Examining Children's Engagement

in an Urban School Garden Education Program

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Introduction

This honor's thesis aims to study school-aged children's engagement in a gardening-based nutrition education program, using tenets from political economy and health and social inequality. This research is embedded in a larger project that evaluates the effectiveness of the "15th Street Farm Nutrition Education Program" (NEP). The NEP is a two-year program funded by the USDA in association with the USF Center for the Advancement of Food Security and Healthy Communities (CAFSHC), the USF Metropolitan Food Project, , and 15th St. Farm in St Petersburg. The NEP seeks to provide a farm-based nutrition education program to children, families, and teachers, increase awareness about the local food system, and renovate school gardens. The communities where this NEP is implemented suffer from different levels of food insecurity and schools are developing programs to teach students the basics of gardening and nutrition to better provide them with tools for a holistic approach to wellness with the goal of combating obesity. The five sites are located in Pinellas County, FL. one elementary, two middle schools, and two after-school programs. Students were eligible for free and reduced lunch ranging from 30% and 99% of students depending on the school that they attend.

This research's goal is to identify factors that facilitate school-aged children's engagement in garden-based nutrition programs. I will examine if hands-on activities increase the motivation and engagement of children in gardening and healthy eating. As an applied anthropology project, this research will contribute to improving the NEP by identifying the attitudes of students towards interventions that aim at increasing healthy eating and its associated health outcomes Additionally, the project explores the socio-emotional effects of outdoor activities and socialization with peers, teachers, and the community.

The research questions are:

1. Are gardening activities enough to engage school-aged children and bring awareness about healthy food habits?
2. What would enhance children's engagement in school-based gardening projects and motivate them to try new types of vegetables?
3. What would motivate children to want to raise fruits and vegetables at home if the economic factor is an impediment?
4. Are hands-on gardening activities enough to engage school-aged children and improve their well-being and socialization?
5. What are the most effective approaches to providing information to school-age children about gardening and nutrition?

Background

Approximately 10,000 years ago, agriculture became the primary livelihood for almost 2.6 billion people worldwide (Convention of Biological Diversity, 2018[1]). The transition from hunter-gatherers to agriculture changed human life, health, and culture. A sedentary lifestyle had many effects on humankind, such as group expansion, stratification of labor, change of social organization, the formation of a political state, and administrative and economic structures coming into place, among others (Milner, 2023). Furthermore, the domestication of

[1] "2.6 Billion People Draw Their Livelihoods Mostly from Agriculture." Convention on Biological Diversity, November 26, 2018. https://www.cbd.int/article/biodiversityforfood-1

animals and crops brought major changes in diet; not getting enough diverse nutrients impacted negatively human health outcomes. Moreover, as the population grew having to feed more people required changes in the food system and distribution over time. Along with the economic impact of land distribution and labor, agriculture brought changes in power structures causing inequality among societies (Diamond, 1987). Wise (2015) reinforces the social impacts on the division of labor and ownership creating social inequalities and classism. He emphasizes power and policy have a direct impact on economic development and communities' access to goods and services that affect their quality of life and well-being.

Other scholars affirm that agriculture was the basis of modern civilization. With sedentarism, the population grew exponentially, and major social changes such as the creation of states and modern civilization to the Industrial Revolution would not have been possible without transitioning to agricultural societies. (Milner, 2023)

All these changes brought about marked economic and social inequalities that contributed to large-scale issues such as food insecurity (see discussion below).

Theoretical approach

The theoretical foundation of this research uses a socio-political inequality approach to analyze food insecurity, nutritional accessibility, and experiential learning in the analysis of children's engagement. Deeply rooted in the foundation of the United States is a history of settler colonialism. Originating with the appropriation of Native American land by European settlers, inequalities have long proceeded from the 1600s until today. Political and social institutions compete for finite resources on how they are distributed and their interactions.

According to the Encyclopedia Britannica, a “state must possess a permanent population, a defined territory, a government, and the capacity to conduct international relations”. As well as states, societies develop structures, policies, and rules to regulate the population’s behavior. Although these structures facilitate the coexistence of individuals, they give power and privileges to those in charge. As stated by Foucault, in Mitchell, (1999) “ … the powers of government… with increases in agricultural production, demographic changes, and an increasing supply of money emerge the new powers of government” (87).

Political Economy

The political-economic approach as quoted by Baer, “observes the analysis of forces that determine the shape and nature of our societies “examines health disparities and inequities as the result of the unequal distribution of resources resulting from capitalism and the mode of production, such as natural resources, income, education, and health care, among others. Baer (1982). Exploring the complexities of governance and power, Wise (2015) alleges that among the main causes of poverty are, low-wage salaries that determine the place people can afford to live, along with restraining the quality of education, limiting the type of jobs they will qualify for. Correspondingly, delinquency and drugs are common in neighborhoods where parents have to take two and, in some cases, three jobs, and children are by themselves without any adult supervision.

Moreover, structural barriers and environmental injustice intersect with poverty, food insecurity, and adverse health outcomes. According to NIH (National Institute on Minority Health and Health Disparities) in 2020, almost 15% of U.S households were considered food

insecure, and 35.3% of households with incomes below the federal poverty line being food insecure[2]. Given these high percentages, it seems that policymakers are not adequately addressing nutrition and food insecurity by. According to Oltersdorf (2003), policymakers assume that food decisions are made exclusively based on personal and cultural preferences, without taking into account any other factors, such as economic and social influences. He asserts that most of the nutrition programs of the past century were based on such understanding and proved to be unsuccessful. The author emphasizes that in addition to disparities in the food system, nutritional recommendations and policies were pertinent in times of crisis like wars. Oltersdorf (2003) argues that political structures are not set to find solutions for root causes, it is imperative to overcome key challenges. For instance, nutrition is "homeless" in governmental structures, adding that nutritionists do not regulate the policy process and do not have the power to set priorities. A genuine commitment from different stakeholders is needed to achieve solutions to root causes.

Food Insecurity

Social inequality has various impacts on society, poverty and food insecurity are two of them. For centuries, governments have tried to guarantee the quantity and quality of food for their population. Although international organizations such as the World Health Organization have dietary goals and policies (Oltersdorf,2003), food insecurity is a social issue has remained unsolved. According to Feeding America, 44 million people (about twice the population of New

[2] "Food Accessibility, Insecurity and Health Outcomes," National Institute of Minority Health and Health Disparities, 2021, https://www.nimhd.nih.gov/resources/understanding-health-disparities/food-accessibility-insecurity-and-health-outcomes.html.

York) were food insecure, and 13 million of them were children in 2022. The United Nations defines food security as “people having at all times, physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life.” Himmelgreen et al. (2020,2) describes the four dimensions used to measure food insecurity: availability, access, utilization, and stability.

- Availability is related to food supply in quantity and quality and depends on the system of food production, storage, and food assistance.
- Access is the ability to obtain food in a household. It is dependent on income, household production, market capacity, and the food supply chain.
- Utilization is influenced by the feeding practices consumption of food and the impact it has on health. Additionally, utilization is related to food quality, quantity, and safety, access to health care, sanitation, and clean water.
- Stability is determined by the interaction of Availability, Access, and Utilization. Stability is dependent on seasonality, environmental and ecological factors, political and economic factors. Instability in one or more of these dimensions increases the probability of food insecurity (Himmelgreen et al.,2020,2).

Low-income households are most likely to have less access to healthy or nutritious dense food that meets their biological needs leading to malnutrition (Himmelgreen et al., 2020) According to WHO, there are multiple forms of malnutrition such as undernutrition including wasting or stunting, and inadequate intake of vitamins and minerals. Additionally, higher consumption of carbohydrates, refined sugars, and highly processed food increases the risk for chronic diseases such as cardiovascular diseases, obesity, and diabetes among others.

According to Food & Research Action Center[3], there is a high correlation between food-insecure populations and reduced life expectancy, with as much as a 4.5%-year gap at birth comparing countries from higher to lower socioeconomic ranking. In addition to having chronic diseases, poor people have higher expenses in health care and frequently must choose between "eat or treat" (2017,2). Moreover, cognitive development and social skills in children are directly related to nutrition and food insecurity. Children who grow up in poverty experience traumatic experiences, and consequently continuous and toxic stress, interfering with brain and mental development (Food & Research Action Center,2017). As stated by Jyoti, et al. (2005) food insecurity was associated with lower academic scores, lower academic performance, absenteeism, tardiness, visits to a psychologist, anxiety, aggression, and difficulty interacting with peers. Also, food-insecure households do not have access to diverse and nutritious food regularly, and in addition to changes in habits of physical activities obesity is considered an epidemic in younger children along with diabetes (Jared, 1987).

