

Living Pono: A Case of School Gardens on the Big Island of Hawai'i

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A kalo (taro) plant growing in Mala'ai Garden on the Big Island.
(Photo by the author, 2015)

Living Pono: A Case of School Gardens on the Big Island of Hawai'i

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Abstract:

In this investigation, based on fieldwork during a five-month period, the impacts on school gardens on students' relationships with food and the environment on the Big Island in Hawai'i are explored. The focus is on the effects of garden based learning on student's understanding and attitudes towards food and their local environments as well as how it encourages the Hawaiian concept of *living pono* or living righteously.

It is argued that society, food, as well as the modern classroom are increasingly fragmented from the natural world and real-life contexts. Applying different theories of constructivist and experiential learning, human-nature relationships, sense of place and place meaning and attachment to the field material, it is further argued that garden based learning as an alternative pedagogy helps students deepen a sense of place, cultivate an ecological consciousness and ethos, while also connecting with communities, and fostering social well-being.

Key Words: school gardens, garden based learning, food, human-environmental relations, environmental education, experiential learning, sense of place, ecological consciousness, community, social well-being, *pono*, the Big Island, Hawai'i, human ecology

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1. Introduction

Driving along the upper highway road it is clear to see the bountifulness of the Island of Hawai'i. Vines of passion fruit dangle on your right hand side and guavas on your left; lush mango trees canopy around the road above and you certainly would not have a lack of choice for local fruit stands. Taking a trip to the center of the island to the ranching community of Waimea, you can even visit Hawai'i's paniolos or cowboys at Parker Ranch, one of the largest and oldest cattle ranches in the United States (Parker Ranch 2016). At a glance, this is undeniably a bountiful place. The Island of Hawai'i (more commonly referred to as the "Big Island") is the largest in the Hawaiian archipelagos (Figure 1). What makes the Big Island unique is that it is an agrarian paradise and home to eleven out of the world's thirteen climate zones, from the snowy tops of Mauna Kea, the Martian looking lava fields outside of Kona, the forests of Honokaa, to the luscious rainforests in Hilo. Everything grows here. It would seem a bit odd or even ludicrous to think that there would be any problems with food here...



Figure 1. Map of the Hawaiian Islands. (Map adapted by the author 2016.)

As it turns out despite being this fertile place, the Big Island still faces issues of a homogenizing agricultural system, issues of poverty with 73% of people living below the poverty line, combined with rising food prices, and pressing issues of food security with roughly 27,280 people experiencing food insecurity (Feeding America 2013). Even though agriculture is the state's second largest industry following tourism, the state of Hawai'i shockingly imports nearly 85-90% of its food (Kent 2015). This is certainly an area of concern for the island's food security. Hawai'i is approximately 4000 kilometers away from continental U.S. If any sort of natural disaster occurs or some type of disruption to the food supply transpires, what would happen to the residents of Hawai'i? What if the ships or planes don't come?



Figure 2. A Local Farm in Waimea on the Big Island. (Photo by the author, 2015.)



Figure 3. A Sale on Spam at a local grocery store in Waimea. (Photo by author, 2015.)

Further complicating this, there are also problems of poor eating habits and the overconsumption of processed foods leading to rising levels of obesity, diabetes, and cardiovascular disease. It seems highly unlikely and even unimaginable when

some children have never even tried pineapple or local taro — the Big Island certainly has its fair share of big problems.

The food system is unfortunately broken. Looking at the juxtaposition of Figures 2 and 3 of a local farm growing fresh produce competing with a sale on Spam (canned meat) at a local grocery store exemplifies the situation at hand. From the hyper industrialization of food and gross overconsumption; where it is cheaper for residents to purchase cherry tomatoes imported thousands of kilometers across the Pacific from Mexico then to purchase from a farm down the road; to soda companies target marketing children in local schools; and where society in general is bracketed off from its natural realities. The process from seed to table thus is in a state of fragmented disarray. The question is then, what can be done about this?

