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Benefits of Integrating Gardening into Outdoor Education for Elementary Students

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Abstract

Sustainability is becoming an increasingly important topic in today's society. Future generations must be cognizant of impending environmental issues and have the wherewithal to actively address these societal tribulations. As future educators, it is our responsibility to provide learners with the knowledge and skills required in becoming an active part of repairing our planet. Society as a whole benefits from having an environmentally conscious citizen who can make an informed impact on social issues involving natural resources. A garden can be a powerful tool in promoting outdoor education, positive peer relationships, community, restoration, and sustainability. We propose teachers with access to the appropriate resources, such as lesson plans, school support, and committed personnel, can educate students on ecological conservation through school gardens.

Benefits of Integrating Gardening into Outdoor Education for Elementary Students

Ecological awareness and sustainability are no longer refutable issues for Californians. On January 17, 2014, California's Governor Brown Jr. declared a State of Emergency based on the extreme drought that has now persisted in the state for four years (Brown Jr., 2014). California is the country's top agricultural merchant; the state produces nearly half of US-grown fruits, nuts, and vegetables (California Department of Food and Agriculture, 2015). Without a sustainable water conservation plan, drought and shortage of nutrient-dense foods may become the standard way of living in the United States. Upcoming generations of elementary students must be cognizant of these impending issues and have the wherewithal to actively address these societal tribulations.

A garden can be a powerful tool in promoting outdoor education, community, restoration, and sustainability. All ages, "abilities, socio-economic sectors--all people, in short--can benefit from outdoor education" (Ford, 1986, p. 1). Besides teaching elementary students about the multiple facets of sustainability, a computerized student population is encouraged to reevaluate their relationship with nature, their peers, and themselves.

As a future educator, I hope to develop and increase awareness of outdoor education programs relating to sustainable directives. Society as a whole benefits from having an environmentally conscious citizen who can make an informed impact on social issues involving natural resources. Through gardening, elementary students can develop an environmental understanding as well as the capability to take action.

My research will incorporate the various benefits gardening has on early development, disclose contemporary elementary school gardens in Monterey Bay, as well as introduce elementary students to the topic of sustainability. That being said, the primary question I will be answering is: *How does integrating gardening into outdoor education benefit elementary students?* This inquiry will be factually accompanied by my secondary question: *What are the benefits for elementary students when integrating gardening into outdoor education according to research?* It has been acknowledged that, “The nature of outdoor education as an experiential discipline gives students a meaningful context in which to become directly involved in knowledge construction” (Knapp, 1992, p. 1).

Within this organic context and within my research, I hope to address issues pertaining to environmental preservation by asking: *How can gardening teach elementary students about sustainability?* Children who are taught green or sustainable habits early in life, “Awaken a sense of wonder and curiosity,” which changes the way students interact with and think about nature and their place in our interconnected natural world (MEarth, 2015, p. 1). Additionally, I hope to answer my third question: *Are there gardening programs currently offered in the Monterey Bay area? If so, how are these organizations executed?* My fourth question deliberates the financial side of gardening by examining: *Who provides funding for gardening projects implemented in elementary schools in California?* This question is intended to observe if garden programs can accommodate all schools from differing socioeconomic circumstances. Lastly, to increase my comprehension of what students learned, my sixth and final question will inquire:

According to elementary students, how will hands-on gardening benefit and teach them about the concepts of sustainability?

Literature Review

Before examining what researchers denote about school gardens, two key terms, environmental sustainability and outdoor education will be described and defined. Both terminologies have fluctuating meanings and are multifaceted.

Firstly, outdoor education has no set definition; still the most inclusive one seems to be, “Outdoor education is education ‘in’, ‘about’, and ‘for’ the out-of-doors” (Ford, 1986, p. 1). Outdoor education in regard to sustainability focuses on changing student’s attitudes and behaviors toward the environment. Yerkes and Haras (1997) explain how outdoor education can increase a child’s understanding of their place in, and their dependence upon the ecosystem. This self-awareness is a prerequisite for deliberating the ecological, sociological, and cultural context in which society functions within the natural environment. Presently, there are no nationally standardized outdoor education curriculums or measures in place to assess competency or knowledge acquired in outdoor education.

Secondly, the description of sustainability is defined as the ability to continue a particular behavior indefinitely. The cultural perspective on ecological conservation currently dwells on the notion that sustainability means maintainable development of economic growth. However, no form of economic growth can be indefinite and sustainable. First defined by the United Nations World Commission on Environment and Development (WCED) report, *Our Common Future*, Shilling et. al. (2012) reiterated, “A system that is sustainable should meet today’s needs without compromising the ability of

future generations to meet their own needs” (p.1). Organic preservation stands on three principles.

