An Evaluation of Captain Planet Foundation's Learning Gardens Pilot Program in Atlanta, Georgia

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Executive Summary

In the last two decades, school gardening programs including interdisciplinary curriculum have been on the rise across the United States and abroad. Many outcomes have been researched related to school gardening programs including children's academic achievements, socialization through gardening activities, food preference and nutritional outcomes, and environmental impacts. Teachers often carry the greatest weight of responsibility in school gardening programs. While current literature evidences child outcomes by evaluating children, parents, teachers and principles, in this project, teachers specifically were able to identify barriers and concerns before and after teacher training workshops in a pilot program in Atlanta, Georgia and express their levels of experience as indicators of commitment and willingness to implement the program in their classrooms. This research provided an opportunity to assess how well the training addressed perceived barriers to outdoor teaching.

Principles of self-efficacy and social cognitive theory were used to guide the development of survey tools in this evaluation. A logic model was created to identify the inputs, activities, short, medium-, and long-term outcomes and overall impact of the Learning Gardens program to be used in program implementation and expansion and to keep goals in sight, providing measurable evaluation steps to monitor progress. Surveys were created to evaluate the efficacy of teacher training and how teachers perceived barriers and self-efficacy during their first year participating in the school gardens program. Surveys were given online and in-person before and after training and after the first year of program participation. Data was collected, analyzed and presented. Curriculum tool kits were prepared for use in the classroom.

Results indicated that with training, barriers to teaching outdoors decreased; perceived self-efficacy and thus the drive and motivation to continue forward movement in the Learning Gardens program increased. Once teachers became aware of their goals, and how they would be able to achieve them together, they gained understanding of how the program would be beneficial to their students. These results stress the importance of teacher training and the provision of tools and resources linked directly to standards-based curriculum as critical components in the implementation of successful school garden programming.

Background

The rapid expansion of school garden programs in the United States has been part of a broader food system relocalization movement over the past twenty years (Berlin, Norris, Kolodinsky, & Nelson, 2013). Other facets of the movement include farm to school programs, the slow food movement, an increase of community gardens and local food cooperatives, the revival of farmers markets and the formation of a direct relationship between farmers and farm to table restaurateurs (Berlin et al., 2013). Community supported agriculture has bridged relationships between growers, processors, distributers and consumers on local and community levels. Interests in improved nutrition-related health outcomes has lead to the restructuring of the food pyramid to the USDA recommended use of the "My Plate" model to include more fruits and vegetables in the American diet (USDA, 2014). School lunch program mandates have been implemented across states to improve nutrition at schools. Proponents of this multi-faceted movement support its activities and growth in efforts to improve food quality and safety, strengthen community ties, protect resources and sustainable economic conditions, appeal to local palates and regional growing capabilities, encourage biodiversity and improve health outcomes across the board (Berlin et al., 2013). The major interest in this study is to encourage lifelong environmental stewardship and improve nutrition related consumer behaviors among youth through the Captain Planet Foundation's Learning Gardens program.

Captain Planet Foundation is a non-profit organization based in Atlanta, Georgia, that funds and supports hands-on environmental projects that empower and inspire children. Their programs encourage environmental solutions in homes, schools and communities around the world and their mission is to give the next generation of environmental stewards an active understanding and love for the natural world in which they live. Captain Planet's Learning Gardens program provides schools with strategies for building effective and long lasting garden-based programs. Participating schools are provided with teacher training, tool kits, interdisciplinary standards-based curriculum, supplies to carry out lesson plans, a fully equipped cooking cart, and a school garden with seeds. Children benefit in a number of ways including increased academic achievement, exposure to new, healthy, seasonal foods, the opportunity to learn

experientially by participating in field investigations, and understanding curriculum in real-life applications while cultivating a context of environmental stewardship.

Literature Review

Introduction

Around the world, school gardens have become the focus of educators' attention in efforts to engage students in experiential learning while addressing societal concerns such as environmental sustainability and childhood obesity (Cutter-Mackenzie, 2009). In the United States, interests in school garden programs have expanded greatly in the last two decades. The trend of garden program development and initiation began in the mid 1990's when California passed the "Garden in Every School" initiative (Graham, Beall, Lussier, McLaughlin, & Zidenberg-Cherr, 2005). By 2006 the California School Garden Program had authorized $15 million in grants to support the initiative in garden programs throughout the state including LifeLab, L.A. Sprouts, The Edible School Yard Project, (Hazzard, 2011; Edible schoolyard, 2014). Many states followed suit, developing programs such as Texas A&Ms Junior Master Gardener Program, New York's Kid's Growing Food, farm to school Programs in Oregon and California, the Tampa Bay School Gardening Network in Florida, School Gardens in partnership with the Vermont Gardening Association in Vermont, and dozens more across the states (Blair, 2009; Graham et al., 2005). With the substantial growth of school garden programs in the U.S., the body of empirical research on the outcomes of school garden programs has continued to grow and a number of evaluations have been developed to monitor and assess their effectiveness based on what they hope to achieve. Although barriers and facilitators have been identified in the implementation and use of school gardens among diverse environments and populations and among disparate resources and capabilities of schools in differing geographic, social or cultural regions, further research and evaluation to improve program efficacy is still needed.

This review identifies literature that either supports or does not support Captain Planet Foundation's Learning Gardens program and describes why the stated methodologies were used in the development of tools and evaluation of the Learning Gardens program.

Health and Non-Health Outcomes of School Gardens

Dietary habits/ Nutrition Behaviors

Early health promotion fosters healthy eating and physical activity later in life (CDC,1996; Birch & Sullivan, 1991). School age children become more independent decision makers and are strongly affected by their social environment, including friends, peers, role models or social models and adult influences (Rafael Perez-Escamilla, 2009). The obesity epidemic in the United States has especially affected children in recent years. Targeting nutrition behaviors at an early age can prevent a myriad of deleterious health effects occurring later in life. Healthy nutrition can prevent adverse cardiovascular events, such as heart disease, myocardial infarction, diabetes, hypertension, and mobility issues by encouraging healthy behaviors early in life. Fewer than 10% of adolescents currently meet the healthy people 2010 recommended fruit and vegetable consumption (CDC,2014; NIH, 2007). School gardening programs can have positive effects on nutrition knowledge and attitudes, and affect nutrition behavior (Berlin et al., 2013; Blair, 2009; Gatto, Ventura, Cook, Gyllenhammer, & Davis, 2012; Gibbs et al., 2013). Logically, the cafeteria would be a sensible starting point for the introduction to taste testing of fresh produce (Graham & Zidenberg-Cherr, 2005).

A study by Gibbs et al (2013) in Victoria, Australia placed 764 children in grades 3-6 in either a school based kitchen-garden program (SKGP) including 45 minutes each week of the school year in a garden class and 60 minutes each week of the school year in a kitchen class versus a regular school with some garden experience but not spending as much time in the garden or in a coordinated SKGP program. Gibbs found that those in the intervention group showed increased odds of willingness to try new foods that they had never tried but grown in the garden. Intake of vegetables and fruits did not increase from baseline in quantitative results. Qualitative findings showed increased student engagement and learning in those who participated in the school kitchen garden program, increased willingness to try new foods and expressed enjoyment of doing so. Little impact was shown on children's ability to describe new foods, transfer of impacts to the home environment, or social impacts of the program on the broader school community (Gibbs 2013). Gibbs' study also suggested that children's healthy eating behaviors are more likely to become evident over a longer period of time (Gibbs et al., 2013). This is consistent with the literature that short-term exposures to interventions that introduce new foods can increase nutrition knowledge, but is not sufficient to change nutrition behavior (Evans et al., 2012).