There is a local movement underway on the Big Island that is starting to respond to this very question and craves improvement by seeking to have a garden at each school. School gardens have the potential to help overcome some of these barriers by linking education, culture and the environment, re-embed individuals and communities with their food system and increase equal access to nutritious, tasty, and sustainable food. The mission is to deepen youth's connection to the *'āina* (land) by using school gardens as pedagogical sites where students can grow their own food and develop an awareness of local environments. As a result students in theory have better access to nutritious foods, an overall awareness of where their food comes from, how it is grown, its ecological connections, as well as newfound feelings of empowerment. The idea is not to necessarily create a generation of future farmers, but rather help a generation make better decisions when it comes to food and have an improved awareness of and ethos for their local surroundings (Hawaii Island School Garden Network 2016).

1.1 Aim and Research Question

As a human ecologist, I have always been interested in people's relationships and connections to land, place, and food in order to seek different avenues for living sustainably and to promote pro-environmental behaviors. In order to explore this further, I travelled across the Pacific to the Big Island to find out more about school gardens and their impacts. The aim of this study then is *to investigate the potential vitality of garden based learning in improving relationships with food, teaching about environmental issues, and fostering an environmental ethos*. To reach this purpose I will pursue the following main research question and sub-questions:

How do school gardens as pedagogical sites impact students' relationships with food and the environment on the Big Island?

- *In what ways does garden based learning foster a sense of place?*
- *How does this affect students' ideas, understandings, and meanings of food and their environments?*
- *In what ways do school gardens impact students' social wellbeing?*
- *In what ways does garden based learning support living pono (or living righteously) for students, the environment, and communities?*

1.2 Choice of Field

What makes the context of the Big Island unusual is that it is not like most other urbanized community garden projects that work with participants living in a concrete jungle. Residents of the Big Island are certainly no stranger to seeing fruits and vegetables growing in their natural habitats or even seeing a farm. However despite these obvious differences when juxtaposing the urban and rural, it appears that they are more similar than one would expect, sharing much of the same issues of fair access to nutritious and sustainable foods as well as changing climates and environments. Given this interesting paradox, the incorporation of school gardens in the context of more rural setting such as the Big Island provides an intriguing point of research.

In recent years there has been growing interest in seeking more sustainable endeavors particularly regarding agriculture and food security in Hawai'i. A 2007 study conducted by the Rocky Mountain Institute on the local food system in Hawai'i mentioned school gardens as a potential resource for improving the local food economy (Page et al 2007). A 2013 report by the Department of Health also expressed interest in school gardens in supporting health, fitness and nutrition (Hawai'i DOH 2013). In addition, there was also a PhD. study about school gardens on the Big Island to help develop a place-based curriculum (Wei 2012). Since the school garden movement in Hawai'i is relatively new and still developing, there remains much opportunity and interest to further explore its impact on students and its overall significance in education and local food movements, thus providing grounds for this study.

1.3 Human Ecology and School Gardens

Human ecology as a field of research lends itself to deeper understandings of some of the world's greatest environmental problems. Often overlooked in other disciplines, human ecology is concerned with the interface between individuals, society and the environment along with their respective political, social, and cultural aspects (Steiner 1993). Though there have been many attempts to combat environmental issues like climate change, global food security, and equitable distribution of natural resources, many continue to fail arguably because they stem from the kinds of Cartesian dualisms between mind and body, nature and society that continue to permeate modern Western thought, convincing us that we as human beings are something separate from the rest of nature and thus resulting in the fragmentation of society. This mental wall is arguably apparent in our current food system as well as our education system. Given this, adopting a human ecologist perspective and taking a more critical look at how society relates to the natural world is important because to a large extent humans are the filters through which these environmental issues arise and hence has much to contribute to the expanding research on school gardens, especially when looking at individual relationships with food and the environment. Given the fact that food is a part of the natural world and hence an ecological concern, the school garden movement's goal to connect students to their local environments and food is a topic for a human ecologist.