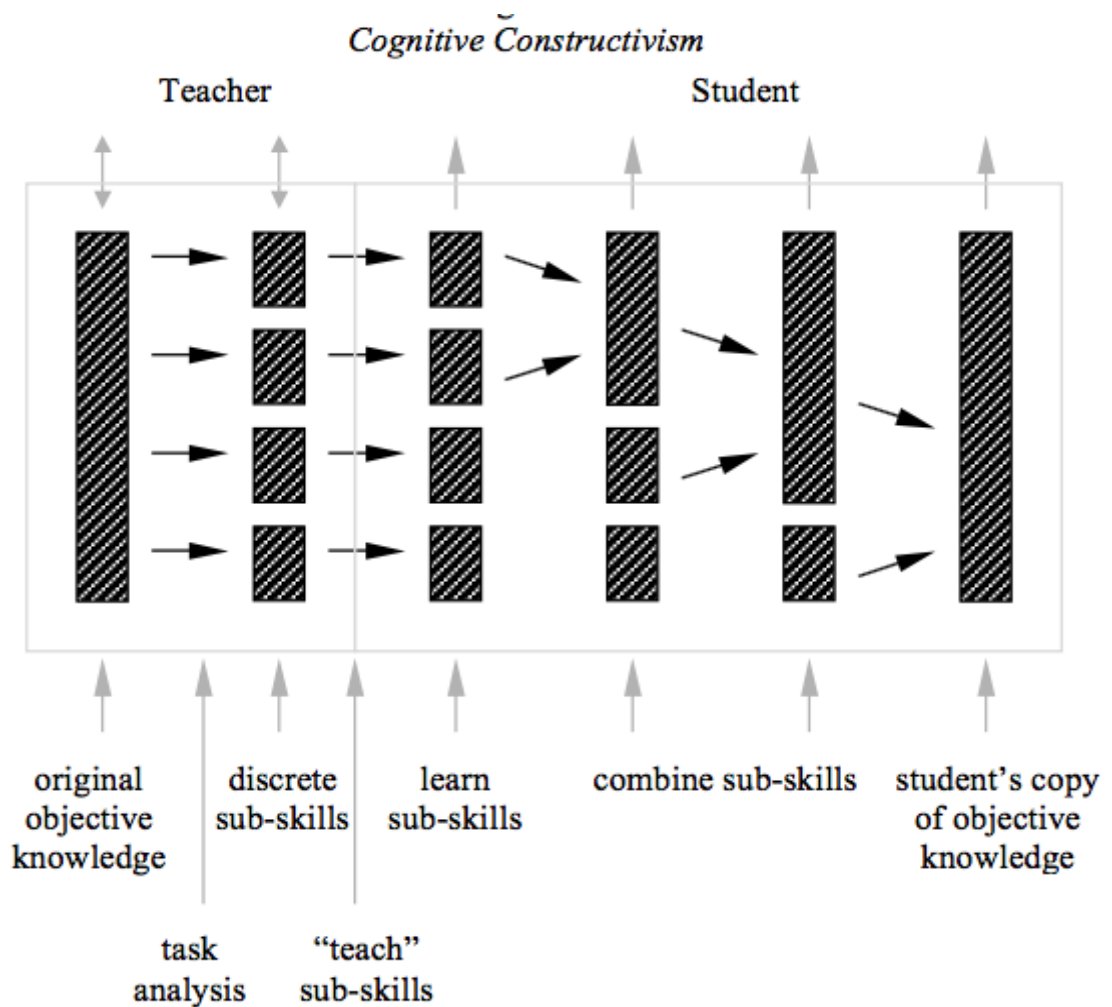
Ecological sustainability expert, Daly (1990) defines, “Environmental sustainability [as] the rates of renewable resource harvest, pollution creation, and non-renewable resource depletion that can be continued indefinitely. If they cannot be continued indefinitely then they are not sustainable” (p. 1). The idea of sustainable gardens is not a new concept in education, but has gained attention in the past decade. Ecological conservation requires each individual’s nurturing and attentive effort to transform civilization’s relation to nature, thusly changing society as a whole.

Children have been compared to sponges in the sense that they absorb all they see, hear, smell, and touch. Through industrial and technological advancements, nature has lost some of its’ wonder for younger generations who prefer remaining plugged in and indoors. This estranged relationship generates students that are indifferent about learning the intricacies of human-environment interactions. This lack of interest stems from a cultural epistemology that nature is a commodity waiting to be ravaged. Today, in an urbanized world, children are more socially connected but engage in less active lifestyles. This transition from outdoor play to electronic play powerfully impacts a child’s physical and psychological growth. For example, Nedovic and Morrissey (2013) elucidate the types of environments children are exposed to heavily influences their play and development.

Scholars and educators have discerned that learning involves parts, wholes, and adaptations (Doolittle, 2014). While this model holds merit, the approach and theories surrounding it have changed. The traditional view of learning involves students being

passive participants in their vocational development and is seen in Figure 1. This form of assessment has been suitable for standardized testing and teacher-oriented education. However, as society moves into the 21st century where innovators and inventors are indispensable, Americans have come to the realization that our school systems are not producing intellectual thinkers. Consequently, a shift towards more inclusive based learning has begun to emerge.