Parmer, et al., (2009) found similar results when evaluating nutrition knowledge, preferences and consumption of fruit and vegetables among second graders in six schools in a southeastern U.S. state. Subjects were assigned to one of three groups: a

nutrition education and gardening treatment group that would attend one hour of nutrition classes every other week and one hour of gardening classes every other week, a nutrition education only treatment group that would receive one hour of nutrition classes every other week, and a control group. In this study, self-report questionnaires, interviews and cafeteria observations were used to evaluate outcomes. An adapted instrument by Domel, et al. measured fruit and vegetable preference using pictures of happy, neutral and sad faces. A "taste and rate" questionnaire developed by Birch and Sullivan was used to test fruit and vegetable preferences (Birch & Sullivan, 1991). Second graders who were part of an intervention group with both a nutrition education and a gardening component were 55% more likely to choose a vegetable at lunch ($P < .01$) than those receiving nutrition education alone ($P < .08$) of those in a control group ($P = .47$) (Parmer, et al., 2009).

Other studies including cultural adaptations for specific subgroups have found results consistent with the Parmer and Gibbs studies. In a pilot study by Nicole Gatto, (2012) on the L.A. Sprouts Garden based nutrition intervention assessing motivation and preferences for fruits and vegetables in Latino Youth, thirty four predominantly Latino 4^{th} and 5^{th} grade students received an intervention comprised of a weekly 90 minute culturally sensitive interactive class at a community garden for 12 consecutive weeks while 70 control subjects received an "abbreviated and delayed" intervention. Motivation to eat fruits and vegetables was assessed using adaption of the Motivation for Healthy Eating Behavior Measure from a Treatment and Self Regulation Questionnaire developed and validated in a pediatric population. At baseline, there were no differences in preferences for fruits and vegetables, motivation to eat, self-efficacy, or other characteristics among the intervention and control groups (Gatto et al., 2011). After the 12-week L.A. Sprouts program, the intervention group had statistically significantly increased preferences for vegetable consumption(but not fruits), increased attitudes and perceptions, and 54% reported taste preferences for vegetables from the garden, rating them as "tast[ing] better than those from the store." Furthermore, program participants had increased self-efficacy in abilities to garden and cook (Gatto, Ventura, Cook, Gyllenhammer, & Davis, 2012).

Although most research reveals consistent results with interventions that include a control component, some studies evaluating the impact of produce grown in elementary school gardens on consumption of vegetables at school lunch did not find statistically significant results. In a 2012 quasi-experimental study of 359 4th and 5th graders in three Delaware schools there was a small positive impact on children's food choices. This impact approached significance (Cotugna, Manning, & DiDomenico, 2012). Another found that although multiple components of a garden based intervention did

not significantly increase fruit and vegetable consumption, it significantly decreased preferences for unhealthy foods (Evans et al., 2012). It is the recommendation of the American Dietetic Association, the Society for Nutrition Education, and the American School Food Service Association that school gardens should be implemented as a useful nutrition education strategy (Graham & Zidenberg-Cherr, 2005).

Positive youth Development

Cornell University's cooperative extension, under the direction of Dr. Cathann Kress developed four themes of positive youth development as the basis for their garden learning experiences that have been adopted among other gardening programs, nationally. These concepts are inherent to the Learning Gardens program and should be included in positive student outcomes and outcome assessments. They include:

1. Mastery. Related to self-efficacy, mastery is the feeling of "I can" and describes one's perceived ability to complete a task or number of tasks in order to produce an identified outcome. For example, if one plant dies, youth would be instructed to plant another to eliminate the fear of failure in future gardening experiences;

2. Belonging. This theme facilitates the cultivation of relationships that promote family and community ties. This can include completing activities within a group setting in the garden or using critical thinking to tackle gardening solutions as a team. Once a goal is achieved with the help of others, children feel like they are a part of something bigger and that their participation is valued;

3. Generosity. The idea that shared responsibility and thoughtfulness will lead to increased power and independence among youth by promoting social, emotional, cognitive, behavioral and moral competence;

4. Power. This theme represents authentic youth engagement and decision-making fostering the idea that "I matter" by allowing children to develop a clear and positive identity and stimulating resilience, self-determination and belief in the future (Cornell, 2014).

In one review of school gardens including 19 studies between 1995 and 2007 in K-12 schools (only 2 studies including high-school students), rationales for school gardening included, but were not limited to, broadening children's experience of ecosystem complexity by teaching through experience and connecting children to nature; place-based learning to clarify the nature and culture continuum by using personal experience and observation of nature as the building blocks for classroom enrichment; vegetable gardening to teach food systems ecology and nutrition

knowledge, and exposure to nature and gardening during childhood as a platform for healthy development of adult attitudes and environmental values (Blair, 2009).

Increased Academic Achievement

Because school garden curriculum has the ability to teach across and between disciplines, fundraising for school gardening is less painstaking. Applying for additional school garden funding is not limited to science or ecology grants, but opens the door to many other grant opportunities such as environmental education, social sciences, math, music, arts and others (Hazzard, Moreno, Beall, & Zidenberg-Cherr, 2011).

The literature has shown increased academic achievement across subject areas as a result of school gardening interventions (Blair, 2009; Graham, Beall, Lussier, McLaughlin, & Zidenberg-Cherr, 2005). Some literature also suggest improved performance on standardized tests with the use of school gardens as a part of academic instruction as well as increased enthusiasm for learning and decreased disciplinary issues (Graham et al., 2005; Hazzard et al., 2011). The Iowa State University Extension developed garden curricula for K-3rd grade classes in Iowa called Growing in the Garden (GITG) Curriculum (Hilgers, Haynes, & Olson, 2008). They began training teachers and implementing the program in 1999. The program differs from others in that it was designed for use in the classroom with room for expansion into the garden. Hilgers' 2007 study utilized parent surveys to gauge their children's interests in areas of science, nutrition and environmental awareness to assess the GITG curriculum's impacts. The surveys contained 12 yes or no questions, 4 in each area of interest. Significant positive results were found in the areas of science and environmental awareness, with no significant results for interests in nutrition (eating new foods, eating more packaged foods, eating more fruits and vegetables, interest in produce) after three one-hour lessons were given. Marginal evidence of increased science achievement outcomes has also been found in the Junior Master Gardener program (Hilgers et al., 2008).

Increased Environmental Literacy. Lessen Environmental Impacts.

Environmental literacy has been defined in a number of ways, but the definition found to be the most suitable in encompassing the true meaning for the purposes and scope of this project follows: "Environmental literacy is a basic understanding of ecological principles and the way society effects or responds to environmental conditions" (McGraw Hill). The concept is a part of environmental education that is comprised of environmental knowledge, awareness, behavior, participation and attitudes, collectively. Early implementation of programs with environmental education

components can foster appreciation and respect for the environment and increase environmental attitudes before adolescence (Hilgers et al., 2008).

The basic components of environmental literacy are represented in figure 1. The goal of increasing environmental literacy through school gardening programs is ultimately to encourage the process of preservation and conservation of the environment for future generations by shifting attitudes and behaviors towards environmental sustainability (Jannah, Halim, Meerah & Fairuz, 2013).

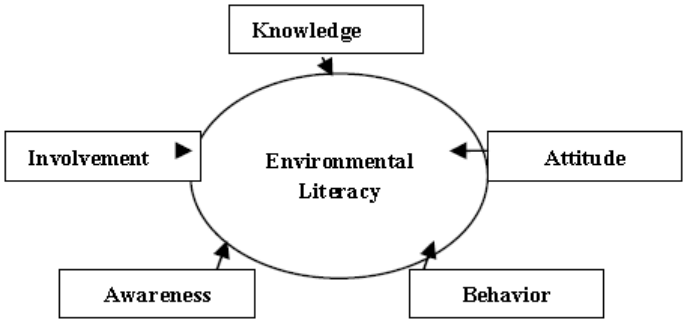

Figure 1. Components of environmental literacy (Jannah M., 2013).