The report of 2020 –2021 from the National Survey of Children's Health (NSCH), cited by Williams and Burns (2023), indicates that 17% of children ages 10-17 in the U.S. have obesity. The statistics on children and adults on Medicare by BFF report "Over one-quarter (26.0%) of Medicaid children have obesity compared with 11.4% of children with private insurance alone" (Williams & Burns,2023). Food insecurity coupled with obesity is categorized as one side of the double burden of undernutrition and household insecurity (Gubert et al. 2016).

[3] "Hunger & Health: The Impact of Poverty, Food Insecurity, ..." Food Research and Action Center, December 17, 2017. https://frac.org/wp-content/uploads/hunger-health-impact-poverty-food-insecurity-health-well-being.pdf.

It is pertinent to acknowledge the social dimension of food because school-aged children depend entirely on household income, food traditions, and resources for nutrition and food intake. As Mintz and Du Bois state, ethnographers have identified numerous ways to study how humans connect food to rituals, symbols, and belief systems. Through food relationships can be reaffirmed or transformed (2002). Furthermore, children can influence their immediate social group and family with their experience and knowledge in gardening, maybe even taking some vegetables or seeds home (Allen et al,2008). Social practices are learned by children through the repetition of patterns and practices validated by social structures and culture becoming part of the individual's identity. Individuals are affected by relations of power, culture, and context but individuals also have agency (Worthman, et al. 2023). The interaction between the individual and society is important because it sheds light to the sociocultural component of food insecurity that implies that availability is insufficient for balanced and nutritious diets; reinforcing the fact that community involvement is necessary for the success of nutrition and garden-based programs (Allen et al. 2008).

Gardening and learning new nutrition patterns are strategies to combat social and structural constraints and contribute to addressing the challenges mentioned above by improving accessibility and availability of dense and nutritious foods (Allen et al. 2008). Probably gardening lessons may not have an immediate impact on nutritional habits, but the concepts and experience gained will become tools and assets for the students that can help them alleviate economic pressure in the future. Moreover, children could help transform beliefs and behaviors within the family and community.

Experiential Learning

Gardening has shown to be beneficial in many ways, although there has not been a study with sufficient data to demonstrate direct correlation between gardening activity and increased vegetable intake. Nury, et al. (2017) conclude that Children enjoy hands-on activities and join them at the beginning for fun, and “young students prefer a hands-on inquiry-based learning approach over traditional textbook based methods and developed more positive attitudes towards schooling and science as a result (8) ... children expressed enjoyment of the outdoor gardening portion of the programme as it enabled them to be physically active and independently nurture their gardens(1)” (Nury, et al. 2017). Gardening activities are mentioned as directly tied to the motivation and participation of the children involved in the research. (Nury, et al. 2017). Other authors mention the motivation to participate in gardening and hands-on activities to affect and improve children’s well-being, Malberg and Wistoft (2018) conducted a study cited by Lohr et al. (2021) in five different settings of the Gardens for Bellies Danish school garden program in Denmark, including both rural and urban locations. The evaluation of the program showed positive effects on the children's willingness to taste and eat vegetables and fruits. Additionally, Malberg and Wistoft (2018) mentioned in their findings that "gardens contribute to emotional well-being, self-esteem, and interpersonal relationships, giving the students agency in and out of the classroom setting" (pg. 1177). Aside from all proven benefits of including children in gardening school programs, the authors introduce a concept of utmost relevance: agency. Agency is related to the interaction between power structures and individuals and is defined as how “different actors manage and interpret their surrounding environment” (Manuel Navarrete and Buzinde, 2009, 6). The concept of agency is expanded by

examining the interconnectedness of physical realities, social constructs, and political influences. Manuel, Navarrete and Buzinde refer to this interconnectedness as socio-ecological agency, which is made possible through the process of reflexivity. This process helps in creating meaning for individual and social experiences within the environment. (2009).

Furthermore, gaining practical experience in gardening through hands-on activities, is an effective way to foster independence, pride, and satisfaction in children. This complements the structured learning that takes place in the classroom (Lancey, 2016). Experiential Learning is rooted in a constructivist perspective and it involves the process of making sense of one's surroundings. As cited by Roberts (2006), Dewey first defined experiential learning as "the process by which people learn from observations of their experiences" (Roberts, 2006,19). The process starts with "individual observation of the initial experience, followed by reflective thought ... and conceptualization to formulate generalizations" (Roberts, 2006, 19). Following this process in hands-on gardening lessons allows children to engage in the entire learning process. They can then be encouraged to expand and generalize their knowledge and experiences in different settings. This approach aims to empower children to create positive changes in their environment through socio-ecological agency, and attain the benefits of improve nutrition and wellness.

Synthesis of Literature Review

Factors that prevent people from accessing adequate food

Unfortunately, the modern lifestyles of a high percentage of working families do not provide the sources or means to give a balanced diet to the children and adults of the

household (Himmelgreen and Romero-Daza, 2009). To address this social problem, nutritional garden-based programs are being developed to bring awareness to nutritional needs and through gardening lessons bring context to agriculture, nutrition, and wellness (Allen et al,2008). Reviewed research suggests that nutrition and garden-based learning have positive outcomes in academics and other areas of the student's life such as a better understanding of the scientific method and improved observation skills among others (Williams & Dixon, 2013).

Benefits of neighborhood-based Community gardens for youth development and nutrition

Ober and colleagues (2008) conducted a qualitative study in two neighborhood-based community gardens with youth programs., The aim was to initiate and maintain garden and beautification projects, provide stipends for youth mentors, and organize other youth-oriented activities. Both gardens were established to reduce dumping and other crimes in the community. The adults leading the programs at the two community gardens perceived that youth engagement in the gardens resulted in less frequent involvement in trouble. Additionally, the community gardens fostered a sense of pride and belonging by enhancing the spaces, uniting the community with a common goal, and strengthening relationships. The gardeners reported that youth working in the gardens "promoted responsibility, hard work, and delayed gratification" Ober et al. (2008, 429). The study demonstrated that participating in garden activities led to improvements in nutrition of the people involved, they affirm that "Households who participated in community gardening have been shown to eat fruit and vegetables more frequently than members of nonparticipating households" (Ober et al. 2008,433)

Motivation from the Psychological Anthropological Perspectives

The concepts of motivation, attitude, and human action are understood as the interaction of events and the interpretations that people make of these experiences in their psyche based on ideologies, symbols, and cultural paradigms (D'Andrade and Strauss, 1992). The individual perceptions and motivations that drive people to behave in a certain way are not yet fully understood. However, some can be explained by associations between cognitive elements and the individual's belief system. This is known as the process of internalizing "what" and "how" information is organized (D'Andrade and Strauss, 1992). When it comes to learning activities in which it is necessary to understand and retain knowledge, individual concepts or experiences are taken to a level of generalization (D'Andrade and Strauss, 1992). For this research, such perspective would be useful as it complements experiential learning in practical activities in the garden setting.

The Maturity Continuum

Stephen Covey, author of “The 7 Habits of Highly Effective People” (2013) understands the process of maturity as a continuum beginning in the first years of an infant's life when they are completely dependent upon the adult caregiver for their survival. As they grow up and they enter childhood, children gain certain levels of physical, emotional, and cognitive independence. They are not reliant on others to take care of their physical needs, they can make their own decisions, contributing to building self-confidence. The independence stage is followed by the interdependent phase Independence is the paradigm of I, … Interdependence is the paradigm of we… Interdependent people combine their own efforts with the efforts of

others to achieve their greatest success" (Covey, 2020, 60). As Covey emphasizes, life is interdependent by nature, humans and society need to rely on it, because is "where the individual recognizes the power of working with others to achieve more than what's possible alone" (Covey, 2013,61).

For this research, the maturity continuum was applied on the participant observation, as a key factor to measure the children's experience in the gardening lessons, as well as to measure the learning curve of participants' concepts and systems. Another key element of the observation was the participants' will to share and collaborate with their peers, which made it possible to identify whether they had reached the interdependence stage of development and had realized the benefits of teamwork.

To effectively address food insecurity, it is important to take a comprehensive approach that involves advocating for policymakers to address and improve key factors contributing to the issue. This can be done by increasing access to affordable and nutritious food, supporting local food systems, and ensuring that educational programs on nutrition and gardening are widely available. Additionally, it is crucial to involve the community and consider the sociocultural aspects so that the programs can positively impact the cognitive and emotional development of children and adults, enhancing self-awareness and promoting sociocultural agency, ultimately fostering the development of a culture of interdependence and collaboration.

Methods

Overview

This research was embedded in a larger project -the 15th Street Nutrition Education Program (NEP) The NEP seeks to provide a farm-based nutrition education program to children, families, and teachers; increase awareness about the local food system; and renovate school gardens.

The NEP is a two-year program funded by the USDA and implemented by the 15th Street Farm in association with the USF Center for the Advancement of Food Security and Healthy Communities, the USF Metropolitan food project. The NEP has three main objectives: educate students in partnering schools on gardening and environmentally friendly agriculture practices through a designed curriculum. Help and allow the schools to build or reconstruct their school gardens with expert assessment. Finally, educate communities on the food-growing ecosystem and healthy eating. Additional to the participating schools 15th St Farm is an Urban farm and a food center in downtown St. Petersburg. (Roa, 2023).

