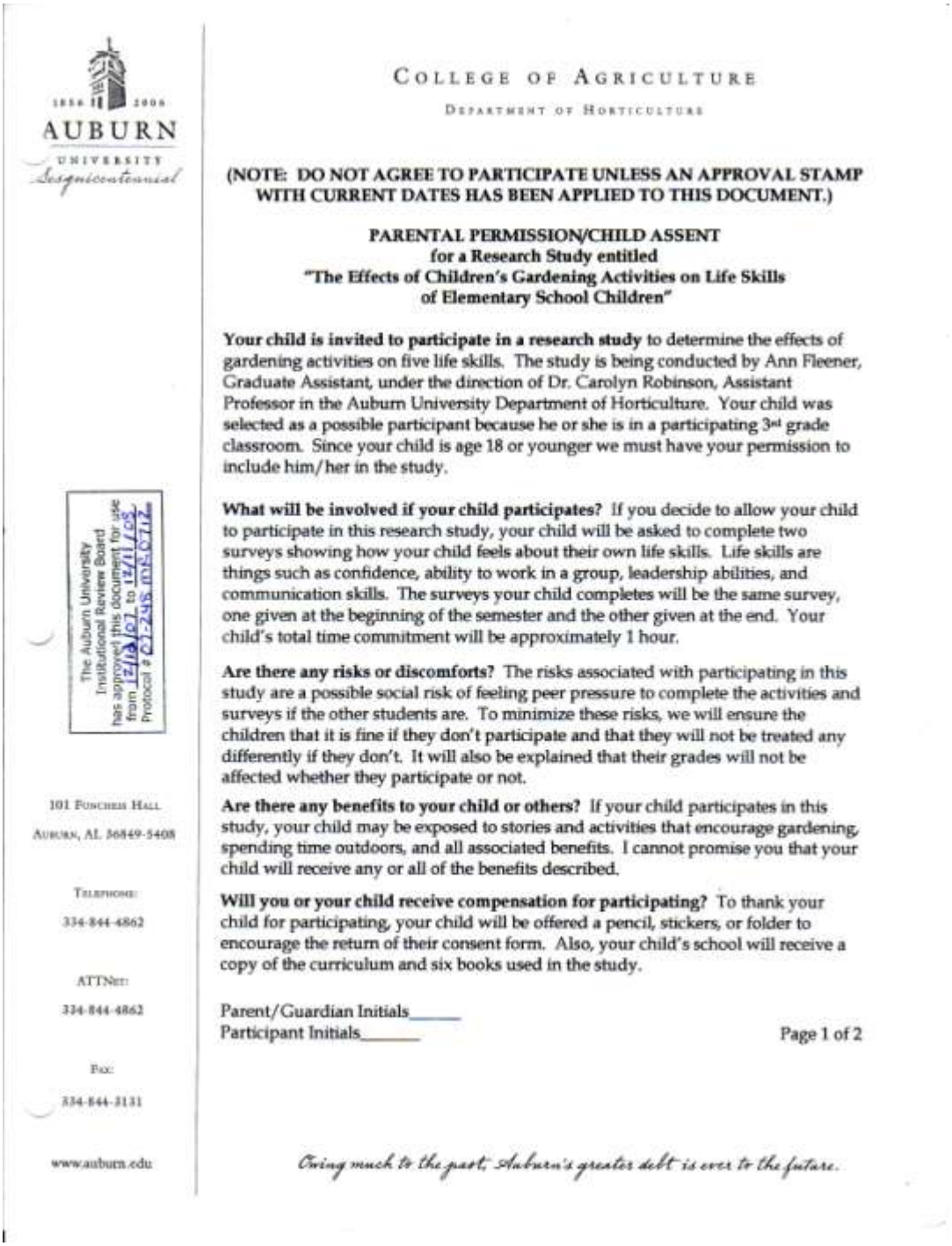
Parental Consent/Student Assent Form

Control Group



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(NOTE: DO NOT AGREE TO PARTICIPATE UNLESS AN APPROVAL STAMP WITH CURRENT DATES HAS BEEN APPLIED TO THIS DOCUMENT.)