Figure 1



This section addresses the constructivism theory currently being used in outdoor education. Additionally, this segment discusses and synthesizes literature pertaining to

the benefits of outdoor education as well as examining the dynamics surrounding school gardens that educate elementary students on sustainability.

Benefits of integrating gardening into outdoor education according to research. The Constructivist model emphasizes a student's responsibility to be an active participant in their learning process. This modification in teaching has produced project-based, student-focused classrooms. Outdoor education functions within the constructivist model, which establishes that learners interpret their own experiences and create their own comprehensions of said occurrences. The constructivist model stands on six learning principles presently emphasized within outdoor education (Doolittle, 2014, p. 489-490): “(1) The construction of knowledge and the making of meaning are individually and social active processes. (2) The construction of knowledge involves social mediation within cultural contexts. (3) The construction of knowledge is fostered by authentic and real-world environments. (4) The construction of knowledge takes place within the framework of the learner's prior knowledge and experience. (5) The construction of knowledge is integrated more deeply by engaging in multiple perspective and representations of content, skills, and social realms. (6) The construction of knowledge is fostered by students becoming self-regulated, self-mediated, and self-aware”.

Social constructivist ideology resides between trivial constructivism and radical constructivism dogmas. Trivial constructivism emphasizes that reality is comprehensible, thus the learner must internalize and reconstruct the external reality to form accurate internal models of the real world (Doolittle, 2014). Whereas, radical constructivism stresses that knowledge is an internal process, comprised of earlier mental structures and

external experiences. Social constructivism highlights the importance between the external and internal interactions the learner experiences, which encompasses other learners, and the environment. These opposing frames of teaching affect student's fundamental development and the way they acquire new knowledge.

Teaching elementary students about environmental sustainability. Children who are taught green or sustainable habits early in life maintain and, “Increase their chances of not only living a sustainable lifestyle as adults, but taking a leadership role in conserving resources and preserving our planet” (School Gardens Teach Kids Sustainable Practices, 2013, p. 1). Researchers Nedovic and Morrissey (2013) report, “Children need outdoor connections with nature to reach their optimal level of physical and cognitive functioning” (p. 281). Learners introduced to a natural setting, such as a garden, were more inclined to take part in physical activities like weeding, running, jumping, climbing, crawling, digging, and loosening soil. Students exposed to this organic topography generally tested higher in agility, balance, and general motor fitness than students who played regularly on blacktop playgrounds.

Children's concentration and attention spans similarly improved when they connected with nature. The organic space's various textures, colors, landscapes, smell, and weather peaked learner's curiosities. Along with enhanced cognitive functioning and improved physical health, learners had lower stress levels, which provided children with the opportunity to negotiate relationships with their peers (Nedovic & Morrissey, 2013). The outdoors gives students a place to independently make sense of the world around them. Outdoor education associated with gardening focuses on the interrelationship of

human beings and the natural resources that societies depend upon, with the goal of stewardship (Ford, 1986). Gardens can be used to instruct students in academic topics involving math, science, nutrition, health, history, and environmental studies.

Gardening Programs in Monterey Bay. MPUSD and MEarth habitat in Carmel Unified School District have been researched. According to the MPUSD (2015) website, there are about a dozen sustainable programs orchestrated in Monterey County. However, there is a deficiency of school gardens within this district. Of the twelve elementary schools in the Monterey Peninsula school district, only two institutions have their own gardens. Other schools within MPUSD participate in sustainable assemblies, Farmer's Market's, or Fresh Fruit and Vegetable Programs. Many institutions do not have the resources or funding necessary to maintain a garden throughout the school year.

However, one habitat in Monterey Bay is a true pioneer in innovating a cohesive garden and standards-based curriculum. MEarth is an environmental nonprofit organization that is “ Growing the next generation of environmental leaders through education, collaboration, partnerships and community action” (MEarth, 2015, p. 1). MEarth resides on the Hilton Bialek Habitat and in a state-of-the-art Green Building that includes a kitchen. The association has close ties to the Carmel Unified School District (CUSD), in particular Carmel Middle School.

Funding for school gardens in California. Accessible through the Education Outside website, there are numerous grants available to elementary schools contributed by agricultural foundations, community programs, gardening associations, corporate businesses, greenhouse and sustainable projects, and government run organizations.

Additionally, Education Outside's webpage offers gardening contests to elementary schools with an opportunity to compete and win scholarship money. Contrariwise, DonorsChoose.org is a nonprofit organization that has aided schools and educators in requesting funding and materials for garden projects. Besides these grant and scholarship prospects, garden money is either fundraised through a school's district or directly fundraised from the school's website.