1.4 The Roadmap

Before proceeding, let us clarify some meanings and concepts. Throughout this study I describe Western society as modern based on the notion of the Cartesian dualism. When I mention food in the garden it refers to what can be grown there, mainly fresh produce and in certain cases chicken eggs. I refer to the Island of Hawai'i as the Big Island, and I use the term Hawai'i to refer to the entire state. When I speak of nature, the environment, or the natural world I use them synonymously. Though some may find this precarious, I acknowledge the interconnections of humans and the environment and thus it is not my intention to infer nature as something separate from humans, however I use these terms for the sake of clarity.

The first part of this investigation offers a general overview of the school garden movement starting with a brief history of incorporating gardens in education, followed by a literature review of past studies, and ending with the background to provide the context for the school garden movement on the Big Island. The second part of this study takes up different theoretical perspectives of garden based learning as an alternative pedagogy. Using empirical data and pulling on threads of human-nature relationships, constructivist and experiential learning, as well a sense of place, this study investigates how school gardens on the Big Island can contribute to combatting the disconnect between society, food and the environment, through the promotion of pro-environmental attitudes and *living pono*.

1.5 Glossary of Key Terms:

'Āina': land

Hā: breath

Haole: Caucasian person, or person not of Native Hawaiian ancestry

Kapu: sacred property in a thing and the law or prohibition that guards it

Keiki: child

Living pono: to live righteously or in balance

Mainland: continental U.S.A

Malama honua: to take care of the Earth

Mana: spiritual power or energy

Na keiki: children

Ohana: extended family

Pono: righteousness or in balance

Pono 'āina: the life of the land is perpetuated in righteousness

Local food movement: refers to a movement to change the current food system towards more a more local, sustainable, and just system.

2. Background Information

2.1 What is Garden Based Learning?

Garden-based instruction includes a variety of agricultural and horticultural techniques including planting different fruits and vegetables, using potted plants and raised beds, weeding and maintenance, compost systems, and in-ground planting (Blair 2009, p.16). School gardens vary in size and structure as some focus on vegetable gardens whereas others also incorporate aquaponics and livestock like chickens, pigs, and goats. There are also many different types of gardens such as cultural gardens, art gardens, ecological gardens, literacy gardens, and vegetable gardens (Johnson and Duffel 2008). Also, tasks vary depending on the age group, and teachers. Unlike conventional school subjects, school gardens do not follow a strict curriculum, as there is no single way to teach a garden class, and so instruction is quite flexible, diverse and largely dependent on the discretion and experience of the instructor. Many teachers take advantage of the growing network of school garden research and online resources for class ideas and ways to start a garden.

Garden-based learning utilizes a hands-on and experiential learning style to bring the classroom outside and to use the local environment as the teaching tool (Blair 2009). A school garden serves as a dynamic, holistic, and interactive 'living' classroom where students can apply observational, social, and nurturing skills (Johnson and Duffell 2008). The philosophy behind garden-based learning is to facilitate an alternative pedagogy, one that connects students to a real-world setting while enriching learning opportunities, allowing students to observe and experience their locale, deepening a sense of place as well as developing life skills (Blair 2009).

School garden education is by no means a new idea. In fact, the value of embedding education outdoors dates as far back as the sixteenth century to John Ames Comenius who professed the benefits of learning through the senses in the garden (Desmond et al 2004, p.34). Jean-Jacques Rousseau also stressed the significance of school garden education laying the foundations for students in later life (ibid). In the past school gardens in the United States School served a more aesthetic purpose rather than for consumption, however during WWI and WWII they became an important contributor to food production (Blair 2009 and Desmond et al 2004). During the post war era, school gardens lost their popularity alongside the shift towards technological advances in education. However, school gardens once again gained momentum during the mid sixties to mid seventies through the wave of environmentalism and progressive liberal initiatives (Blair 2009).