Curriculum and lessons

The NEP gardening and nutrition education program in one of the participating schools was a six-month enrichment class, from August to December, and from January to June, so two different groups of students participated in the program in one school year, while in the other schools, it was offered throughout the school year. In the schools, the gardening lessons and nutritional content were taught during school hours, as opposed to the after-school programs, where the NEP lessons were an extracurricular activity, with students coming to the center

after school hours. Each lesson was taught by an NEP gardening instructor and a teacher from the school/center was present for the gardening lessons. The structure of each lesson was divided into three parts: the first part when the instructor introduced the topic and asked the students to answer questions about it to measure their knowledge of the specific topic, followed by the instructor explaining the concepts, in some cases with the help of different resources, such as visual aids, mostly posters, printed handbooks, or the computer. In some lessons, an experiment was conducted to explain certain concepts, and some of them included observations over several weeks. In other lessons, children participated in tasting activities and contests between groups to encourage engagement and learning. In the second part of the lesson, the instructor included hands-on activities in the garden. For these activities, students were divided into sub-groups to do regular tasks such as weeding and watering, while planting and harvesting was done depending on the instructor's plan and filling in the beds or when the plants were ready to harvest. The third part of the lesson was a general meeting where the students were asked to review the activities that were done during the lesson, answering questions from the topic studied to assess and evaluate how much they had learned.

The curriculum was organized into four main topics divided into chapters: Soil, compost, seeds, and plants. Each part had specific goals to be achieved, important vocabulary to be covered, an introduction to the topic with key concepts, and resources for the instructors based on links to webpages for content and activities for the classes. The next part comprised the questions and answers about the topic, starting with basic knowledge and the easiest questions for the younger students followed by the more advanced and in-depth understanding of the topic. This section was carefully defined and revised by Emmanuel Roux the Master gardener

and educator of 15th St Farm. Lastly, there were some experiments and suggested activities to reinforce learning the concepts.

My research goals were twofold: 1. to understand children's perspectives and experiences in the program and 2. to measure the effectiveness of an urban-based garden and nutritional education program after the first six months of operation. To achieve these goals, I sought to identify the factors that help engage school aged children in Garden based Nutritional Programs and change their nutritional habits. The results of this research will help fill the gap on the long-term evaluation of urban-based gardens and nutritional education programs in general, and specifically on those that involve children. (Williams & Dixon, 2013).

As an applied outcome, I was involved in the development of a curriculum with didactic, learning through play and age-based suggested activities to improve the learning process (Rosi, et al. 2016).

Methods

Data for this study were obtained through the triangulation of quantitative and qualitative methods including systematic observations of the neighborhood where participating schools are located, participant observation of NEP activities, and -semi- structured interviews.

In-depth Semi-structured interviews

A targeted sample of two NEP instructors, one schoolteacher, and one school principal agreed to participate in the research and in an individual interview. The interview was an open conversation about their opinion, feedback and suggestions about the program and what could

be improved. The interviews with the instructors were conducted at the garden site. Those of the teacher and the school director were in the classroom and in the director's office, respectively. Regarding the duration of the interviews averaged one hour. However, the director's interview lasted twenty minutes due to his busy schedule.

Qualitative data recorded from the interviews were analyzed by listening to the audio recordings, identifying overall themes, and comparing the occurrence of themes across participants.

Participant observation

Most of the data for this thesis were collected through systematic observations of the day-to-day activities performed as part of the NEP. During the lessons, I observed behaviors previously defined as the reflection of engagement in gardening activities. The interactions between the students and the instructor/teacher were observed also. Behaviors such as participation, asking and answering questions, following instructions, discipline, and willingness to collaborate, were registered in the fieldnotes and used to rate children's engagement. All observations were used as qualitative data.

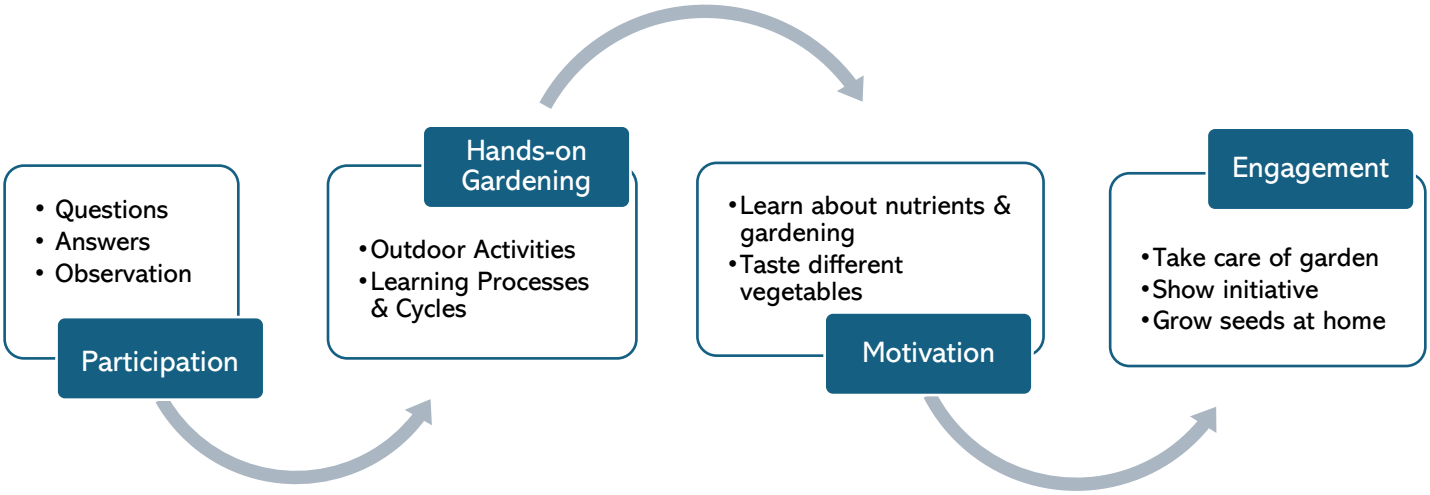
Participant observation notes were also analyzed identifying common behaviors about the instructor/teacher, topic, and activities performed. The information was used to address changes to the curriculum, and or activities, and to inform further research.

Figure 1 below provides a visual representation of the way in which I assessed student engagement. For this research, engagement in gardening classes was understood as a continuum, beginning with participation in the question-and-answer sessions and hands–on

activities, followed by learning cycles and concepts to reach the motivation phase which allowed the students to take care of the garden and do the required activities with some kind of independence. Finally, the engagement phase, where students learn the basics of gardening, soil, plants, and harvesting, and understand food cycles and the interaction of the elements. The expected outcome would be that they would be able to plant seeds and grow some on their own at home.

Figure 1

Measure of Engagement



Design by Marcela Munoz M.

Pre and Post Tests

Quantitative data collection was done through pre- and post- test designed for school age children and based on USDA dietary assessments. At the beginning of the class semester, the children were administered two pre-tests one pertaining to their gardening knowledge and experience, and the other concerning their nutritional and dietary knowledge and habits. Both

the garden and nutrition and diet surveys were administered as post-tests at the end of the semester.

Observation of school neighborhood

Observation of the neighborhood and area of two of the sites of this research were conducted as a way of identifying aspects of the community in which the program is physically embedded. Houses, sidewalks, front yards, lawn maintenance, and parking spaces were recorded. In addition, I observed the accessibility of convenience and grocery stores, as well as other public and health services such as pharmacy, parks, health centers and resources that have a direct impact on the wellbeing of the population in the area.

Results

The results presented below are based on neighborhood characteristics, participant observation of the NEP educational activities, interviews conducted with personnel involved in the program, and pre and post-test surveys completed by the students.

This research and the NEP program were conducted in St. Petersburg, Florida, with five participating schools. These included one private middle school, one charter elementary middle school, one public elementary school, and two after-school programs. The observations took place during Fall 2022 and Spring 2023. In addition, some of the gardening lessons were observed at the 15th Street Farm, which are reported here. It is important to point out that in 2010, the 15th Street Farm "was transformed into a therapeutic garden to provide fresh, nutrient-rich food to residents" [4]. In 2016 the farm became a non-profit educational urban farm.