Methods and Procedures

To develop a substantiated background, my research was found through the CSUMB Library Database, ERIC, Google Scholar, MEarth, and the MPUSD website. These networks provided my study with an academic understanding of outdoor education and the facilitation of gardening through that prospect. ERIC expanded my knowledge of outdoor education and how it has changed over the last decade, while the CSUMB Library Database increased my knowledge on sustainable practices being used in schools presently. MEarth and the MPUSD website advanced my comprehension of ecological lessons plans grounded in standards-based curriculum.

Correspondingly, these websites contributed to my understanding of how necessary an outside party is in arranging a garden project in a school environment. Subsequently, I communicated with the Executive Director of MEarth, Tanja Roos, to improve my conception of the organization and its' practices. She shared the habitat's mission statement and their ultimate goal in getting all learners to think green with me. MEarth strives to make all youth conscious of the fact that every action has a reaction.

After our discussion, I left Roos with a survey (See Appendix A) concerning

third to sixth graders' perceptions on MEarth and sustainable practices. Roos explained that a paperless survey would reach more of the student body so I turned my survey into a Google spreadsheet where students could access my questionnaire online. To improve my research topic and develop a full comprehension of teacher's perspectives on school gardens, Hannah Cobb and I collaborated on our research.

She concentrated predominantly on the teacher's understanding of sustainability through gardening, whereas I tackled children's, grades three to six, conception of sustainability via gardening. I will attach her questionnaire queries (See Appendix B). Moreover, I attempted to organize a small garden at La Mesa where I was assistant teaching in a fourth grade class. However, the school year had already commenced and the general feedback from teachers was disinterested and unmotivated to integrating another project into an already packed semester.

Results

Although school gardening programs have extensive benefits for elementary students, one dynamic appears paramount to successively managing a school garden. A non-profit organization partnering with a school or district is indispensable. Teachers and school personnel do not have the time or appropriate training to instruct a course on sustainability. Without provided coordination, maintenance, resources, and instruction for gardening programs, an ecological project seems unrealistic for many schools. Using my secondary questions to consolidate my discoveries, I will reflect on my literature review to clarify my findings.

What are the benefits for elementary students when integrating gardening into outdoor

education according to research? The findings of my research suggest that gardening programs implemented into outdoor education have immense benefits for students. Students become active learners and obtain practical skills that can be used throughout their lifetime. Through these proficiencies, learners improved or reached their optimal physical and cognitive functioning. Students engrossed in natural settings had increased agility, balance, concentration and attention spans, as well as decreased levels of stress. This allowed students to reconsider their relationships with their peers and their personal relationship with the natural ecosphere. The outdoors gives students a place to independently make sense of the world around them and feel safe while accomplishing this cohesion of realities.

School gardens also stimulate more positive attitudes towards eating nutritional foods but have little affect on student's general eating behaviors. Bronfenbrenner, as cited in Ozer's *The Effects of School Gardens on Students and Schools: Conceptualization and Considerations for Maximizing Healthy Development*, stated that "A social ecological-transactional perspective of human development views the child as nested within immediate contexts or micro-systems (e.g., school, family, community) that reciprocally interact with each other and the child over time to shape development" (Ozer, 2015, p. 851). This human development perspective stresses the significance of the contexts in which children live, and the influence an environment has on a child's growth. In addition, student's sense of pride, attachment, and belonging to their school increased with gardening projects.

According to the National Longitudinal Study of Adolescent Health, learners who feel more connected to their institutions show "lower levels of emotional distress, risk

behavior, and aggression” (Ozer, 2015, p.854). Nonetheless, there are numerous categories of garden-based programs and activities. Due to this assortment of themes, there are over 2,000 school gardens in the United States today that vary widely in scope, integration into regular school curriculum, volume and intensity of participation (Ozer, 2007).

How can gardening teach elementary students about sustainability? School gardens connected with biome learning are platforms concentrated on teaching students about recycling, composting, growing organic foods, planting native vegetation, conservation of freshwater, watersheds, habitat restoration, alternative energy sources, tracking invasive plant species, observing stream health, and sometimes raising livestock. With a copious variety of topics, gardens in the same school district can differ extensively in instruction.

The Center for Ecoliteracy in Partnership with National Geographic (2014) expresses the importance of children understanding the “Linkages between the foods we eat, the ways that culture shapes our food choices and behaviors, the relationship between food and our health, and the interconnections between our food systems and the environment” (p. 3). An innovative Executive Director, Tanja Roos, leads MEarth, a nonprofit organization dedicated to environmental stewardship. Roos rationalizes that elementary student’s perception of foods needs to change before any work in ecology or a garden commences.

The best way to get students interested in ecological stewardship begins with food from the garden. Roos explains after learners plant, harvest, and taste their first yield of

crops, their interests in organic foods and the outdoors are reignited. Subsequently, students discover local plants, insects, and animals that reside in their gardens as well as in their immediate communities. Learners then investigate the relationships between each species and denote their significance to the ecosystem. A garden's immersive environment promotes cooperative, active-based learning while concurrently acting as a sustainable model for local food production.