Environmental awareness has been recognized as a serious issue since the 1960s, marked by the publication of Rachel Carson's *Silent Spring*, and perhaps, more notoriously, the inception of Earth Day. By the mid 1970s, air, water and land pollution as well as occupational hazards made regular headlines in US newspapers and television programming (Aguilar, Waliczek, & Zajicek, 2008). Conditions have improved since that time with advances in technology and in public health and toxicological and epidemiological research however, further steps must be taken to prevent further damage in the future. School garden activities create experiences that foster children's abilities to critically address and mediate environmental issues beginning with the identification of steps to evaluate and analyze environmental concerns from an early age. Such participatory activities permit students to construct ecological understandings and develop positive feelings for the natural world, allowing abstract ecological concepts to be brought into the concrete and applied outside the scope of the school garden (Johnson & Manoli, 2011).

Johnson and Manoli used a modified version of the 2-MEV scale to measure environmental attitudes in the United States. The four-year study found statistically

significant changes in the environmental attitudes of participants in an earth education program, but not in control groups (Johnson & Manoli, 2011). This program included concepts such as energy flow, materials recycling, interrelationships and change. Other programs frequently include additional concepts, such as diversity, community and adaptation.

In a study among differing demographic groups of elementary school children in Texas using curriculum developed from the Junior Master Gardener Handbook, no statistically significant differences in environmental attitudes or locus of control scores between experimental and control groups in youth gardening program for 3rd to 5th graders were found. Students from both groups exhibited positive environmental attitudes and those with previous gardening experiences scored significantly higher on both statements compared to those with no experience. This included at home or in-school gardening experiences and reported that hands-on gardening experience in any context seemed to positively influence both outcomes of interest (Aguilar et al., 2008). This outcome has been consistent among all literature and within the Learning Gardens program findings.

An exemplary school garden model in Georgia can be found at Ford Elementary School in Cobb County. Many of Ford Elementary's gardening lessons include aspects that demand ingenuity, enhancing children's ability to understand and utilize natural resources by using critical thinking and problem solving skills within school gardens by finding things around the house or school that they can use to solve a problem. For example, students find a way to keep vegetables protected during a freeze. This allows students to apply what they are learning directly in real-world circumstances.

Barriers to School Garden Success

Integrated Standards-Based Curriculum

Using a garden for academic instruction can be challenging for many reasons. Addressing the obstacles associated with school gardening interventions is critical to achieving successful outcomes. When teachers are already faced with limitations due to class management and time constraints, developing their own lesson plans for use in school gardening may be challenging, especially if they have little experience with gardening to begin with. Having a master gardener or designated garden coordinator can be extremely helpful in planning lessons but not all schools have access to such resources (L. DeMarco, Relf, & McDaniel, 1998; Hazzard et al., 2011). Programs that provide standards-based lesson plans for use in the garden are sparse. Only 2 of 10 exemplary school-garden schools in Hazzard's California study of best practices for

implementing, sustaining and using instructional school gardens had specific standards-based curriculum and those were obtained form a university and an agricultural education foundation. Hazzard et. al, 2011 suggests that implementing and sustaining school gardens lacking in standards-based curriculum may diminish the functionality of the garden. This idea is supported throughout the literature (Blair, 2009; L. DeMarco et al., 1998; Pérez-Rodrigo & Aranceta, 2003).

Time Constraints

Time available for instruction is important when considering the effectiveness of any curriculum (Hilgers et al., 2008). Time constraints were frequently cited as a barrier among studies regarding teacher concerns in implementing teaching lessons in the school garden (Aguilar et al., 2008; Blair, 2009; Graham et al., 2005; Hazzard et al., 2011; Rafael Perez-Escamilla, 2009). In Graham et al. 2005 study of the use of gardens in academic instruction, researchers found that time was the second greatest perceived barrier to having a school garden (57%) among schools that did not have a garden, secondary to lack of funding (60%). Additionally, the study reported time constraints as the top perceived barrier to using a school garden for academic instruction (88%) among schools that already had a garden. The second and third greatest perceived barriers to using a garden for academic instruction in these 4,194 California schools were lack of standards-based curricular materials (74%) and lack of teacher knowledge, training and experience related to gardening (70%) (Graham et al., 2005). As programs address other barriers related to gardening by providing curriculum, materials, and support, barriers concerning time will naturally decline as teacher-planning requirements decrease in programs that have already accounted for barriers in program development.

Lack of Integrated Support – People, Funds, Materials, Instruction

Lack of support was consistently reported as a barrier to the implementation of school garden activities and completion of lesson plans in an outdoor garden setting. The word “support” is used broadly in this context and is meant to include, teacher instruction and training material, funds, support from other teachers, principals, volunteers and school administration and physical materials to be used to carry out lesson plans in the garden.

In an article by Dobbs, et al. (1998), Virginia elementary school teachers experienced in using gardens as teaching tools were surveyed and interviewed to identify successful strategies for integrating gardening into elementary school curriculum. The most important factors were student and faculty ownership/commitment to doing so, availability of physical resources, faculty

knowledge and skill in the application of gardening to enhance interdisciplinary lesson plans. As in many existing programs, teachers reported heavy reliance on other sources for personal knowledge. Consistent among all literature in this review, teachers felt that gardening lessons relied heavily on their own knowledge and experience and requested additional school gardening education and training in the form of continued education or master gardener training (L. DeMarco et al., 1998; Dobbs, McDaniel, & Relf, 1998; Graham et al., 2005; Graham & Zidenberg-Cherr, 2005). Teacher need for support and training was the highest priority facilitator in using gardens as a part of academic instructions (Blair, 2009).

Because teachers play a crucially important role in implementing effective environmental lessons for students to achieve higher levels of environmental literacy, it is important to provide support among teachers and administration to keep them involved and motivated (Jannah M., et al. 2013). Previous research suggests that moderate to low levels of teachers' attitudes and interests toward teaching environmental education as well as knowledge related to pedagogy and the environment (Leeming, Porter, Dwyer, Cobern, & Oliver, 1997). Without interest, knowledge, support, training, and positive attitudes among teachers, programs may not achieve the desired objectives of environmental education (Jannah M., et al. 2013).

Another study in the state of California interviewed a key school member from 10 schools awarded a California Instructional School Garden Program grant. The study found that schools who attained the greatest success in overcoming barriers identified in the study (funds, uncooperative administration, burnt out teachers, lack of long-term volunteers) were those who also received support form the principal and other administrators who recognized the value and benefits of using their garden for academic instruction (Hazzard et al., 2011). To increase involvement and support, some schools create a committee . With more parties contributing time and effort, responsibilities are shared, limiting the possibility of failure due to a single invested party whom may be overinvested and exhausted (Hazzard et al., 2011). Having a committee can diversify tasks so that more people can be accountable for fewer, smaller things and no one feels overwhelmed. This makes members feel like they are a part of a team. Barriers regarding teacher and administrative support can be mitigated when the goals of the program become larger goals that are included in the mission of the school, county or state, for example.

Overcoming Barriers

Facilitating Teacher Enthusiasm and Self-Efficacy

Providing materials, curriculum, funding, teacher training and outside support from other teachers, forming a "green team" or school committee dedicated to setting and achieving goals related to school garden instruction, involving administrators, volunteers, etc. are all building blocks to increased self-efficacy among teachers and program promoters. These aspects help teachers to feel prepared and confident in not only the program, but also their abilities to carry out the program's activities and achieve its outcomes successfully. Identifying and overcoming barriers and promoting facilitators maximize self-efficacy and a teacher's ability to teach effectively in the garden is exponentially increased, thus increasing the program's efficacy.