In 2023, 15th St Farm became "15th St EcoFarm" with the addition of a commercial kitchen and event space." [4] The farm is located in downtown St. Petersburg and serves the community by providing fresh vegetables and nutrition education programs and will soon offer cooking classes and events. It offers tours "where residents go to reconnect with nature, to discover the true taste of organically grown food." [4] As stated by its founder Emmanuel Roux, "A farm is a community asset. It is a place where people come and work on the farm, but also socialize. It also has a therapeutic effect. It has many benefits," Its main purpose is "to teach agricultural science and improve the nutritional health of students, parents, and teachers living/working in lower-income communities that have food deserts [4] . In addition to the educational activities, the program provides both human resources and monetary support to build several school gardens where hands-on activities take place[5]

Research Site

I. Neighborhood characteristics for site A and C

When observing the landscape of south St. Petersburg (Florida) nowadays, certain characteristics depict inequalities in the area around two of the sites studied in this research. For instance, sidewalks near schools are small or nonexistent and most homes have no driveways, giving the impression of low-income households. Likewise, some homes have front yards, some with unmowed grass and no fences, and in some of them, unused objects are accumulated on the sides.

[4] "About Us," 15th Street Farm, accessed 2024, https://www.15thstfarm.com/about-the-farm.
[5] University of South Florida, "Research," Overview | Research | USF CAFSHC, accessed 2024, https://www.usf.edu/arts-sciences/centers/cafshc/research/index.aspx.

In this area there is a plaza with an empty grocery store and only 3 open businesses. A cell phone service center, a beauty supply store, and a Chinese food restaurant. According to news reports, the Sweetbay supermarket served for a brief period, but after closing its doors, it reopened as Walmart, and in 2017 it closed, and since they closed, the food needs of the area have yet to be met by any supermarket chain.[6]

Besides four corner stores in the area with "market" signs with men gathered at the entrance, there is a Dollar General with refrigerators with frozen food and no other available places to buy any type of food. There are no parks other than the green areas of the schools, however, there is one pharmacy, one "Senior Medical Center", seven churches, and one cemetery. Surprisingly there are no liquor stores other than the great variety offered in the Dollar General, and in a short distance there are four beauty supplies. As the observation occurred around the middle of the day, elderly people were on the porches or entrances of their homes.

At another point farther away from the schools, the neighborhood includes green spaces and parks, with larger homes with large front yards with fences, decorated with plants and manicured lawns, expensive cars parked outside, and wide sidewalks, characteristic of middle-class homes. Compared with the previous location, at the time no people were seen outside their residences. Two grocery stores are located near this area, along the avenue leading to the main highway, almost two miles from the low-income homes, and in addition to the supermarkets, there is a YMCA, fast food outlets, and two gas stations.

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[6] Waveney Ann Moore, "There's a Food Desert in St. Petersburg. It's Not Imaginary.," *Tampa Bay Times*, November 1, 2019, sec. News, https://www.tampabay.com/news/st-petersburg/2019/11/01/theres-a-food-desert-in-st-petersburg-its-not-imaginary/.

From these observations of the area, it can be inferred that one of the two areas has greater economic constraints, with limited walking access to convenience stores and no supermarkets in the area, only accessible by car. Although it cannot be classified as a food desert, it hinders the quality of life and the possibility of obtaining healthy food. This physical description evidence how economic factors are determinants of food accessibility and availability for low-income households.

II. School Sites

The following section includes a brief description of each center's school philosophy statement (taken from the center's website), as well as a general overview of the physical infrastructure of the garden and the center, in addition to the characteristics of each center according to GreatSchools reviews and rankings within the state of Florida. (See Table 1). For the after-school programs, there are no GreatSchools.com reviews or ratings available.

Table 1 School Ratings and Demographics

Site	**School**	**Type**	**School ranking**	**Student's**			**#Students per teacher (ratio)**
				Population	Ethnicity	Gender	
A	Middle school	Private non-profit	among the top 20% of private schools in Florida	129 Minority group# 99.2%	97.7% African American	54% female, 46% male	11:1.
B	After school	N/A	N/A	N/A	N/A	N/A	N/A

Table 1 School Ratings and Demographics, cont.

Site	School	Type	School ranking	Student's			#Student per teacher (ratio)
				Population	Ethnicity	Gender	
C	K – 8	Charter school Offers gifted program	#717 in Florida	365 30% qualify for Free or reduced lunch	69% white, 12.9% Hispanic Latino 7.9% Asian 4.9% African American.	53% female 47% male	17:1
D	Elementary K-5th	Public Offers gifted and Magnet programs	#455 in Florida	740	42.3% white, 28.4% African American, and 11.9% Latino.	42% female and 58%male	14:1
E	After School	N/A	N/A	N/A	N/A	N/A	N/A

Site A is a private, non-profit high school oriented to "students who qualify for need-based scholarships, with rigorous academic and enrichment programs to develop future leaders in the community. These programs are combined with graduate support to facilitate scholarships through high school, college, and into their careers." (School's website).

The main entrance has a gate with an intercom system that gives access to a one-story square building surrounded by hallways to classrooms with a few benches and lockers. There is a large field in the back of the school where children can play sports during recess. The garden is located to the right side of the main entrance and there is a small parking lot in front of the building with appropriate signage and a flower-decorated bridge. Both the administration and

the director's office are located in the main office, with two reception desks. The door remains open for students and visitors, and they are equipped with an electronic keypad for visitors and employees to sign in. As for the office and furnishings, they are in good condition and well decorated.

Site B offers the after-school program as a family service center that "was founded on land donated by the Catholic Diocese with the active participation of community members, private donations and coalition with many organizations." The community center with after-school activities, and other services provides educational enrichment programs, homework help, and tutoring for children aged 6 to 14" (Center's website). This center shares its name with a K-8 International Baccalaureate (IB) school, which is a Magnet School of Choice. Unfortunately, no further reports or demographics of the center are available or known, other than the fact that it was created to serve the African American population. There are no security guards when entering the parking lot, which serves more than 30 cars. The facility has a reception office and a reception desk with a glass partition; however, no registration is required. Enrichment activities take place in a large classroom and the garden is in the back, though it uses only the right side of the area. The school has a spacious classroom which includes a stage and a round table.

Site C is a K-8 charter school that "adopted a family-centered approach, where teachers, students, parents, and the community form a tight-knit alliance. The school emphasizes foreign language immersion and appreciation of a specific foreign culture with celebrations typical of the culture. It offers enrichment and after-school care programs" (School's website). The entrance to the school is a fairly large parking lot with space for more than 30 cars and is not

gated. There is a traffic circle for dropping off children and one of the gardens is located in the center of this area. Next is the main office which has a doorbell with a custodian on site, and the reception desk is in the center leading to the hallways of the classrooms and administrative offices. All visitors must register by presenting their driver's license to be scanned and a sticker is printed. Outside the office, there are tables for outdoor classes and a large field for sports and outdoor activities. The other designated space for two garden beds near the gifted program's classroom is to the right of the parking lot.

Site D is an elementary public school from kindergarten through 5th grade, located in a suburban setting with approximately 740 students. It offers gifted, magnet, and character education programs and a schoolwide enrichment model. Their education model is focused on "cultivating students' leadership, service, scholarship, innovation, and citizenship" (School's website). The school complex has a reception office and outdoor walkways, which have no plants or other decorations. The garden is at the end of a hallway, to the left side of the entrance, in an open space.

Site E is 15th St Farm, a half-acre farm in downtown St. Petersburg. This site is visited by a group of hearing-impaired teenagers once a week, as part of their after-school program. There is no demographic data or information available on this center or the program.
The place has a wooden entrance with no security. There are fruit trees and vegetables planted on the ground and a shed to store materials and tools. Next to it, there is a covered tent with some wooden tables that serve as a greenhouse for growing seedlings and aromatic herbs. To the right, a community restaurant is being built.

III. Sample

This research project included a selected sample of approximately 64 school-age students from the five schools described above that participated in the NEP. In each school, the number of students per class ranged from two to twenty and the gender also varied, but in most cases was balanced between boys and girls. The number of students also was variable from site to site. In Site A, all students were in the 5th grade, and 90% were of African American ethnicity, ranging in age from 10 to 12 years, with a typical class size of six to twelve students. Some students reported that their parents had been involved in community gardens. In Site B, the number of students ranged from ten to twenty children in all grades, as it was an after-school program. They were of mixed ethnicity, but predominantly white, and ranged in age from seven to eleven years old.

In Site C, the gardening classes were taught only to 4th and 5th graders from the gifted program, with the number of students ranging from six to nine. Their ethnicity was white and at least one of them came from a European country, where the parents had a farm, and some others had been involved in community gardens. This group of gifted children had a specific teacher for the regular program for a block of hours every day, and the gardening classes were taught as part of that block, twice a week. The teacher explained that the program was offered only to this group of students due to a logistics matter, given the size of the other student groups. Site D consisted of a group of approximately fifteen children of about 10 years of age from 3rd grade with varied ethnicities. For Site E, the group consisted of adolescent girls accompanied by female teachers. The number of students varied from two to six and they were offered the possibility of attending every week.