Ecological knowledge is delivered through garden centered educational concepts that increase the student's engagement in their learning process. The garden naturally cultivates active play, assists in developing healthy eating habits, and satisfies the student's cognitive, social, and emotional needs of place-based learning. Elementary student's newfound environmental aptitudes generate an open dialogue on organic produces. Recycling and composting are helpful secondary devices that get children to think about waste management, as well as reflect on what kinds of foods their families regularly consume. Elementary students learn that not all waste can be reutilized or composted.

Gardening intuitively invites students to ask where their food comes from and contemplate what foods are healthy. Today, "getting food from the farm to the consumer ... involves a compound system that includes many different jobs, complex processes, and resources" (Center For Ecoliteracy in Partnership with National Geographic, 2014, p. 24). Learning about the process and individual effort necessary in getting food from farm to table, is essential for elementary students to understand the impacts food choices have on our physical health and the ecosystem.

Are there gardening programs currently offered in the Monterey Bay area? If so, how are these organizations executed? This section of the paper will primarily address the Monterey Peninsula Unified School District's (MPUSD) garden programs. In addition, the sustainable projects occurring throughout MPUSD will be assessed and elaborated. MEarth habitat, located next to Carmel Middle School, will also be examined.

J.C. Crumpton and Ord Terrace Elementary are the only two schools within MPUSD that broadcast their environmental gardens. J.C. Crumpton Elementary offers a gardening club as an extracurricular activity. Although a gardening program has been introduced into the school sphere, the general student body has no interaction with the greenhouse. Conversely, little information is offered on how the garden club is coordinated and who facilitates said program. Ord Terrace Elementary School successfully integrated an active-based, learning garden into their school dynamic and curriculum.

All grade levels in Ord Terrace Elementary have assisted in establishing a dune habitat garden as well as nurtured gardens within the Monterey Bay community. These gardens foster native plants species from the Central Coast, and teach students about local watersheds and drains that lead to the Pacific Ocean. Learners share their newly acquired knowledge on fresh and ocean water protection with the community of Monterey Bay (MPUSD, 2015). The concept of water preservation guides students to deliberate on water conservation and consumption.

Given Monterey's history of devastation and revitalization on the bay's ecosystem, oceanic protection is important to the community and critical for sustaining a

healthy habitation. After being exposed to these sustainable ideologies, many students strive to live an environmentally conscious life. Children who learn about ecological stewardship earlier in life, “Increase their chances of not only living a sustainable lifestyle as adults, but taking a leadership role in conserving resources and preserving [the] planet” (School Gardens Teach Kids Sustainable Practice, 2013, p. 1). It is recognized that Ord Terrace Elementary could not initiate a garden program without additional capital.

Sustainable practices, programs, and assemblies have been consistent subjects throughout the district. Monterey Peninsula Unified School District “has a Wellness Policy that recognizes the link between student health and learning and stands to promote a healthy school environment with parent/guardian and community involvement” (MPUSD, 2015, p. 1). To support the district’s ecological mission, last year King Elementary held a walk to school day to help reduce carbon emissions. La Mesa Elementary conducted a school beautification day where students picked up trash on their campus, restored tarnished school property, and weeded the plant beds. To further advocate the district’s environmental stewardship, La Mesa and Crumpton Elementary also stipulate an annual ecological assembly.

A musical husband and wife who love educating students about water conservation created Zun Zun. The tuneful duo travels throughout MPUSD. They bilingually speak to the students about the natural water cycle, clean water, California’s need to conserve freshwater, and the watersheds in Monterey Bay. Additionally in 2012, MPUSD generated an Energy Conservation Program to support the Wellness Policy and certify the district’s mission of creating a healthier school atmosphere. The Energy

Conservation Program has a website easily accessible through MPUSD's webpage. Each school's electric, water, and natural gas use are monitored and charted on their websites'. Moreover, individual schools graph the amount of solar energy used in a day and compare that data to their total consumption of energy. At the end of the school year, MPUSD displays the utility cost avoidance for the entire district.

MPUSD is determined to create healthier school environments, and construct positive routines so students can continuously pursue sustainable lifestyles. To support this ecofriendly attitude, Marshall Elementary proudly displays an energy conservation chart on their official website. The school primarily asks students and their families to turn off electrical appliances like lights during the day, and air conditioners or thermostats at night. The school extends the ideas of sustainability to parents in their work place, by asking them to turn off machines like copiers, computer monitors, and phones. Learners and their families going out of town for the holidays are encouraged to clean out their refrigerators and leave them unplugged to reduce their use of electrical energy, natural gas, and water.

Marshall Elementary compares the reduction of these resources with "removing 24 tons of Carbon Dioxide pollution or planting 967 trees and then growing them for 10 years" (MPUSD, 2015, p. 1). The school's investment in promoting green behaviors to the families and students attending Marshall Elementary, positively contributes to the arduous battle of conserving and restoring Earth's natural resources. Conversely, the community's involvement in reducing the city's carbon footprint builds public awareness and connection to beautifying and maintaining Monterey Bay. Furthermore, Del Rey Woods, Martin Luther King, Highland, and Ord Terrace Elementary all participate in a

Fresh Fruit & Vegetable Program.