School gardens in the United States are once again returning to the spotlight. For example, a notable garden program in Berkeley California called the "Edible

School Yard” uses vegetable gardens as a way to actively engage students, teach them about sustainability issues, and promote healthier lifestyles (The Edible School Yard Berkeley 2016). Another initiative is underway in New York schoolyards where children are being exposed to a world of gardening and horticulture (Grow to Learn). Even the United Nations has started their own garden club and has turned to small scale gardening projects to assure more sustainable avenues towards food access, health and nutrition, and food sovereignty (UN Food Gardens 2016). The reoccurrence of school gardens has arisen to a great degree out of growing attention to the importance of teaching younger generations about healthy eating habits and nutrition, encouraging more physical activity as well as engaging in more environmentally and ecologically based pedagogies while connecting participants to the natural world in the school setting.

2.2 School Garden Research

There is increasing recognition of the benefits of moving the classroom outdoors in the garden. Multiple studies praise school garden education for taking the classroom outside and having a wide scope of impacts on nutrition and healthy eating habits (Graham et al 2005), fitness, improving academic performance, strengthening individual confidence and social behavior, and instilling a stronger environmental stewardship and pro-environmental behavior.

Ratcliffe’s et al (2011) study on youth’s eating behaviors and Lineberger and Zajicek’s (2000) study on school gardens and the consumption of fruits and vegetables found that school gardens positively increased students’ preference for eating more fruits and vegetables and had great potential for promoting healthier lifestyles. Morris and Zidenberg’s study (2002, p. 93) with fourth grade students also agreed with the positive effects of garden based education and encouraged educators and administrators to consider incorporating garden based education as a means to improve health and nutrition programs.

Additionally, Robinson and Zajicek’s (2005) year long investigation on school gardens impact on elementary school students development of life skills found that participants improved a host of social skills including life skills, working with others, and also self- esteem and understanding. Miller’s study (2007) on school gardens and child development with kindergarten students showed that working in the school garden is conducive to academic success as well as developing communicative skills, self-understanding as well as an environmental consciousness.

Extending this, Lohr’s and Pearson-Mim’s (2005) study on children working with plants revealed that childhood experiences with the natural world strongly shaped adult attitudes later in life. They suggested the garden would influence children’s future environmental perceptions, attitudes and behaviors in adulthood (2005, p. 476). Similarly, findings from Skelly’s and Zajicek’s (1998) investigation on garden programs and environmental attitudes suggested that environmental and garden based learning should be considered in education because they positively contribute to pro-environmental views among students. Taking this a step further, Skelly’s and Bradley’s investigation (2007) revealed that students who worked in

school gardens had a stronger sense of responsibility, higher environmental ethos as well as a better understanding of real world applicability of science.

Amongst these studies and research projects, there is a wider call for more long-term analyses of the effects as well as the sustainability of school gardens programs. Moreover, there has been some skepticism, delay, and uncertainty for full incorporation of school gardens in regular school curricula due to the lack of standardization, the difficulty to quantify academic achievement and progression, the challenge to implement and change current curricula, as well as to equip and train teachers (Williams and Brown 2012). Taking all of this into consideration, despite its limitations, the school garden movement is certainly gaining momentum and is making a positive impression as an alternative educative tool.

2.3 School Gardens in Hawai'i

There is currently no official statewide garden curriculum that is regulated or implemented in Hawai'i. In spite of this the school garden movement is still becoming increasingly popular on the Big Island thanks to the support of the Hawai'i Island School Garden Network and the Hawai'i Farm to School and School Garden Hui (HFSSGH). The HFSSGH was established in 2010 and is composed of different farm to school and school garden network leaders from six islands as well as delegates from the Hawai'i Departments of Education and Health. They serve as an interim for school gardens in Hawai'i with a goal to improve statewide Farm to School and School Garden movements by helping similar island groups in the development and sharing of resources and state policy. The Hawai'i Island School Garden Network is a program established in 2007 supported by the local NGO, The Kohala Center (Kohala Center 2016). Some garden programs also receive assistance from Food Corps Hawai'i, a nationwide association run by AmeriCorps leaders who engage in gardening, food advocacy, and education (Food Corps 2016). The network helps facilitate the school garden movement by assisting local school gardens, running professional development workshops for educators, and supplying small grants (Hawai'i Island School Garden Network 2016). Their task is to have a school garden at each school in hopes of reconnecting *na keiki* to the land by teaching basic agricultural and gardening techniques, all with the greater intention of improving the local food economy as well as the creating access to healthy, nutritious, and sustainable food (ibid).