IV. Garden setting

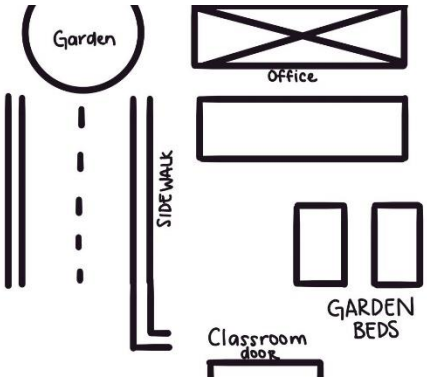
Site A garden has 14 raised beds and a wooden pavilion with four picnic wooden tables with

benches where the garden classes take place. There are fruit trees along the borders of the garden, a shed on one side to keep gardening materials and tools, and at the back, soil and compost are stored. On one side, the garden overlooks the street, and on the other, a field for the children to practice sports. It is important to mention that center B of the after-school program is at the back of the school, separated by a fence.

The garden at **site B** is a rectangular field, with a water system installed, and although it does not have raised beds, it has enough space to plant fruit trees and vegetables on the sides. The garden is surrounded by a fence that adjoins site A, and there is still plenty of room to plant more if desired. Gardening classes are held both inside and outside the classroom, however, there is no dedicated shed for storing materials. Most outdoor experiments and activities are conducted on a concrete surface immediately outside the classroom.

Site C has two designated garden spaces and one of them is in the center of the loop at the

entrance to the main school office. It is a roundabout, and the plants and trees are distributed around a circle. Inside the circle, there are concrete benches, and in the center a space decorated with gravel where classes are held. The other area for the vegetable garden is located to the right of the parking lot at the entrance of the gifted program classroom and has two wood beds. Although it has a water system, the school installed a hose to reach both gardens as the water system needs to be upgraded due to low water pressure.



The garden at Site D is an open space at the left border of the school. Two

wooden beds are built, and there are no tables or any space to sit down. A portable box serves to store materials and tools. The garden has the form of a rectangle and in the back, there is also space to plant fruit trees. Since the garden does not have any designated borders, the instructor in charge usually brings portable fences to decorate and give the students the sense of entering the garden space.

Site E 15th St Farm as described above, is a half an acre space dedicated to growing organic fruits, vegetables, and edible flowers in downtown St. Petersburg

V. Educational/Disciplinary Approach

The following section is an analysis of the disciplinary approached at each stie, based on observations of the interactions between the children and the instructor, the role of the teacher during the gardening lessons, and the relationship and interactions among the students.

Site A is a small private school that was funded by donors. Their academic model states that they "wish to provide rigorous and focused education and develop critical thinking and problem solving to be successful students and become invested in their learning." The school values and reinforces discipline and as part of the discipline style, students have to wear uniforms. However, the students did not have to walk in line to go to the garden, instead, they came as a group. It was frequent to see the teachers talking to the children sitting down and talking with familiarity. It is also worth noting that there were two seats at the reception desk and the children could sit there; also, when students arrived at the office, the office assistant knew their names. The children had time to play and run around during recess and had the chance to participate in sport activities. In garden classes, they were allowed to go to drink

water when they asked for it. Only when the children asked to go repeatedly did the teacher refuse to let them go, but this happened only a few times.

An example of the school's disciplinary approach was evidenced by the decisions that were made with the misbehavior of four children during gardening classes and the results that followed. The director firmly and assertively reprimanded them by stressing how fortunate they were to be part of the program and had them say out loud the core values of the school that all the children knew by heart. The four children were suspended from the gardening program for not following instructions, not doing assigned activities, and being disrespectful to the instructor. As a result, the school decided to remove the students from enrichment activities and had them do school assignments during the gardening class time. The students wrote a letter of apology to the instructor recognizing their misbehavior, and one of them asked to see the principal. Although he was granted the opportunity to speak, he was not accepted back in the gardening classes. After a month of being suspended, the students were reincorporated into the program, and their attitude and appreciation were evident in their excellent behavior.

The situation and the way it was handled suggest that the school's philosophy promotes independence, self-management, and the skills to take responsibility for their actions. The students had the opportunity to learn from their experience, not only that actions have consequences, but also that there are second chances, as long as there is reflection and commitment.

Another important fact that was observed during gardening classes, when the teacher had to get the students' attention, he always spoke to them in a very firm but respectful

manner. He did not raise his voice. He helped to form the teams whenever necessary, and the students respected his decisions.

Site B seemed to have a more traditional disciplinary approach. More than one teacher came to the gardening classes and merely observed the classes, only following up with the instructor and taking notes. They did not help in any way to engage the children in gardening activities. Because it was an after-school program, the discipline and enforcement of rules were not as strict as in a classroom and the children were allowed to behave in a more relaxed manner.

Site C is a charter school and there are no tuition fees. However, there are charges for after-school activities, as well as before and aftercare programs. The school philosophy affirms the importance of individual needs and of offering special accommodations as needed. As an example, once one student who seemed upset, and unwilling to participate in any of the activities, the teacher was empathetic, talked to him on the side and gave him some time. The student decided not to participate, but he was allowed to stay, and the student's decision was respected. Students wore uniforms, but on several occasions, one student did not. Students would line up to enter the front office and garden, and there was some familiarity in the interaction between staff and students. Students greeted outside staff when they entered the office even if they had never seen them before. As mentioned above, only the gifted students participated in the NEP.

Site D seemed to have a conventional and strict education system. Children lined up to enter the gardening class and were repeatedly asked to listen with a loud tone of voice. On one occasion, a few teachers were observing the gardening class and started chatting among

themselves and also some of the students, to the point where the lack of discipline became unmanageable for the instructor, who shouted at the class and even threatened to remove the students from the garden. The children were not given time to run or play, and were only given one ten-minute recess a day, so it was difficult to keep them focused, quiet and/or paying attention to the instructor during class. One teacher explained that the school had eliminated recess and other play activities to improve the school's rating. According to greatschools.com, the school's grade on equity was 3/10, which explained that "underserved students at this school may be falling behind other students in the state, and this school may have significant achievement gaps." The Percentage test scores for low-income and underserved students was 35% as compared to 94% for all other students.

Site E was an after-school program and the students who attended the garden were hearing impaired teenagers. The teachers who accompanied them were attentive and supportive of the learning experience. They encouraged their students to learn the topics and participate in the activities, but it seemed more like a personal initiative of the instructors than a directive from the center. The teachers encouraged the students to get the most out of the program, but always let them decide and participate as they pleased.

VI. Student's experience in the gardening lessons

In order to describe and measure children's engagement in gardening classes, I chose the following behaviors as indicators of engagement and level of motivation.; willingness to collaborate with the instructor in the activities; overall participation; sharing and competitive behaviors among students;; level of independence in repetitive activities; and, finally, general

level of discipline during gardening classes. Observations related to each of these items are presented separately for each site.

SITE A

Site A had the same number of boys and girls at the beginning of the semester, and in terms of their ages, they were already entering preadolescence, with the girls being slightly older and more mature than the boys. Another important site feature was that having a covered shed helped to avoid having to cancel class due to bad weather, which allowed the instructors to include experiments or contests. Students who seemed more committed to academics seemed to enjoy and participate in the contests. However, some students mentioned that while the contests were fun, they preferred the hands-on activities.
When assessing their willingness to collaborate with the instructor, I considered whether the students did not want to do an activity because they did not want to get dirty or whether they preferred to be in the shed claiming that it was too hot or too sunny.

i. Willingness to collaborate: Some of the girls did not complain about getting dirty, while others tried not to get dirty at all during the entire semester and preferred to stick to watering the plants and planting rather than harvesting or weeding. For example, when they had to remove leafy suckers from a tomato plant, one knowledgeable girl did it with her fingers covered with her sweater so as not to touch the plant. In contrast, some girls volunteered for the shoveling activities and were very invested and wanted to harvest themselves to take the produce home. In any case, by the end of the semester, none of the girls had a problem with any of the assigned activities, doing whatever it took to get it done.