This association is categorized under the Farm to School program, which is supported by the Department of Education. The Farm to School organization helps connect students to local small farms. Through this relationship Farm to School, “incorporate[s] nutrition and agriculture-based curricula; and provide students [with] experiential learning opportunities through farm visits, gardening and recycling programs” (California Department of Education, 2015, p. 1). The Fresh Fruit & Vegetable Program aspires to provide nutritious foods at snack time and lunch. The institution aims to increase the assortment and volume of produce elementary students eat, and are exposed to. The organization hopes to stimulate healthier food environments at school and create a lasting effect on student’s and their family’s dietary habits.

The Fresh Fruit & Vegetable Program encourages teachers to “use the fruit or vegetable snack for the day as an opportunity to make connections to daily curriculum” (MPUSD, 2015, p. 1). A compilation of Writing, Mathematics, Geography/ Social Studies, and Science activities and are offered by the program via MPUSD’s website. Moreover, MPUSD collaborates with a Farmer’s Market where students have the ability to shop for locally grown produce. The market expands learner’s comprehension of seasonal foods and develops their mathematical abilities through the practice of authentic purchases and sales. These environmentally conscious associations have a massive influence on learner’s appreciation for nutritional foods and maintaining an active routine.

Yearly, MEarth educates about 1,500 CUSD students on ecological conservation.

The institution exposes learners to ecoliteracy curriculum and ties the school's World Language, History, Science, and English-Language Arts classes into the garden curriculum. MEarth programs' educate students on pressing ecological issues like habitat destruction, invasive plant species, plastics pollution, overconsumption, and overpopulation (MEarth, 2015). For nearly a decade, MEarth staff members have tirelessly collaborated with elementary to high school teachers in constructing standards-based curricula. MEarth personnel aligned the curricula to compliment Science, Math, Social Studies, 6th Grade CORE, and World Language classes currently being taught (MEarth, 2015).

MEarth's Executive Director, Tanja Roos, explains that Carmel Middle School or any other institution linked to the program is not responsible for bankrolling or maintenance of the garden. Dedicated staffs, interns, and volunteers keep MEarth open and available to all community members of Monterey Bay. Although MEarth is modernizing the educational approach in which learners study sustainable practices and environmental issue, affording a habitat like this would be improbable for the schools in MPUSD.

Who provides funding for gardening projects implemented in elementary schools in California? All elementary schools in California are eligible to receive garden grants and compete in conservational contests. These horticultural challenges stimulate community relationships, sustainable practices and awareness, and structured garden activities connected to standards-based curriculum. A funding program DonorsChoose.org's mission is to take "donations from people nationwide and ship project materials to school[s]" (Education Outside Open the Classroom Door, n.d., p. 1). Resources given to

schools cultivating a garden consist of soil, seeds, gloves, fences, shovels, hoes, and other gardening supplies.

Along with listing and supplying these scholarship, award, and grant prospects, the Education Outside website provides extra online resources to assist teachers in beginning a gardening program at their schools. Additionally, Education Outside offers grant application assistance to teachers and institutions. Many schools have the best intentions for designing plant gardens but do not conform their resumes to fit “narrowly-focused funding” (Education Outside Open the Classroom Door, n.d., p. 1). This is the downfall for many schools.

Grant funding requires specificities of garden space, planning, and vegetation being planted and introduced into the ecosystem, how big said plants will become once fully grown, and knowing environmental terminologies. If a submission does not meet all of these requirements, the resume is eliminated. Inversely, MPUSD asks for agricultural donations on school websites, especially for Crumpton and Ord Terrace Elementary, who already have established gardening programs. To get a comprehensive assessment on how these outdoor educational endeavors teach students about sustainability, I quizzed sixth graders who attend MEarth about their perspectives on ecology.

According to elementary students, how will hands-on gardening benefit and teach them about the concepts of sustainability? The feedback from students who join MEarth has been overwhelmingly positive. Many sixth grade learners have expressed their desire to make a difference and be engaged with the world around them. The four sixth grader answers are highlighted in Appendix C. In general all students want to take care of the

planet and have shown an elevated interest in knowing where their food originates. Tanja Roos and the coordinators of MEarth cleverly implemented acronyms to teach students about sustainability. Learners were excited to explain what F.L.O.S.S. stood for. With Fresh, Local, Organic, and Seasonal foods, students can become Sustainable (F.L.O.S.S.).