Perez-Rodrigo suggests, "the degree of implementation often depends on the willingness of overloaded teachers to further develop the educational attainments and perform suitable activities through curricular projects." This statement implies that school garden programs and interventions should include multiple components that specifically address the needs of the teacher and the school to minimize the stress among those who already carry the bulk of responsibility for the garden. Additionally, effective teaching depends on content knowledge as well as delivery methods (Mohd Zohir, 2008.) Content delivery is dependent upon one's confidence, knowledge, and not only willingness, but eagerness to share the content, all direct capacities of a teacher's self-efficacy.

Jannah et al. 2013 noted that without the relevant knowledge and positive attitude amongst teachers, it is assumed that we may not achieve the desired aim and objective of environmental education.

What is the purpose of evaluation?

"Good evaluation reflects clear thinking and responsible program management" (W.K. Kellogg Foundation, 2004). Many approaches to evaluate school garden effectiveness exist. Some evaluate child outcomes using elementary level pre- and post tests to be given to students, before and after a school garden intervention over the course of a semester or year (Aguilar et al., 2008; Evans et al., 2012), before and after a class (Gatto et al., 2012; Parmer, Salisbury-Glennon, Shannon, & Struempler, 2009), or comparing students among intervention and control groups within the same school or in different schools within a state or region (Gibbs et al., 2013; Johnson & Manoli, 2011, Jannah et al.,2013). Others evaluate outcomes by interviewing the students' parents and analyzing any observed changes in the child.

Another approach researchers have used to evaluate a program's effectiveness is to evaluate principles' and teachers' enthusiasm for gardening as a learning tool (L.

DeMarco et al., 1998; Dobbs et al., 1998; Graham et al., 2005; Hazzard et al., 2011). Such studies might evaluate how they use the garden, and what barriers they perceive in a program's implementation (Blair, 2009). This can be evaluated by sending questionnaires to teachers and principles who are using school gardens , giving a pre- and post-test to those piloting a program, or sampling all schools in an area and evaluating data from those who are and are not using school gardens (Blair, 2009).

Regardless of the approach taken, evaluation of progress must be sensitive and involve collaboration of all participants (Perez-Rodrigo, 2003). The ultimate goal of evaluation is to determine the quality or adequacy of a program and can ultimately add up to savings in time and money. This allows program developers and stakeholders to determine if the program is meeting its goals and if it is doing so in a timely manner based on pre-determined targets. Evaluation enables monitoring and strengthens a programs implementation, delivery of services, as well as recruitment processes and will indeed affect the decisions that will based on the evaluations such as policy, funding, program expansion, or the adoption of the program with the most impact by educational institutions based on the considerations of their resources.

Use of a logic model in establishing outcomes

A logic model is a roadmap that identifies the specific inputs, activities, short- medium- and long- term outcomes and the overall impact a program seeks to achieve. It is a graphical depiction of the logical relationships between the aforementioned aspects of a program. A logic model can be a useful tool for anyone involved because it clearly defines roles, actions and intentions of a program or organization while identifying what will be achieved, and how each step will be evaluated. It is a great way to manage the progress of a program and evaluate its effectiveness and may be particularly useful when introducing the program to someone interested in investing in some way because it is a simple, legible way to identify the meat of the program and describe its mission, purpose and procedures without requiring extensive reading or research. This makes it beneficial in program planning and expansion as well as evaluation.

Logic models have long been used as performance measures for non-profits and government organizations where the goal of the program is not revenue. They exist in many forms and formats, and can be tailored to fit the needs of a specific program. The primary resource used to develop the logic model for the Learning Gardens program was the W.K. Kellogg Logic Model Development Guide. It is based on the Theory of

Change (discussed further in subsequent sections) and makes an explicit visual statement of how change will be brought about by providing a common reference point for all stakeholders (W.K. Kellogg Foundation, 2004). Although it appears linear in presentation, it is still provides room for flexibility as the program continues to grow and change while keeping its goals in sight.

Developing evaluation tools:

Tools as they currently exist

Many tools were taken into account and researched in the literature review in consideration for the development of evaluation tools in this project. They included tools that evaluated environmental literacy, environmental attitudes and behaviors, nutrition outcomes, and experiential learning such as the Life Skills Inventory, Environmental Response Inventory, food and vegetable questionnaires and food recall journals. For the purpose of this section and the specific outcomes of interest in this arm of the Learning Gardens program evaluation, only existing tools examining outdoor learning programs, academic instruction in school garden efficacy and self-efficacy will be examined. Additionally, survey tools targeting child responses will be excluded as the outcomes evaluated in this arm of the Learning Gardens study pertains to adult participants.

Many studies that sent questionnaires out to teachers and principles with yes or no responses, ranking questions, and open ended questions inquiring about garden use and training and then coding for positive or negative responses (Dobbs et al., 1998). Similarly, one study used a survey developed specifically for the project by nutrition and horticulture professionals and evaluated for validity by pilot testing before making revisions. This particular questionnaire was composed of 18 items that were either categorical or ranking items related to the three outcome measures (Graham et al., 2005).

Other tools include:

Data based on Interviews with key members of schools with gardens (Hazzard et al., 2011).

Evaluation toolkit for Garden Based learning (Cornell University, 2014).

National School Gardening Survey (L. W. DeMarco, Relf, & McDaniel, 1999) to address barriers faced by teachers in the use of environmental education curriculum. Designed and tested by Sewing (1986) - teachers asked to identify 5 of 18 listed school gardening

factors that were essential to the successful use of gardening in the curricula. Open space for teacher comments providing additional factors.

American Environmental Values Survey, a 240 Item mail survey focusing on first person attitudes and specific indicators (SRI-BI and ecoAmerica, 2006).

Bandura's Instrument Teacher Self-efficacy Scale (Bandura, 2006).

Nutrition Teaching Self-efficacy Scale (NTSES) (Brenowitz & Tuttle, 2003).

California School Garden Survey, (Lifelab, 2010).

Theoretical Framework:

Tools were developed for this program to evaluate the effectiveness and perceived impacts of teacher training sessions, program goals and outcomes, barriers to school gardening and teacher self-efficacy. The development of the surveys and logic model take into consideration existing validated surveys and some items adapted from existing literature. Within the fields of public health and nutrition education, theory-based interventions that target the key underlying factors that influence health behavior offer the most promise (Berlin, L. 2013). As a whole, the development of evaluation tools relies heavily on the principles of Albert Bandura's Social Cognitive Theory (SCT) as a foundation for health promotion. The theory appeals to the learning needs of developing youth by including approaches such as positive reinforcement and considers the driving forces that motivate human behaviors. SCT is appropriate for school interventions because it encompasses factors linked to intrapersonal, and interpersonal spheres of influence.. By including both spheres of influence, the theory considers the ways in which children and adults interact with one another in a school or garden setting and the ways in which they respond to stimuli on a personal level (within themselves). SCT also takes in to account institutional and community influences that affect the ways people acquire and maintain health behaviors. These influences are relevant because the school is an integral part of the community and involves many community members, leaders and decision-makers.