To measure the level of involvement, attention to instructions was considered, since at the beginning of the semester the students carried out the activities with a very low level of specific detail and attention. However, as they were able to observe the effects of certain actions, such as the impact on seedling growth of planting the seeds at a certain distance from each other, they began to follow the instructions meticulously because they understood the reasons for each process.

ii. Participation: During the lessons, most of the students showed equal interest in the class and in the practical activities. Except for the contests, when not having their close friends in the group affected their engagement in the activities. As for participation in the questions and answers, one of the girls always wanted to participate, but it appears this was mostly because she wanted to get noticed rather than because she knew the answers to the questions asked. Furthermore, other girls sometimes knew the answers but, out of shyness, did not say them out loud. Whereas boys were more actively engaged in all the garden hands-on activities, some of them were less focused, and if they finished the activity ahead of time, they would begin to run or initiate push-up competitions or other games. On the other hand, once the girls were finished with their activities, they would just seat around the garden or in the shelter to talk. Gradually this behavior changed and at the end of the semester, both girls and boys would ask what else had to be done. One boy once asked the instructor *"What other important activity is there for me to do?".* As mentioned earlier, when the four boys were withdrawn from the gardening classes due to indiscipline, other students who sometimes complained changed their attitude and became more willing to participate in the activities. As they began to learn the routines and to know what to do, it

was remarkably interesting to observe that while they were doing practical activities, they began to talk about different topics, sharing information and getting to know each other. Sometimes they would reflect on the activities they were doing, for example, when harvesting sweet potatoes that have long roots, one of them said "If you want to harvest the sweet potato you have to follow the thread of life", meaning that you have to follow the root to find the sweet potato. Likewise, when the instructor was assigning gardening activities, they always wanted to participate in planting and watering. However, at the beginning of the semester weeding had to be assigned by the instructor and were not willingly accepted, at least not until the end of the semester. When the students understood the importance of that activity, they even volunteered to do it. Similarly, harvesting some produce required getting dirty and some girls preferred not to participate.

iii. Collaboration, sharing, and competence: As previously discussed, during the first part of the semester students in Site A tended not to share with each other unless their closest friends were in the group. This was particularly evident in in the context of harvesting sweet potatoes, which had to be dug deep by hand. The girls who did not want to harvest and get dirty, requested that their classmates, who had been harvesting all class, provide them some as a gift so they could take home. However, these requests were not accepted. As mentioned above, the students in the garden at site B could be observed from site A, and both had classes with the same instructor. On several occasions, the students at site A complained to the teacher because he had missed his class with them, but not the one at site B. Although they had been assigned another teacher, they openly expressed that they did not like that he was with the children from site B and not with those from site A. They

also made it clear that they did not want to share the produce with the students from site B. However, by the end of the semester, these students showed more willingness to share and collaborate, even with those who were not their closest friends. Another important aspect of engagement and learning was the level of Independence when doing repetitive activities. Once the students learned to do the practical activities and to size up the importance of doing them in a certain way, they did not have to focus so much on a single activity and began to have conversations and share information about themselves and opinions about different aspects of life, creating new relationships and bonds among themselves.

iv. Discipline: for the children, being in an open space with more freedom and where the rules and activities are not as strict as in a regular classroom can be a challenge at times. However, the teacher was very clear from the beginning about the importance of behaving respectfully and following instructions. He always intervened in an assertive and timely manner so that there was not much disruptive behavior. However, there were some moments when instructions were not followed and the teacher had to reprimand students, which led to making changes in the teams for the contests and it was even necessary to ask some of the kids to leave the gardening classes. . These events then led to the students being very well-behaved and disciplined in their activities towards the end of the semester.

SITE B

In Site B, As previously mentioned, this site is an afterschool program, which is evident by its distinctive characteristics, such as the group size and the age of the students enrolled in

the same class, and contrary to what could be expected, there was not much difference in understanding the concepts explained in the lessons. In contrast to other sites, the garden was big and there were plenty of edible flowers and leaves to taste. However, the lessons were shorter in the classroom due to the age difference.

i. Willingness to collaborate: Site B was one of the largest groups involved in the NEP, with up to twenty students. Despite the garden's larger size, there were not enough hands-on activities for all the children. However, they enjoyed running around and tasting flowers and vegetables. During the activities that required getting dirty, no one complained, and students always volunteered to do all the chores. However, when there were activities or experiments to be done in the garden, the students did not actively participate in them because there was no seating or shelter, only a cement slab and some students did not want to sit on the ground, so, instead, they would get up and go to the garden.

ii. Participation: As mentioned above, there were children of different ages. In the question-and-answer session in the beginning of the class all the students participated enthusiastically by asking and answering questions. However, it was not possible to delve too deeply into the topic. After the questions and answers, the NEP instructor took the children on a tour of the garden to observe and learn about vegetables and plants. The hands-on activities did not provide equal opportunities among all the children.. While some students were doing hands-on activities, others were tasting vegetables and flowers, or just running around enjoying to be outside.

iii. Collaboration, sharing, and competence: There were subgroups of close friends and different groups according to age, though the unwillingness to work with others was not

evident,. Compared to children at site A who sometimes refused to work with those they did not consider their friends, children at site B were willing to share responsibilities in carrying out the tasks even with the younger ones who always wanted to participate actively.

iv. Discipline: Since this site was an after-school program, the children did not have any strict behavior requirements. They were allowed to run and be wherever they wanted, and the teachers would not intervene. However, the NEP instructor organized the activities in such a way that students would be given a tour of the entire garden to allow all the children to see how the different plants were growing. Most of the time children paid attention, but the instructor was the one who tried to maintain order, the teachers did not intervene in helping with discipline.

SITE C

As described above, the garden in site C is divided into two spaces. The garden lessons began in the garden space near the gifted student's classroom and then continued in the rounded central loop. As mentioned before, sometimes the class was delivered to both 4th and 5th graders, and there were more boys than girls.

i. Willingness to collaborate: The students were always attentive and eager to collaborate and volunteered for all the activities. Since there were not enough activities for all of them, they would take turns in doing them. For example, they would say "We will water the plants here, and the other team can water the other garden". Also, contrary to what was seen in other sites, the girls did not complain about getting dirty, and they would sit down on the

ground if needed. Though the class was in the morning, students never mentioned anything about the heat. Additionally, when they finished their assigned activities, they would go and look at the plants, vegetables, or the other students' activities and reflect on what they were doing, asking questions, or just mentioning interesting facts.

ii. Participation: The Q&A section of the garden lesson sometimes took longer than the ten-minute set time due to the reflections and questions on the topics by the students, and there were cases where one question would lead to the other. In addition, at the end of the Q&A session, the students would reflect on the differences they observed in the plants and the impact they had on the produce. For example, students would talk about the impact that having butterflies and bees as pollinators would have on the garden or discuss what to do to transplant new banana trees that had sprung from the main banana tree. Participation was balanced among all of the students. Although there was one boy who had more experience in gardening because his parents had a farm before living in the US, the other students participated as well; they asked questions and tried to correlate their knowledge with the things they observed in the garden.

iii. Collaboration, sharing, and competence: When the tasks were going to be assigned the older students volunteered in teams, as mentioned before. When the younger children wanted to do something they did not know, the older students asked them if they needed help and taught them how to do it. For example, one team was helping the instructor to transplant a baby banana tree that had to be separated from the mother tree and it required strength and precision not to cut the roots. The instructor taught one boy and later the boy explained to another student how to do it. On another occasion, when one student

wanted to dig a hole but was not strong enough to push the shovel, the bigger students helped him to do it. They would encourage him to go through instead of mocking him as could be expected at their age. Likewise, the girls wanted to use the shovel and plant the little trees. In this garden, there are not as many activities, but the students would go and collaborate with others or explore and observe the other plants. They showed initiative.

iv. Discipline: Since the students were in the gifted classroom they did not have to walk to the garden because it was at the entrance of the classroom. The students chatted a little bit when they were doing their tasks, but they were always focused on the activities. When the class was over, they would leave as a group, but no line was required. They were attentive and contributed to the lesson by asking and answering questions but always asking for their turn and contributing to others' ideas in a very respectful manner. No disciplinary issues were observed on this site.

SITE D

Site D is a public school and the garden lessons consisted of a group of approximately fifteen children of about 10 years of age from 3rd grade with varied ethnicities. They came to the garden lesson in line from their classroom accompanied by two teachers and sometimes by the social worker.

i. Willingness to collaborate: In the garden, there was no designated space to sit down, and not much grass either. Even though they were young children, contrary to what is expected, they did not want to sit down on the ground and get dirty. Since the garden was recently created there were not enough hands-on activities for each child to perform In addition,

since the students were not used to being outdoors, it was difficult to keep their attention. Nonetheless, they volunteered and wanted to collaborate and do the tasks that were required. Some of them wanted to transplant seedlings into the beds and at first, were a little concerned about getting their hands dirty but after they were taught how to do it, they did not care. Other students preferred to watch their peers do the tasks. Moreover, the students who sow the seedlings would say “This is my plant” taking ownership and wanting to take care of them.

ii. Participation: In the Q&A section of the gardening class it was difficult to get students’ attention and participation. Some students answered a few questions but mostly the instructor gave them the content first and then asked the questions again. In some cases, the students would give the correct answers to the questions.

iii. Collaboration, sharing, and competence: This was a big group and as expected with younger kids, they do not like to share with others who are not their friends; this was the case when they had to do hands-on tasks, they wanted to do it by themselves or only with friends. The instructor made her best effort to divide tasks between all students, so they would participate in at least one activity. When they were not assigned to one task, students began to jump and talk loudly between them. The children who were doing tasks generally finished them.