Several students expressed their aspiration to teach their family about sustainability was due to this technique. Additionally, sixth graders were intrigued to learn about native plant species and seasonal produce. This fascination derived from students being apart of planting, nurturing, and harvesting yields. To maintain this immersive learning, students are also responsible for cleaning up. Many pupils enjoyed composting and recycling excess ingredients. Students were involved in categorizing garbage as recyclable, compostable, or waste. Children were attentive and interested in learning about the misconceptions of recycling and about recyclable materials.

A majority of learners want to become progressive citizen who make a difference in the world. To support them, MEarth exhibited their composting site and taught students how to make personal compost boxes. Afterward, students felt compelled to create individual composts for their homes, and feel more inclined to actively evaluate what they are throwing away. Another big conservational concept students supported were the notions of habitat healthiness and protective wildlife sanctuaries. MEarth is home to a bee sanctuary, and nearby a bird watching facility. Students discover the relationship between the health of an ecosystem and the varieties of animals that can live there. Overall, students were engaged and very attentive in maintaining a responsive, ecological existence.

Research suggests that gardening can be a powerful tool in teaching learners about sustainability. Not only are there physical and cognitive benefits to ecological gardening as well, but also the students are interested, excited, and engaged with lesson content. Learners become active participants in the shaping of their knowledge. However valuable, garden projects currently do not have the committed personnel, resources, or funding required for implementing an agricultural site at each school. With ecoliteracy trained employees, gardens can teach children about the concepts of environmental sustainability.

Discussion

Outdoor activities like horticulture have proven to be extremely beneficial for elementary students. Appropriately utilized school gardens have a richness of active-based learning where students develop their own sense of knowledge and discovery. Garden projects successfully incorporated into the school curriculum have proven to increase elementary student's physical and cognitive well-being. Learners enveloped in the natural sphere experience lower stress levels as well as stronger relations to their peers, school, and community. Additionally, school gardens teach students about sustainable models like recycling, composting, the interconnection between humans, animals and the environment, and the importance of local food production.

Outdoor education demonstrates that learning can transpire anywhere. Despite the tremendous amount of profit students' gain in garden-based learning, they are under valued. Some schools do not focus on ecological conservation year round, but host assemblies or farmers markets once or twice a school year. In general, most elementary

schools do not have the dedicated staff, time, or finances essential for accomplishing a sustainable garden. After researching the concept of outdoor education via gardening, I understand the tribulations that arise when executing said projects. However, the amount of constructive learning that can occur in a garden holds paramount to me. Society as a whole benefits from having an informed citizen who has the wherewithal to actively address environmental issues presently being experienced. However, thought-out, well-integrated garden projects are time consuming and rigorous.

Problems and Limitations

Many teachers do not have time or the ability to complete a well-established, immersive garden program on top of their already cramped schedules. Within the first couple years, teachers or staffs who attempt to initiate school gardens often dissolve or disband due to a lack of maintenance, commitment, and income. Besides school personnel not being properly trained in ecological concepts or practices, it has been recognized that an outside party is necessary to sustain an academic garden. Funding for school gardens is narrowly focused. Many good intentioned teachers are unaware of these parameters and as a consequence, do not receive subsidy.

Furthermore, to get a comprehensive understanding of how elementary students view gardening and sustainability, I hoped to distribute an ecological questionnaire at La Mesa Elementary and implement a school garden. However, the school year had already begun and the fourth grade class I was assistant teaching in had little time or interest in starting an agricultural project.

Additionally, the questionnaire I was able to circulate at MEarth did not reach the

volume of students I originally anticipated. I wanted to survey about fifteen to thirty third to sixth grade students to get a breadth of perspectives among different age groups. Due to time constraints, I was only able to examine sixth graders. All in all, only four sixth grade students responded to my online survey, which gave me a small insight into student's perspectives and ideologies on sustainability. The positive feedback from learners gives instructors room to expand their teachings to outside the classroom.

Recommendation

Firstly, I recommend that elementary schools partner with nonprofit ecological programs that wish to teach future generations about today's environmental distresses. Through my research I have found that an outside source founded in ecofriendly activities, coordinated by teachers and knowledgeable staffs delivers the optimal outcome for school gardens. Secondly, I advocate that teachers and institutions become educated on sustainable materials to give students a well-versed training on sustainability and being green. Thirdly, I encourage teachers and schools to become more informed about grant and scholarship requirements. Without funding and informed personnel, school gardens are impractical.

Conclusions

A garden can be a powerful tool in promoting outdoor education, community, restoration, and sustainability. Gardening can become a lifelong hobby that stimulates physical activity and psychological stability. Outdoor education via gardening fosters stronger student-institution connection, as well as increases learner's attachment to the surrounding community. Elementary student's new regard for the community reduces

student's risk behavior and increases the child's self esteem.

Due to a lack of money, school gardens cannot be orchestrated through a district or institution. Garden grants, scholarships, and awards are available to all schools in California. Nonetheless, ecological applications are narrowly focused and difficult to complete if the candidate is unfamiliar with healthy gardening configurations and environmental vocabulary.