Social Cognitive Theory is applicable to public health issues as evidenced by its recent applications within the field (Berlin et al., 2013). It has been used in the theoretical foundations of nutrition, environmental, education and other interventions for some time. Using such theory-based interventions that target key factors affecting behavior is considered a current best practice in the development of nutrition interventions. One construct of SCT is that motivation is critical to task accomplishment. Belief in one's personal efficacy plays a critical and central role in personal change and is the foundation

of human motivation and action (Bandura, 2004). It is important to clearly establish outcomes and facilitators so that those delivering the program activities feel certain that they will be able to achieve desired goals and have a concrete plan with all of the necessary tools to do so. Self-efficacy among teachers is a focal determinant because it affects health both directly and indirectly by influencing other determinants, such as increased class time spent teaching in the garden. Figure 2 demonstrates the ways in which training, experience, outcome expectations and sociostructural factors can shape one's perceived self-efficacy, and its role in the adoption of health habits. Bandura claims "unless people believe they can produce desired effects by their actions, they have little incentive to act or to persevere in the face of difficulties"(Bandura, 2004).

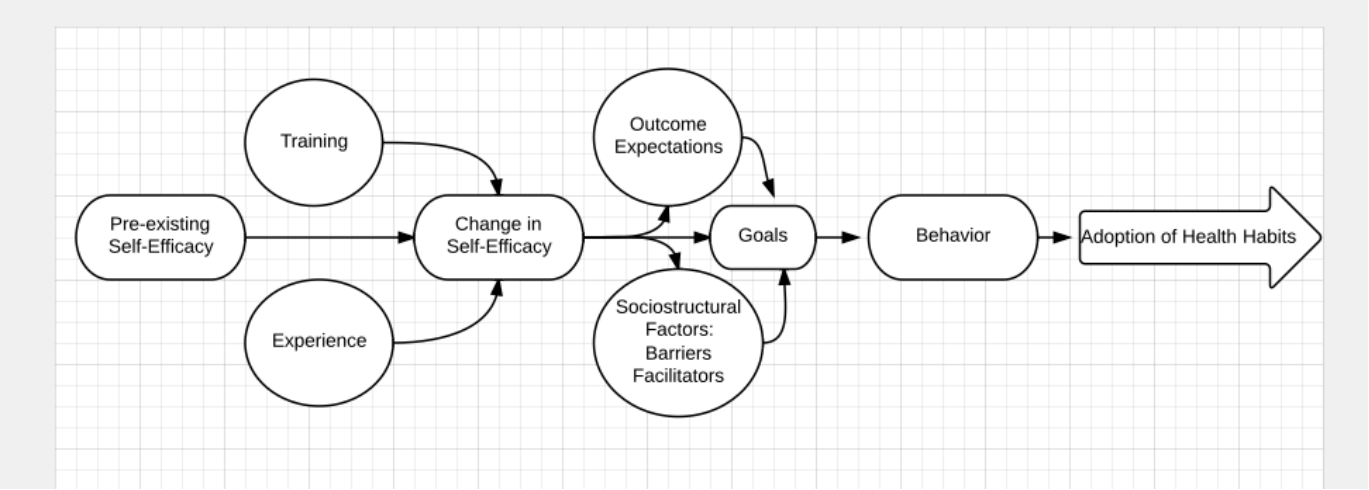

Figure 2. Paths of influence whereby perceived self-efficacy affects health habits both directly and through its impact on goals and expectations of perceptions of health promoting behaviors. Adapted from Bandura, 2004

Given the interrelatedness of the paths of influence of behavioral adaptation established by the Social Cognitive Theory, it can be deduced that humans' inquiry of knowledge on any subject is largely based not only upon content, but also upon the environment in which they learn as well as their perceptions of the experience. This includes the context of learning as well as the social interactions and outcomes of the learning experience and allows participants to determine if the newly acquired knowledge or behavior is something that will be applicable outside of context and whether or not there are any perceived rewards in maintaining a behavior.

W.K. Kellogg's Logic Model Development Guide relies primarily on the Theory of Change, or Stages of Change model, for the development of the type of logic model used in this project (W.K. Kellogg Foundation, 2004). This model is closely related to SCT as it considers progress leading up to an action as motivated indicators of "readiness" before an action can be completed or a goal can be achieved as seen in figure 3.

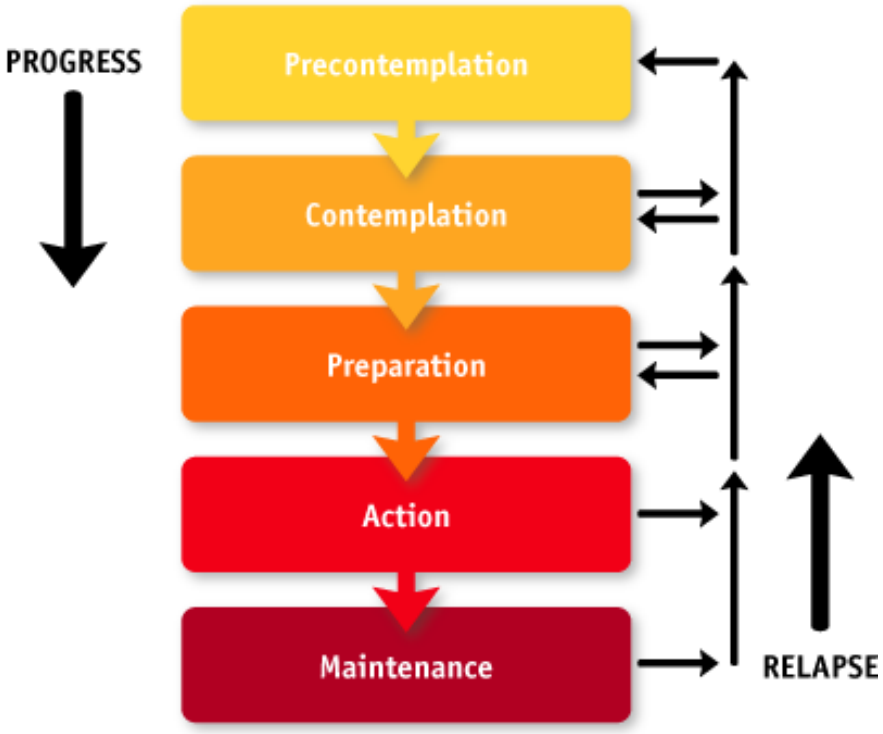

Figure 3. The Stages of Change continuum. 5 stages of readiness to improve health behavior. From DiClemente, & Prochaska, 1998.

Like Social Cognitive Theory, The Theory of Change posits that one's willingness to complete an action or achieve a goal relies heavily upon one's perceptions of their ability to successfully do so (DiClemente & Prochaska, 1998). In the case of the logic model, the clear format of established inputs, outputs, activities, goals and impacts contributes to the reader's ability to readily move forward from one stage of change to the next by establishing an executable plan of action and identifying exactly what will be involved. For example, if a program participant is contemplating being a part of the Learning Gardens program, once they are given the tools and training, leading to increased perceptions of self-efficacy, it is likely that they will feel prepared to take action (the next stage in the continuum) by moving forward with outdoor gardening activities.

Proposed Plan and Activities

My objectives as an intern at ICF International for the Captain Planet Foundation were to:

1. Establish short-term, medium-term, and long-term goals as well as an overall impact for the Learning Gardens Program and present them in a concise and concrete format. This will include resources that will go into achieving goals as well as activities to be carried out in doing so.

2. Evaluate the program's efficacy at reaching established goals by evaluating three concepts: teacher training workshops, teacher self-efficacy in first-year participants, and the program's ability to identify and address barriers to success among schools and within the program.

3. Contribute to the program's overall expansion and development as well as the body of empirical research that governs school-garden programs to encourage Captain Planets Learning Gardens program's long-term success and self-sustainability within schools.