PARENTAL PERMISSION/CHILD ASSENT
for a Research Study entitled
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Your child is invited to participate in a research study to determine the effects of gardening activities on five life skills. The study is being conducted by Ann Fleener, Graduate Assistant, under the direction of Dr. Carolyn Robinson, Assistant Professor in the Auburn University Department of Horticulture. Your child was selected as a possible participant because he or she is in a participating 3rd grade classroom. Since your child is age 18 or younger we must have your permission to include him/her in the study.

The Auburn University Institutional Review Board has approved this document for use from 12/10/07 to 12/11/08 Protocol # 07-245 ms 0712

What will be involved if your child participates? If you decide to allow your child to participate in this research study, your child will be asked to complete two surveys showing how your child feels about their own life skills. Life skills are things such as confidence, ability to work in a group, leadership abilities, and communication skills. The surveys your child completes will be the same survey, one given at the beginning of the semester and the other given at the end. Your child's total time commitment will be approximately 1 hour.

Are there any risks or discomforts? The risks associated with participating in this study are a possible social risk of feeling peer pressure to complete the activities and surveys if the other students are. To minimize these risks, we will ensure the children that it is fine if they don't participate and that they will not be treated any differently if they don't. It will also be explained that their grades will not be affected whether they participate or not.

Are there any benefits to your child or others? If your child participates in this study, your child may be exposed to stories and activities that encourage gardening, spending time outdoors, and all associated benefits. I cannot promise you that your child will receive any or all of the benefits described.

Will you or your child receive compensation for participating? To thank your child for participating, your child will be offered a pencil, stickers, or folder to encourage the return of their consent form. Also, your child's school will receive a copy of the curriculum and six books used in the study.

Parent/Guardian Initials_____
Participant Initials_____

Page 1 of 2

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Are there any costs? If you decide to allow your child to participate, you will incur no costs.

If you (or your child) change your mind about your child's participation, your child can be withdrawn from the study at any time. Your child's participation is completely voluntary. If you choose to withdraw your child, your child's data can be withdrawn as long as it is identifiable. Your decision about whether or not to allow your child to participate or to stop participating will not jeopardize your or your child's future relations with Auburn University, the Department of Horticulture or your child's elementary school.

Your child's privacy will be protected. Any information obtained in connection with this study will remain confidential. The data collected will be protected by coding the survey's after your child's second survey. The name information will then be destroyed. Information obtained through your child's participation may be used in a thesis as well as published in a professional journal and presented at a professional meeting.

If you (or your child) have questions about this study, please ask them now or contact Ann Fleener at 334-844-3040 or Dr Carolyn Robinson at 334-844-3031. A copy of this document will be given to you to keep.

If you have questions about your child's rights as a research participant, you may contact the Auburn University Office of Human Subjects Research or the Institutional Review Board by phone (334)-844-5966 or e-mail at hsubjec@auburn.edu or IRBChair@auburn.edu.

HAVING READ THE INFORMATION PROVIDED, YOU MUST DECIDE WHETHER OR NOT YOU WISH FOR YOUR CHILD TO PARTICIPATE IN THIS RESEARCH STUDY. YOUR SIGNATURE INDICATES YOUR WILLINGNESS TO ALLOW YOUR CHILD TO PARTICIPATE. YOUR CHILD'S SIGNATURE INDICATES HIS/HER WILLINGNESS TO PARTICIPATE.

Participant's signature Date	Ann Fleener 1/24/08 Investigator obtaining consent Date
Printed Name	Ann Fleener Printed Name
Parent/Guardian Signature Date	Co-Investigator Date
Printed Name	Printed Name

The Auburn University Institutional Review Board has approved this document for use from 1/30/07 to 1/11/08 Protocol # 07-248 MR 0712

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APPENDIX C

Biographical Information Section of Survey

Student Information

Fill in the circle for the answer that best describes you.