iv. Discipline: as mentioned before students were brought to the garden in line, they were talkative and required a lot of effort from the instructor and the teachers did not intervene with discipline issues until they became unmanageable. It was challenging to explain the concepts with all of the students talking at the same time, but the instructor managed to

explain the concepts in didactic and simple terms to interest participants. When giving the instructions for the hands-on tasks the instructor divided students into subgroups

SITE E

Site E Garden lessons took place in 15th St Farm for hearing-impaired teenage girls in an afterschool program. Therefore, the teachers who accompanied the students assisted with the translation into sign language. The students were around sixteen years old, and the number of students varied from two to six. The garden had a variety of fruit trees, vegetables, and herbs, but hands-on activities were different from the other sites, and the students would do a tour to learn about the different trees and vegetables tasting new flowers, vegetables, and fruits. The girls preferred to water a part of the garden; however, they were not very attracted to planting and harvesting.

i. Willingness to collaborate: The girls, as was to be expected for teenagers, at first did not want to get dirty or try the samples that the instructor offered them. Eventually, some of the students tried them but there was one student who said she definitely would not try them, saying that she liked coming to the garden because she felt peaceful and liked being outdoors, but that she did not like the vegetables and was not going to try them. Interestingly, she was one of the students who asked for seeds and directions on how to plant at home, but she said that it was just to care for and watch the plants grow, not to eat them. On the other hand, the students would take turns and always ask if they could water more plants.

ii. Participation: The students enjoyed being in the garden and outdoors. They were attentive and responsive when asked directly One girl showed interest in planting at home and she asked a few more questions about plants and seeds. The other students just paid attention as well. The issue of translation and the inability to communicate directly with the students due to the NEP instructor's lack of knowledge of sign language may have contributed to the low level of participation observed. Additionally, hands-on activities at this site were limited to watering and planting seeds. However, in addition to being larger the variety of vegetables and fruits is much greater than the other sites.

iii. Collaboration, sharing, and competence: As previously stated, watering was one of their preferred activities and they agreed on sharing, but the instructor was obliged to assign turns. When asked what they liked about the gardening classes they responded, "*the peace I feel when I come here*," and that their favorite activity was watering the garden. Unfortunately, there were not alternative activities that the instructor would assign that would have required collaboration between the students. It should be noted that the number of classes offered during the semester was limited due to the cancellation of classes on rainy days and other planned student activities by the institute.

Iv. Discipline: There were no situations where it was necessary to reprimand the students for not following instructions or not doing what they were asked to do. In any case, since it was an extracurricular activity, the students were free to decide to come to the garden and to decide which activities to participate in. It is worth noting that the teachers accompanying the students encouraged their participation and engagement asking questions and sharing their own experiences showing the friendly relationship they had with the students.

Comparison between sites

The overall experience in the five centers was well-received by both students and teachers. However, behavior and attitudes differed even among the same age groups. Thus, while the 5th-grade students in schools A and C belonged to the same age group, their behavior was quite different. Students in center A came straight from their lunch break, and it often took several minutes for them to calm down before they could start interacting with the teacher. During class, some students were distracted, and the instructor or the teacher had to draw their attention. However, by the end of the semester, they showed interest and became involved in the proposed activities, asking for additional tasks after the initial assignments were completed. When they were prompted to share or collaborate it was not easy to get them to do so with others other than their friends. Most of the time the teacher or instructor had to mediate negotiations between them to decide when or how they should do certain activities. In contrast, children from site C came to the garden organized and in silence and they would talk only when the instructor requested. In the Q&A they would always build upon other's answers. When there were not enough activities for all they teamed up and collaborated to decide who would go first and only requested the instructor for guidance on how to do a task.

One aspect worth mentioning is that the children in Center A were all on scholarship and most likely came from food-insecure families. When coming to the garden, they frequently tasted fruits and vegetables and asked to have more at times. Although attending the classes was not their choice, some of them said they wanted to participate in them because they thought they would eat more during the lessons. But after being in the gardening classes, they

all said they enjoyed them and if given the opportunity they would take them again even if they did not like some of the vegetables or would not eat them at home.

In contrast, the children at Site C tasted all the vegetables and flowers and made connections between the themes of the gardening experience and their science classes and reflected on them. Once they were finished, they would go and see what the others were doing; some others preferred to be on their own but would collaborate if necessary. This is an outstanding difference that the instructors commented on in the interview which was observed as their level of maturity.

In Site D there seems to be two factors influencing the experience of the gardening lessons. One is the reduced hands-on activities due to the small space and the garden just being started. The other factor was the style of discipline and the age of the students. The expected behavior of younger students was that they would enjoy their time outside and not worry of getting dirty or sitting on the ground. However, the expectations were not met, this is a variable that may be due to reduced recreational activities during their free time and not having enough recess and physical activities outdoors. This can also affect their level of attention and discipline.

It is also noteworthy that the majority of students at site A expressed a lack of interest in taking produce home. Only a small number of students mentioned that their mother or grandmother would prepare the food items they brought from the school. In other instances, the students indicated that their mother was displeased with them for bringing produce home and subsequently discarding it. In contrast, in sites B and C the situation was entirely different. The teacher gathered the produce which then she then distributed among the students. On

occasion, some teachers would approach the NEP instructor to request specific produce. In Site C some children would take produce home, and neighbors and parents also.

On the other hand, the level of engagement among the teenage students who visited the 15th Street Farm, Site E, was notably different from the other groups. While they demonstrated a keen interest in attending the gardening class yet displayed less enthusiasm for engaging in the activities. Although their experience was mostly taking the tour in the garden, tasting, and learning about fruit trees, plants and vegetables. However, the students were unwilling to taste most of the produce and plants that were offered to them. Although the hands-on activities were less abundant than at the other schools, they were similar to the other afterschool program. However, the children in Site B, were younger and also enjoyed being outside but tasted joyfully everything they could in the garden.

In-depth Semi-structured interview

Four interviews were conducted with two NEP instructors, one schoolteacher, and the dean of student life of one of the school sites to assess their experience and their opinion of the gardening program.

1. School dean: This respondent was asked about their opinions about the NEP program as implemented in their school. The interview started in his office and had to be completed over the telephone. It lasted less than thirty minutes due to the dean's multiple activities. The school dean is a middle-aged man who has been in the position since 2019. His main responsibility is to oversee the behavior and discipline of the students. In the interview, he mentioned that his main objective is to contribute to the development and growth of the

students through education and enrichment programs. He emphasized how exposing students to activities that are not accessible in their daily lives helps them expand their reality. One of his priorities and concerns in previous years was the gardening class, as they had not implemented an effective system to achieve the proposed goals. The dean expressed his satisfaction with the program and the outcomes obtained so far, and above all with the reliability of the NEP. He stated, "*I am proud of the gardening classes as an enrichment program which NEP provides, with care for the students, maintenance of the garden, and knowing that someone is going to be there for the kids every Tuesday and Thursday no matter what… Being able to show the garden at any open house and it being so beautiful every time gives us pride*". One of his major concerns was that previous master gardeners did not engage the children's attention and did not teach them gardening activities. In addition, on several occasions, they canceled at the last minute, which complicated the logistics of getting the students relocated and taken care of. When asked if he would change anything, he replied that he would like to expand the program and allow the students who want to deepen their knowledge in gardening to become master gardeners for the school. In response to the question regarding why the gardening class is only offered to 5th graders, he asserted that they decided to prioritize engagement among younger students, given that their level of interest and engagement is typically at its peak during their younger years.

2. Instructor Interviews: The two instructors who were interviewed as part of this project responded the interview in the garden after a lesson and they lasted for 1 hr. in average. The NEP instructors were asked about their experience with teaching gardening classes, how

they perceived the dynamics and what could be done or changed based on their experience. One of the instructors is a man in his late 30s. He discovered his passion for gardening when he moved to Florida in 2019. His interest in gardening grew from his love for cooking and his appreciation for the flavor of naturally grown food. When asked about potential modifications or enhancement of the program he emphasized the importance of setting up garden beds and irrigation infrastructure before starting the programs at schools, especially in Florida where water for irrigation can be expensive and *"is a big thing specially here in Florida for the dry season plants without water, I see how they suffer"*

When reflecting on his experience teaching in the garden he mentioned *"I like teaching younger kids, cause when they're young they taste everything and enjoy activities. The 5th graders are more on their ways and are hesitant to taste, younger kids are really into it"*

Another issue he brought up is discipline "*as I understand it, is because the parents have to work a lot and they aren't at home or around the kids that much, so it's difficult to discipline kids when you're not at home, and some of them don't have a father at home. One little kid once asked me if I could be his dad. There are not two parent households, so those kids, not all of them, but sometimes I feel are a little bit harder to discipline sometimes".*

The other instructor is a female, also in his late 40's that has a family tradition with gardening. *"The program gives the children the possibility not only to go back to their roots but be able to learn something precious and priceless. Being able to understand the relation between humans and nature and the importance nature has on humanity … the connection comes in when there are enough hands-on activities… I can talk about gardening all day long but until you get your hands on the dirt and finding worms and understanding ecosystem and*

understanding insects, the pros and cons, and its benefits, the experience is totally different… it's the same when you bake a cake and eat the gratitude is different!!!"