First, I familiarized myself with the existing objectives of Captain Planet Foundations Learning Gardens (LG) Program as well as those of the organization as a whole by combing the website and interviewing key officials within the organization. An extensive literature review was conducted to identify similar school garden programs and existing evaluation tools. A review of logic models and their use and formulation was undertaken to prepare for the design of an appropriate model for the LG program. Some of the work was completed alongside a Doctoral student whose work will evaluate student-outcomes and her objectives were included in the model, additionally. A timeline was formed for task completion and a log was kept of hours and activities completed within the 9-month research time frame. Four tools were developed to evaluate the program and complete study objectives. They included:

1. A pre-test for teachers to take before starting the program. The pre-test assesses teacher self-efficacy and addresses barriers to garden use.
2. A post-test to be given directly after a teacher-training workshop to assess the effectiveness of the workshop/training session, as well as assessing whether outcomes have been identified or if teacher self-efficacy has changed.
3. A post-test to be given after the completion of the first year of program participation to further address barriers of outside lesson plan completion. The final post-test will also evaluate the program's ability to achieve its 1-year goals, and changes in teacher self-efficacy after one year.

4. A logic model to establish the overall outcomes and impact Captain Planet hopes to achieve with the Learning Gardens program.

The first teacher-training workshop took place in October 2013 at a Cobb County School with an existing garden program whose gardens serve as a model for entering schools. The workshop included an introduction session where Captain Planet introduced themselves as an organization and then discussed the key elements of its Learning Gardens program. An itinerary for the two-day workshop was distributed before the attendees split into groups. There were four sessions to be attended by each group throughout the day. "What's Cooking in the Classroom" included cooking and kitchen cart demonstrations, and activities and tips for making nutrition education hands-on. There were also demonstrations led by chefs and nutrition experts from local organizations. "School Gardens 101,Tools for Teaching Successful Outdoor Lessons" included tips on planning, planting and maintaining an outdoor garden, classroom management, and cultivating community and volunteer support. A third session took place on the assessment of impacts of outdoor lessons. Finally, a session titled "Making Garden-Based Lessons Relevant- Integrated approaches to environmental education" discussed foundations and applications of STEM education.

The second day consisted of a K-5 grade-specific curriculum workshop with hands-on sessions for teachers to try out Learning Gardens lessons designed to meet the standards of their particular grade level.

Pre-test surveys were sent to all participants via E-mail one week prior to workshop attendance to be completed online before arrival. Paper copies were held on the premises for those who were not able to complete the survey online prior to arrival. The pre-test surveys served as pre-test for both the training workshop post-test as well as the end-of-year post-test.

Post training surveys will be given at the end of the two-day workshop, or at the end of day one activities for those who could not attend both days. The second day is a half-day and consists primarily of interactive demonstration activities.

Another training workshop was given in March 2014 for Atlanta Public School district's first year participants (educators). Modified versions of the same pre-test and post-training surveys were given there in the same fashion and the teacher training followed the same agenda as the October Workshop.

After data collection at each workshop, all data was manually entered into Survey Monkey and simple graphs were formed to illustrate informal quantitative results.

The final post-test will be given in May, upon the completion of participants' first school year in the LG program. It will be given in-person, on paper by the doctoral student as she will be completing some research on another arm of the study at that time. Informal analysis will be completed as it was with previous survey results and the doctoral student will perform a more formal analysis in the following months in addition to her own research analysis regarding student outcomes.

The logic model was completed in February after several submissions, discussions, and revisions with colleagues at ICF and Captain Planet Foundation.

Additionally I assisted with assembling curriculum packets, tool-kits and kitchen carts to be distributed to schools participating in the program.

All results and documents were compiled into a Capstone document and a presentation to be given in late April 2014 before the completion of final surveys.

Discussion

Key findings after the 2-day teacher training workshops included an increase in teachers' knowledge of intended outcomes of the Learning Gardens program from 26.2% to 77.5% . Teachers who are more aware of the intended outcomes of the program will be more likely to achieve its goals. The five barriers most frequently cited in the literature were evaluated to test teachers' perceptions of barriers to successful program implementation in the first year. Those barriers included 1. Time 2. The ability to manage a class in an outdoor environment 3. Lack of resources and funding 4. Lack of ones own knowledge and experience related to gardening and 5. Safety concerns. Of the five barriers, three significantly decreased after one teacher training workshop. Lack of funding and resources as a perceived barrier among teachers decreased from 42.2% to 34.9%. Lack of resources and funding as a perceived barrier decreased from 42.2% 28.6% and safety concerns as a perceived barrier decreased from 9.4% to 6.3%. Based on survey responses, perceptions of time as a barrier as well as the ability to manage a class in an outdoor environment stayed roughly the same before and after teacher training workshops. Regarding attitudinal changes, teachers' interests in learning more about the Learning Gardens program increased from 66.1 % to 84.2%. Before training, 73% of teachers reported looking forward to utilizing Learning Gardens program lesson plans in their school garden while after training 81.8% teachers looked forward to utilizing LG lesson plans in their school garden. Teacher responses indicating strong

agreement that the Learning Gardens will help their students learn basic concepts across the curriculum increased from 74.2% before teacher training to 82.9% after training. Findings from the first and second teacher training workshops yielded consistent results. The decrease in perceived barriers indicate that the program's training components effectively identify and address at least three of the five barriers evaluated. This can guide the focus of program training to draw more attention to time and classroom management in an outdoor environment. Teacher's expression of increased attitudes and increased awareness of outcomes also indicate increased self-efficacy in teachers' abilities to achieving program goals.

Key findings from the survey material in this project will be used by Captain Planet Foundation to strengthen and expand their Learning Gardens program. These findings will inform professionals in the fields of education, horticulture, nutrition or public health to achieve similar experiential learning outcomes and implement successful school garden programs.

Limitations in this study include problems with surveys such as length, participants not filling out surveys in their entirety when manually filling out pages with a backside, teachers leaving early and not completing post-test, and lack of agreement on some survey responses that were later revised. Other survey issues were inability to report on questions that required an answer and other small logistical problems related to the survey program used to administer questionnaires. It is recommended that the learning gardens program has outgrown the current interface and should upgrade to a more appropriate survey program for more ease and efficiency in collecting data as well as analyzing, graphing and interpreting results. Subjects taking the surveys may also find them less painstaking, and possibly more entertaining using a more appropriate and less time consuming interface. It seems contradictory for an environmental organization to distribute such a large number of paper surveys. In the future, the use of tablets, or computers to have all surveys completed electronically before and after training is suggested. Additionally, workshop recommendations were to include hands-on experience in both the first and second days of the two-day workshop so that even if participants were only able to attend on a single day, their interests would be piqued equally. Workshops should not exceed the hours of a normal school day as participants become restless and begin to lose interest.

In the second teacher training workshop in late February, outdoor learning areas were not well developed nor flourishing due to upkeep and time of year/weather so they were not as appealing to participants who were shown lessons in the garden as the those who attended the October workshop. Still, after both workshops, teachers

reported increased perceptions of their abilities to incorporate gardening curriculum into their current lesson plans, increased knowledge of school gardening outcomes, increased willingness and enthusiasm toward teaching in an outdoor school garden, and increased perceptions of their students abilities to benefit from school garden instruction. Additionally, after training sessions, teacher perceptions of availability of resources and supplemental materials, lack of personal gardening experience, and safety concerns as barriers to teaching outside of the classroom in the Learning Gardens all decreased, while time constraints and abilities to manage the class in an outdoor environment stayed the same. Teachers reported feeling a little better and much better prepared to teach in the garden.

Recommendations and Conclusion

Implementing gardening programs within school systems is a great way to reach a variety stakeholders within the population, maximizing benefits across the continuum of those involved. This may include children, parents, teachers, principals and administrators, community inputs or cooperative organizations and policymakers. Programs should consider the needs of students, teachers and the school in terms of its individual resources and limitations.