1. I am a
   - ○ Girl
   - ○ Boy
2. I am
   - ○ Asian
   - ○ Black
   - ○ Hispanic
   - ○ White
   - ○ Other
3. Where have you lived most of your life?
   - ○ In the city
   - ○ In the country
4. Do you have a garden at home?
   - ○ Yes
   - ○ No
5. Have you ever worked in a garden before?
   - ○ Yes
   - ○ No
6. If you have worked in a garden before, where was the garden? (it's okay to have more than one answer)
   - ○ Home
   - ○ School
   - ○ A relative's house (grandparent, aunt, etc.)
   - ○ Neighbor's house
   - ○ I have not worked in a garden before.
7. How much time do you usually spend reading each day?
   - ○ No time
   - ○ One hour
   - ○ Two hours
   - ○ More than two hours
8. How many books do you usually read for fun each week?
   - ○ None
   - ○ One to two
   - ○ Three to five
   - ○ More than five
9. What kinds of books do you like to read? (it's okay to have more than one answer)
   - ○ Funny
   - ○ Mystery
   - ○ History
   - ○ Biographies
   - ○ Fiction
10. Do you like to read books about plants or gardens?
    - ○ Yes
    - ○ No
11. After school, how much time do you usually spend outside?
    - ○ No time
    - ○ Less than an hour
    - ○ One to two hours
    - ○ More than two hours

APPENDIX D

Youth Life Skills Survey

Survey Questions

Remember to fill in the circle that has the best answer for you on every question!

1. I can work with other people.
   ○ Yes ○ Maybe ○ No
2. I can work well in a group.
   ○ Yes ○ Maybe ○ No
3. If I do something good, I am proud of myself.
   ○ Yes ○ Maybe ○ No
4. I think that I should help other people.
   ○ Yes ○ Maybe ○ No
5. If I do something wrong, it's ok to blame it on someone else.
   ○ Yes ○ Maybe ○ No
6. There are some things that I can show other people how to do.
   ○ Yes ○ Maybe ○ No
7. Before I decide on something, I think about what my choices are.
   ○ Yes ○ Maybe ○ No
8. When other people want to say something, I listen to what they say.
   ○ Yes ○ Maybe ○ No
9. I can help others in important ways.
   ○ Yes ○ Maybe ○ No
10. I have done things to make life better for others.
    ○ Yes ○ Maybe ○ No
11. I think what other people want to say is important.
    ○ Yes ○ Maybe ○ No

12. Other kids that I know admire me.

○ Yes ○ Maybe ○ No

13. If I am a leader of a group, I can bring up things that we need to talk about.

○ Yes ○ Maybe ○ No

14. When I am in a group, I do what I am supposed to do.

○ Yes ○ Maybe ○ No

15. When I try to decide what to do, I think about things that have happened to me before.

○ Yes ○ Maybe ○ No

16. I like being the leader of a group.

○ Yes ○ Maybe ○ No

17. When I try to decide what to do, I ask other people what they think I should do.

○ Yes ○ Maybe ○ No

18. I am a good listener.

○ Yes ○ Maybe ○ No

19. When I say something, people understand me.

○ Yes ○ Maybe ○ No

20. I think I am a good person.

○ Yes ○ Maybe ○ No

21. I think that helping other people is important.

○ Yes ○ Maybe ○ No

22. I care about my school.

○ Yes ○ Maybe ○ No

23.I think that all people in a group should help in doing a job.

○ Yes ○ Maybe ○ No

24.I am good at following directions.

○ Yes ○ Maybe ○ No

25.I am good at being a group leader.

○ Yes ○ Maybe ○ No

26.When I try to decide what to do, I think about what good things and bad things could happen.

○ Yes ○ Maybe ○ No

27.It is a good idea to have plans in order to get a job done.

○ Yes ○ Maybe ○ No

28.I can make my own decisions.

○ Yes ○ Maybe ○ No

29.I can do things on my own.

○ Yes ○ Maybe ○ No

30.I like to do what everyone else is doing.

○ Yes ○ Maybe ○ No

31.I try very hard to do my best.

○ Yes ○ Maybe ○ No

APPENDIX E

Youth Life Skills Survey Cover Sheet

Growing Leaders

- Please read each question carefully.
- Fill in the circle that has the answer that is most correct for you.
- Choose only one answer.
- There are no right or wrong answers so you will not be graded on your answers.
- Ask your teacher if you do not understand something or have a problem.
- Please print your name, your teacher's name, your school's name, and the date at the bottom of this page.
- When you are finished give the pages back to your teacher.

Thank you very much!!

Name _____

Teacher _____

School _____