Elementary students have shown interest in learning about ecological sustainability and keeping our planet green. As educators, it is our responsibility to capture learner's enthusiasm about the environment and direct that energy towards collaboratively building something constructive for the betterment of humankind. Sustainability does not need to be an ambiguous topic, and with my research I hope to clarify that notion.

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Appendix A:

Students 3rd-6th Grade Survey:

1. What grade are you in?
2. Do you enjoy going to MEarth Habitat? If so, do you think other students would be interested in going? –Why?
3. What is the most interesting thing you have learned at MEarth Habitat?
4. What is your favorite thing to do at MEarth?
5. What is your favorite thing to plant in the MEarth garden?
6. What have you learned about being green or sustainable?
7. Do you think you could teach your family and friends about being green?
8. After going to MEarth, do you plan to live a more environmentally friendly life?
9. Are you more interested in learning about nature after going to MEarth? –Why?
10. What would you like to do when you grow up?

Appendix B:Questionnaire for 6th grade teachers at Carmel Middle School in collaboration with
MEarth:

1. Do you believe that teaching students about sustainability is important? (Ex. water conservation, composting, growing own food, recycling, etc.) Why or why not?
2. Do Carmel Middle School students know what sustainability is?
3. Do you believe that gardens are important in schools? Why or why not?
4. How do you (or other classrooms) educate Carmel Middle school students on sustainability or environmental education? (If you do)
5. Are there any sustainability/ environmental education programs that you know of being implemented in Carmel Middle School besides of MEarth?
6. What subjects do teachers in Carmel Middle School utilize the garden for? (Just science, or math and literature as well?)
7. How do your students react to learning the garden? Do they enjoy it?
8. What are the benefits that your students gain from learning in the garden?
9. Are there any difficulties you experience in using the school garden to educate the students?
10. Was getting MEarth started difficult? What were some drawbacks you may have faced? (Funding, support, etc.)

Appendix C (Appendix A Answers):**1. What grade are you in?**

Student1- 6th

Student2- 6th

Student3- 6th

Student4- 6th

2. Do you enjoy going to MEarth Habitat? Why or why not?

Student1- Yes I think it is a great place to learn as long as we take care of it.

Student2- Yes, because there are new things I am learning in MEarth.

Student3- Yes it is really fun because of all the fun activities we do i think everyone should go.

Student4- I do, because we harvest and learn how the world is, and how we can make a difference.

I think other students will like doing it because you get to harvest, create, and it helps us get involved in the world.

3. What is the most interesting thing you have learned at MEarth Habitat?

Student1- Bird watching

Student2- I leaned about H.I.P.P.O and F.L.O.S.S.

Student3- How to make Chinese food

Student4- The most interesting thing in the MEarth Habitat is learning about the Metric (mistreatment of our food), and how to stop it.

4. What is your favorite thing to do at MEarth?

Student1- Observe.

Student2- I like planting.

Student3- Science.

Student4- My favorite thing to do at MEarth is to bird watch, to be creative, and being involved in the world.

5. What is your favorite thing to plant in the MEarth garden?

Student1- I don't know I have not planted here yet.

Student2- EVERYTHING!

Student3- Beans

Student4- I like all the plants, but my favorite is strawberries

6. What have you learned about being green or sustainable?

Student1- It is important to save water because in a time of drought there is less water being evaporated into the air therefore you must conserve water because there is less rain

Student2- I learn that aluminum is not recyclable.

Student3- Making a compost box

Student4- I have learned that to be sustainable I have to follow F.+L.+O+.S.=S.

R. O. R. E. U.

E. C. G. A. S.

S. A. A. S. T.

H. L. N. O. A.

I. N. I.

C. A. N.

L. A.

B.

L.

E.

7. Do you think you could teach your family and friends about being green?

Student1- I think I can tell my family about what I have learned in a family meeting.

Student2- I could get my family got compost and recyclable because it would really help.

Student3- We could maybe have a party and give out compost boxes

Student4- I could teach them to follow the rule F.L.O.S.S., and I could teach them how to vote with their fork.

8. After going to MEarth, do you plan to live a more environmentally friendly life?

Student1- Yes!

Student2- Yes

Student3- Yes I already do

Student4- Yes. I look at everything differently and only buy foods that are good for me, and made without any antibiotics, rbst or rbgh, etc.

9. Are you more interested in learning more about nature after going to MEarth?

Student1- Yes because learning is one thing but being in a habitat while learning about habitats is amazing.

Student2- Yes, because I like learning more about our community ecosystem.

Student3- I am interested in learning about cougars

Student4- Yes, because I like the Earth and it is rude for people to harm animals with chemicals. God said we would be in charge of the animals, but he never wanted us to cheat to eat.

10. What would you like to do when you grow up?

Student1- I would like to be a marine biologist

Student2- I would like to write for the New York Times, and write about what is happening in the world.

Student3- I would like to play sports or be a youtuber

Student4- I would like to be an artist and an engineer.