Captain Planet Foundation's Learning Gardens program allows teachers to gauge their students' basic knowledge of the environment before beginning lessons in the garden. It provides detailed lesson plans as well as the resources needed to carry out the lesson plans, integrating various teaching strategies that are suitable to the interests, abilities and cognitive level of the students as well as the teachers. Captain Planet's Learning Garden Program is the only one of its kind in terms of providing and distributing curriculum and materials in pre-packaged, ready-to-go toolkits per lesson, per grade level and include a fully equipped kitchen cart for cooking demonstrations and preparation of garden-harvested food.

The results of this Learning Gardens pilot study as well as others in the literature review indicate that for teachers and staff to be willing to commit time and effort toward school gardening they must recognize that gardening is a valuable teaching tool that will enhance the education of their students (DeMarco,1999). To effectively utilize school gardens and attain maximum outcomes, teachers must genuinely understand the value of outdoor learning through gardening. In order to achieve this goal, teachers must first be presented with opportunities to see how the school garden can be used successfully as a teaching tool through instructional and hands-on activities [based on standards-based curriculum]. Instruction should include the basic concepts of horticultural knowledge, interdisciplinary use of gardening, and basic gardening concept models for

local adaptation that can be changed over time as gardening goals and responsibilities change throughout the school year. Successful programs should provide training prior to program implementation within the school, the tools necessary to carry out lesson plans and should provide a forum for troubleshooting including multiple, accessible resources. In the case of the Learning Gardens program, the website serves as an extensive forum for troubleshooting. It includes several downloadable and printable lessons, links to outside resources to increase understanding of outdoor learning concepts, subject-specific activities, links to similar gardening programs and contacts for expanding expertise, and a place where teachers can share their experiences and comment on the strengths and weaknesses of gardening exercises. Provisions including all aspects that promote success and address barriers identified in the literature will work together to increase teacher self-efficacy, forging foundations for success in forward-moving, self-sustaining gardening programs over time.

Having the opportunity to experience interdisciplinary lessons in the garden in a hands-on fashion that includes critical thinking and problem solving will create more valuable learning experiences that can be applied outside of the classroom and carried into other experiences. Increasing teacher self-efficacy is a key to seeing that teachers continue showing increasing interest in carrying out lesson plans in the school garden. This comes with experience and training.

Learning Gardens program is unique in its ability to address all barriers by providing necessary resources: provision of tools, including garden installation, resources, various avenues of support, teacher training and curriculum. The LG program continues to evaluate and improve its program based on the needs of its participants and its evaluation tools require further validation.

Use of gardening as a teaching tool among elementary students is critical in cultivating a lifelong ethic of environmental stewardship and healthy lifestyle behaviors.

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Appendix

Logic Model

October 2013 Pre-Test Survey

October 2013 Post-Training Survey

March 2014 Pre-Test Survey

March 2014 Post-Training Survey

Captain Planet Foundation
Learning Gardens Logic Model

INPUTS	ACTIVITIES	OUTPUTS	OUTCOME 1 YR	OUTCOME 2-4 YR	OUTCOME 5-10 YR	IMPACTS
- Funds via Captain Planet Foundation	Educators teaching multi-subject curricula in an outdoor setting	Number of outdoor learning experiences for students and teachers by lessons completed	Teachers and students increased willingness to participate in lessons in the garden environment	Improved attitudes toward the environment	-Increased engagement in the environment -Increased environmental stewardship behaviors	
-Teacher tool kit and supplies curriculum, pre- and post-tests, per lesson	Launch Learning Garden program education and training among teachers	-Number of trained educators	-Increased amount and quality of training provided to teachers and students on community gardening skills -Increased used of garden based lessons	-Improved environmental literacy among students and teachers. -Increased ability to apply core curriculum to real world circumstances among students.	Teachers from all subjects and grade levels use the garden as a classroom.	Lifelong ethic of environmental stewardship and healthy lifestyle behaviors
Environmental Survey -School grounds -School garden -Summer garden mgmt, kitchen carts supported by teachers and chefs	-Gardening, planting, harvesting, sharing, learning -Experiential exposure to new, local, seasonal healthy foods.	Number of children exposed to number of different healthy foods	Increased exposure to cooking demos/kitchen carts and garden experiences. Transfer of nutrition knowledge from school to home and social contexts.	Improved food choices and consumer behaviors.	-Improved health outcomes. -Decreased indicators leading to obesity and other chronic disease related to dietary choices.	Consistent use of school gardens as an extension of the traditional classroom.
-School faculty and administration	-Expand program administration roles within school faculty	.Number of involved faculty and administration within schools	-Improved self-efficacy among students and teachers in the Learning Gardens Program	-Expanded involvement in and support for the schools' Learning Gardens program	School districts build internal support for policy to sustain Learning Gardens program	
-Interns, graduate students and Captain Planet volunteers -Research projects	Data collection	-Surveys -Program evaluation tools	-Identification of barriers and facilitators in the Learning Gardens program within schools	-Strengthened abilities to enrich and evaluate children's outdoor learning experiences. -Publication of research findings.	Each school garden appropriately addresses its schools abilities and limitations so that gardens operate to maximize academic and health outcomes.	
-Evidence-based research on similar programs	In person workshops. Develop scalable model for program expansion	- Number of opportunities for teacher and student volunteers within the	Increased number of schools enrolled in the program	Increased number of second-year program participants	Increased number of schools with long-standing, successful participation in Learning Gardens	

CPF Learning Gardens Teacher Pre-Test

***1. Name**

***2. E-mail address:**

***3. School:**

***4. District:**

***5. Grade level or subject taught:**

***6. Are you participating in Captain Planet Foundation's Learning Gardens program?**

- ☐ Yes
- ☐ No
- ☐ I don't know

7. If yes, is this your first or second year?

- ☐ first
- ☐ second
- ☐ I don't know

***8. How did you find out about the Learning Gardens program?**

- ☐ other
- ☐ Another teacher/faculty member
- ☐ Webpage
- ☐ E-mail
- ☐ A principal

Other (please specify)

CPF Learning Gardens Teacher Pre-Test

***9. Are you aware of the intended outcomes of the Learning Gardens program?**

- ☐ Yes
- ☐ Somewhat
- ☐ No

10. For each of the following questions, please select the answer that best reflects your opinion of experience.

	Strongly agree	Agree	Disagree	Strongly disagree
The Learning Gardens Program will help my students learn basic concepts across the curriculum	○	○	○	○
I will use the Captain Planet Foundations Learning Garden lesson plans in the school garden	○	○	○	○
I will include Learning Gardens Activities in my current lesson plans	○	○	○	○

***11. What do you think will be the greatest barrier(s) to teaching outside of the classroom in the Learning Gardens? (select all that apply)**

- ☐ Time constraints
- ☐ Managing the class in an outside environment
- ☐ Availability of resources and supplemental materials
- ☐ Lack of my own gardening knowledge/experience
- ☐ Safety concerns

Other (please specify)

***12. Do you currently teach lessons outside in a school garden or other outdoor learning environment?**

- ○ Yes
- ○ No

CPF Learning Gardens Teacher Pre-Test

13. If yes, how frequently?

- Once a year
- 2-3 times per year
- 4-5 times per year
- More than 5 times per year

***14. Do you currently do any cooking with your class?**

- Yes
- No

15. If yes, how frequently?

- Once a year
- 2-3 times per year
- 4-5 times per year
- More than 5 times per year

***16. Do you teach about nutrition in your classroom?**

- Yes
- No

17. If yes, how frequently?

- Once a year
- 2-3 times per year
- 4-5 times per year
- More than 5 times per year

October 2013 Post Training
Questionnaire

Captain Planet Learning Gardens Teacher Post-test

*1. Name:

*2. E-mail Address:

*3. School:

*4. District:

*5. Grade level or subject taught:

*6. Did you attend both days of the Learning Gardens workshop (Friday October 18th and Saturday October 19th)?