In response to the question to what do the kids take from the gardening class "*for some kids it is a place of stress release, a place where they don't have to worry about academics, the teachers, the moms, the dads, the friends, the bullying, the popularity, it's just them and the task at hand, and they can step away for a little bit of time and just connect with something that doesn't have to do with anything else … I've seen that here with a girl that had a bullying situation, and she came here just crying, and when I asked other girls, they said it's teenage stuff… and I made sure to keep incorporating her into the activities and 20' later she wasn't thinking about what happened, because her mind and her focus was here on the task"*

Regarding the question about the impact the program would have on the children's eating habits she mentioned "*maybe not all, but some of them pay a lot of attention. In one of the schools they are always talking about sugar and takis, and ask me to bring snacks… so I did an experiment, brought some celery and put it in a jar with a lot of sugar, another with dye, and other with salt and they saw the impact of each one in the celery the next class, so when I brought cracker graham and granola bars, and a couple of them read the back and said these are healthy snacks"*

In summary, both instructors have been working for more than a year in the program and perceive the NEP to be a great program that contributes to the well-being of the children and that has been a meaningful experience for them. They concur with the opinion that the structure of the classes and the curriculum are adequate to achieve the objective of teaching children the basics of nutrition and gardening.

Comparing their experiences in site A, both instructors agreed that having more structured classes would not be a better strategy to gain the students' attention and that the hands-on method was enough to get them to participate and later be engaged in gardening. They felt that allowing the students to have a little fun and independence in engaging activities helps them gain confidence and control of their environment, preparing them to generalize the experience to other situations. In their opinion, the commitment of the school and teachers to the gardening classes is key to the program's success. One of the instructors commented "*having garden beds in concrete shows permanency, showing that they value and invested in it and will make an effort to maintain it".*

One of the instructors teaches gardening lessons on sites A, B, and C, and in his opinion, the difference in behavior and discipline between sites A and C is that kids in site A have not been able to develop their maturity and independence due to lack of social stimulation and parental involvement in their education. In contrast, the children in Site C belong to a different socioeconomic class, and being in the gifted program provides them with intellectual and material advantages. Their reasoning and generalization of knowledge is an experience valued by the instructor, as well as their behavior and discipline.

Regarding site B, both instructors agreed on the wonderful experience of having children of different ages in the same class, contrary to what might be expected it is an enriching activity because everyone shares and enjoys tastings and hands-on activities. Both agreed that site B has more advantages than the other because they have a large garden with enough space and activities for almost twenty children. Also, the students can enjoy being outdoors even when they are not in the gardening classes, so they feel more comfortable with

nature. However, in the opinion of the other instructor who teaches at site D, even though the children are in 4th and 3rd grade, they do not know how to be comfortable outdoors. The garden is small and does not have enough space and activities for all the students.

3. Teacher interview: The teacher was asked the same questions as the instructors, and he admitted: "*At first, I signed in to be the teacher of the class to do something different, but I did not have high expectations because we had other gardening classes in the past and they were not successful. Having the experience to see how the children become involved and how they appreciate being here, makes me very proud to be part of the program. . . I would like to introduce the gardening vocabulary and topics in my English classes and have more communication with the instructors to reinforce the concepts the children learn in the garden in the classroom."*

To the question regarding the strengths of the program *"the kids are outside of the four walls, a different learning environment is great for them. The way you break it down, start with I want to teach you something, and then we go and apply it. The experience of having something tangible and say look what I grew in this garden and go home and tell their parents and then show them in the open house, look this is something that I did. Another thing is using poster boards and doing experiments that engaged them a lot better than when we started the program"* When asked if he would change anything, he suggested including the garden topics in the school curriculum to reinforce learning.

Discussion

Informal conversations with the students during gardening lessons and participant observations revealed that the program is effective in achieving the goal of engagement in the majority of participating students. Although different levels of commitment and other outcomes were observed, such as not being interested in gardening per se, but enjoying being outdoors in nature and taking care of plants. As expressed by some of the students, they discovered the joy that being outdoors could bring them and learned to appreciate nature and the peace and relaxation that it brings. Future research should be conducted to determine what would be the best approach to get them involved in gardening activities, and subsequently, at least try vegetables.

A further important result, which is not directly related to gardening, but rather to caring for the plants and the garden, was the visible increase in autonomy, independence, and responsibility in carrying out the activities in the garden. As the children began to experience a sense of ownership and pride in harvesting the produce they had helped to grow, they became more confident and independent in carrying out their assigned tasks. These tasks consisted of tending the soil and watering, weeding and transplanting seedlings, and they even volunteered to weed, the activity they liked the least. However, they eventually understood its importance for the proper growth of seedlings and vegetables, which led them to have a holistic perspective on vegetables and gardening.

One of the program's strongest points is the "hands-on activities", which allow students to build knowledge from their experience and relate it to the concepts taught by the instructors through Q&A. It appears that experiential learning and hands-on activities are directly related

to the level of engagement, while increasing knowledge and, in some cases, the application of concepts to other subjects, such as environmental sciences, among others. This became evident when some students at Site C were able to establish the relationship between the plants and trees they planted in the garden and, after a few weeks, began to see butterflies and bees and realized that they were part of the pollinators in the garden and that certain plants and trees attracted them. Consequently, the group of students at site E who did not experience as many hands-on activities were not as involved in the gardening activities per se, although they enjoyed the time spent in the garden, and enjoyed their time outdoors

After more than a year of observations and gathering opinions from students and interviewees, it is clear that even when students were not initially enthusiastic about gardening, it became an activity they looked forward to with great enthusiasm. Some students expressed their desire to return to the garden, even after the end of the program saying, *"I definitely want to come back because I enjoy being here."* In addition, the teacher noted in the interview, *"The kids are having an authentic educational experience, and the best part is that they don't realize how much they're learning."* This was evident when, towards the end of the semester, some students surprisingly asked to help with weeding when tasks were being divided.

Limitations

Involving parents and getting their input on how they perceive the gardening experience for their children was not possible. Some of the students had previous gardening experience with their families and simply shared with their parents what they learned in the gardening

classes. According to other students, their parents did not care, so they did not share any information and for that reason did not take any produce home.

Originally, I had planned on using pre-and post-test data to analyze the impact of garden education on the participating students. However, since not all sites had responded to the post-tests at the time of data analysis for this research, this information was not used at all. Future analysis of this data will provide valuable information about the effectiveness of the NEP.

The experience for students in Site E was different for two reasons. On one hand, the garden did not offer hands-on activities such as weeding, transplanting, or planting seeds in the garden. However, it offered more diverse vegetables, edible flowers, and fruit trees. Therefore, this is a variable to be studied and compared with the effects on the overall experience. On the other hand, the students were deaf, and the teacher had to translate their opinions to the instructor. This may or may not have influenced the outcome of their opinions, as something may have been lost in translation or they may have been embarrassed to share it.

For this research, the regular Site C students were not included in the gardening class, therefore it was not possible to conduct a comparison to assess whether behavior, discipline, and collaboration are related to the school's discipline system and pedagogy or whether it is related to the fact that they are on the gifted program.

Furthermore, the economic status of the students in site C was evidently higher than those of sites A and B, and D so the comparison of discipline and willingness to taste vegetables can be affected by this variable.

Conclusion

Based on the data I was able to collect for this thesis, it can be concluded that the knowledge and commitment the children have acquired in the gardening classes will certainly contribute to their future. Exposure to new foods and vegetables may increase healthy habits in the future, but there is insufficient evidence to predict such behavior. However, being exposed to new flavors and textures expands their sensory experience and may increase future willingness to adopt a healthier and varied diet. The program is grounded in the principles of Emmanuel Roux which states that "growing vegetables and fruits not only helps children to be aware that we are one with nature and we need the same air, water, and nutrients and "we are what we eat"[7]. Therefore, when children understand the relationship between soil nutrients and nutritious food, they may make healthier decisions in the future.

By having different schools with different philosophies and styles of discipline enriched the research, it was possible to observe that social behavior and development are intimately related to the environment and the learning opportunities to which the children are exposed. The fact of having an educational space with little structure, such as the gardening classes, allowed the children to assume levels of independence and self-control and to develop some interdependent and collaborative behaviors.

It can be concluded that the main gains from the NEP are flexibility, adaptation, and new learning patterns. Although school gardening programs are a first step in addressing food

[7] Admin, "Urban Farming for Urban Families," Futurum, October 3, 2023, https://futurumcareers.com/urban-farming-for-urban-families.

insecurity in local communities, they bring so many benefits that it is worthwhile to continue efforts to create and support them.

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