- Yes
- No

7. If you attended only one day, which day did you attend?

- Friday October 18th
- Saturday October 19th

*8. Are you participating in Captain Planet Foundation's Learning Gardens program?

- Yes
- No

9. If yes, is this your first or second year?

- First
- Second

Captain Planet Learning Gardens Teacher Post-test

***10. For each of the following questions, please select the answer that best reflects your opinion or experience:**

	Strongly agree	Agree	Disagree	Strongly Disagree
Today's workshop was informative and useful.	○	○	○	○
The workshop increased my interest in the Learning Gardens program.	○	○	○	○
The training was geared toward the teachers' needs and interests.	○	○	○	○
I am looking forward to utilizing Learning Gardens lesson plans and tool kits	○	○	○	○

***11. I am aware of the intended outcomes of the Learning Gardens program.**

- ○ Yes
- ○ Somewhat
- ○ No

12. How many times per year do you anticipate being able to teach in your school's garden?

- ○ 0
- ○ 1-2
- ○ 3-4
- ○ 5+

***13. How will you use the school garden?**

- ☐ To teach science
- ☐ To teach math
- ☐ To teach ELA
- ☐ To teach social studies
- ☐ To teach art
- ☐ For purposes not related to standards-based curriculum

Other (please specify)

Captain Planet Learning Gardens Teacher Post-test

14. How often do you teach science?

- Daily
- Weekly
- Monthly
- I don't teach science

Other (please specify)

*15. Does your school have a STEM lab or science coordinator?

- Yes
- No

16. If yes, does this person teach:

- Core content
- Enrichment
- Core content and enrichment

*17. Organization

	Excellent	Good	Okay	Poor
Was the workshop well organized?				
Opportunity to see the gardens, outdoor learning areas?				
Opportunity to make contacts, discuss, ask questions?				
Logistics and amenities: Registration, lunch, meeting spaces?				

*18. Program Value and Relevance

	Excellent	Good	Okay	Poor
Was price reasonable?				
Was time commitment worthwhile?				
Were topics and information relevant and useful?				
Did you learn some things you didn't already know?				
Were resources useful? (book, curriculum CD, materials, exhibits)				

Captain Planet Learning Gardens Teacher Post-test

19. Comments:

APS Learning Garden Workshop Pre-Survey

***1. School:**

***2. District:**

***3. Grade level:**

- [ ] K
- [ ] 1st
- [ ] 2nd
- [ ] 3rd
- [ ] 4th
- [ ] 5th

Other (please specify)

4. Subject taught

- ○ Science
- ○ Math
- ○ Language Arts
- ○ Art
- ○ Social Studies

Other (please specify)

***5. How did you find out about the Learning Gardens program?**

- [ ] Another teacher/faculty member
- [ ] Webpage
- [ ] E-mail
- [ ] A principal

Other (please specify)

APS Learning Garden Workshop Pre-Survey

***6. Are you aware of the intended outcomes of the Learning Gardens program?**

- ☐ Yes
- ☐ Somewhat
- ☐ No

7. What do you expect to gain by participating in the Learning Gardens Program

8. For each of the following questions, please select the answer that best reflects your opinion of experience.

	Strongly agree	Agree	Disagree	Strongly disagree
I am interested in learning more about the Learning Gardens program.	○	○	○	○
I am looking forward to utilizing Learning Gardens program lesson plans and tool kit.	○	○	○	○
The Learning Gardens Program will help my students learn basic concepts across the curriculum.	○	○	○	○

***9. What do you think will be the greatest barrier(s) to teaching outside of the classroom in the Learning Gardens? (select all that apply)**

- ☐ Time constraints
- ☐ Managing the class in an outside environment
- ☐ Availability of resources and supplemental materials
- ☐ Lack of my own gardening knowledge/experience
- ☐ Safety concerns

Other (please specify)

***10. Do you currently teach lessons outside in a school garden or other outdoor learning environment?**

- ○ Yes
- ○ No

APS Learning Garden Workshop Pre-Survey

11. If yes, how frequently?

- Once a year
- 2-3 times per year
- 4-5 times per year
- More than 5 times per year

***12. Do you currently do any cooking with your class?**

- Yes
- No

13. If yes, how frequently?

- Once a year
- 2-3 times per year
- 4-5 times per year
- More than 5 times per year

***14. Do you teach about nutrition in your classroom?**

- Yes
- No

15. If yes, how frequently?

- Once a year
- 2-3 times per year
- 4-5 times per year
- More than 5 times per year

March 2014 Post-Training
Survey

APS Learning Garden Workshop Evaluation

1. Are you aware of the intended outcomes of the Learning Gardens Program?

- ○ Yes
- ○ Somewhat
- ○ No

2. What do you hope to accomplish by participating in the Learning Gardens program?

3. For each of the following questions, please select the answer that best reflects your opinion or experience:

	Disagree	Somewhat Disagree	Agree	Strongly Agree
The workshop increased my interest in the Learning Gardens program.	☐	☐	☐	☐
The training was geared toward the teacher's needs and interests.	☐	☐	☐	☐
The program takes into consideration the limitations and abilities of my school and students.	☐	☐	☐	☐
I am looking forward to utilizing Learning Gardens lesson plans and tool kit.	☐	☐	☐	☐
The Learning Gardens program will help my students learn basic concepts across the curriculum.	☐	☐	☐	☐

4. Organization

	Poor		Okay		Excellent
Was the workshop well-organized?	○	○	○	○	○
Opportunity to see gardens, outdoor learning areas?	○	○	○	○	○
Opportunity to make contacts, discuss, ask questions?	○	○	○	○	○
Logistivs and amenities? registration, food, meeting spaces	○	○	○	○	○

APS Learning Garden Workshop Evaluation

5. Program Value and Relevance

	Poor		Okay		Excellent
Was time commitment worthwhile?	○	○	○	○	○
Were topics and information relevant?	○	○	○	○	○
Did you learn some things you didn't already know?	○	○	○	○	○
Were resources useful? (lesson supply kits, cooking cart, DVD)	○	○	○	○	○

6. Presentations

	Poor		Okay		Excellent
Welcome and Introduction	○	○	○	○	○
Mobile Cooking Cart Demo	○	○	○	○	○
School Gardens 101	○	○	○	○	○
Recycling Presentation	○	○	○	○	○
Making Garden-Based Lessons Relevant	○	○	○	○	○
Tips and Tools for Teaching Outdoors	○	○	○	○	○
Closing Session	○	○	○	○	○

7. What was the most valuable part of this workshop?

8. What was the least valuable part of this workshop?

9. About You - Work

- ○ Teacher, public school
- ○ Teacher, private school
- ○ Teacher, pre-school
- ○ Work for non-profit
- ○ Work for government agency
- ○ Volunteer

APS Learning Garden Workshop Evaluation

10. Garden status

- School has an active garden
- School has abandoned garden
- Want to start a garden
- School has other outdoor learning stations

Other (please specify)

11. Outdoor teaching

- Did not teach outside last year
- Taught outside 1-2 times
- Taught outside 3+ times
- Plan to teach outdoors __ times per year (below)

Other (please specify)

12. Nutrition

	Never	1-3 times per year	1-4 times a semester	Monthly	Weekly
How often do you teach nutrition in your classroom?					
How often do you do food tastings in your classroom?					
How do you talk about healthy habits with your students?					

13. Knowledge:

- Did not know much about school gardens before today
- new a little about school gardens before today
- Knew a lot about school gardens before

14. Perceptions

- Feel unprepared to teach in the garden now
- Feel a little better prepared to teach in the garden
- Feel much better prepared to teach in the garden