The network has been gaining momentum over the course of nine years. As of 2012 the majority (96%) of schools had gardens, including a total of sixty school gardens, thirty-three working garden leaders, over six thousand students who were involved with a form of garden-based learning, 4046, 86 m² of land used, and an astonishing 4390 kilograms of food were grown by students (2012 Farm to School and School Garden Survey, 2012).

2.4 Hunger for Change: the Problem of a Decontextualizing Food System

For the young, food is from Venus; farming is from Mars (Louv 2008, p. 55).

The school garden movement on the Big Island sprouted out of growing concern of the local food economy, the state of health and nutrition (particularly of children) and the overall care for and connection to the environment (Hawai'i Island School Garden Network, 2016).

As previously mentioned, the modern industrialized food system is currently in a damaging state of displacement and disembeddedness (Orr 2012). Agriculturalist and naturalist, Berry argued (2008, p. 305) that the industrialized nature of the modern food industry has eroded the link between food and agriculture and by result we have forgotten that “eating is an agricultural act”. Food itself has become an abstract idea leaving eaters sequestered from a “biological reality” (ibid p. 309). It has been argued that the current state of the food industry renders eaters as mere “passive” and “uncritical” consumers” (ibid, p. 306) who rely on “services and resources outside themselves and their families (Tansey and Worsley 1995, p.142). As a result, many consumers are unaware or misinformed about their food and its process from farm to table (ibid, p. 162).

Yet the growing of food and fishing has always played an important role in Hawaiian culture and was once a thriving system that went beyond basic sustenance needs, interrelating identity, *kapu*, religion, *ohana*, and other social interactions. Ancestors of Hawaiian peoples utilized a sustainable agricultural and fishery system called *ahupua'a*, which divided the land into different wedges or boundaries from the mountains down to offshore parts of the ocean growing staple crops such as taro, sweet potato, banana, coconut and breadfruit as well as the utilization of tidal pools and fish ponds (Chirico and Farley 2015, p. 4). Under this system people had open access to fresh water coming from the mountains and down to the oceanfront for fishing. However commoners had to pay taxes to land owners (Fisher 2015). These land boundaries were formalized under *kapu* which sought the preservation of the *mana* and secured the sustainable use of resources by restricting fishing and harvesting depending on the season or abundance of particular resources in order to safeguard the overall well being of a community (Fisher 2015, p.13). Underpinning this was a worldview of respect for and responsibility to care of the land and its resources, a strong sense of place, and interconnections with communities (Fisher 2015).

However Hawaiian social and agricultural systems were uprooted when the wave of colonialism arrived at its shores following Captain Cook's so called “discovery” in 1778. The onset of European contact drastically shifted Hawaiian agriculture from one of ancestral connection to domination over land (Fisher 2015, p.17). Alongside the wave of *haole* came ranching and cattle, plantation practices growing sugar, pineapple, coffee, and rice as well as long lasting changes to the physical landscape from soil erosion, redirection of waterways¹, and the introduction of invasive species (Fisher 2015,). Land became an interest for foreign trade used mostly for production of export crops like rice, pineapple, and sugar²and

¹ To produce 1 kilogram of sugar requires approximately 1893 liters of water. In 1900, the Big Island had 5 sugar mills consuming 114 million liters of water a day (Wilcox 1996, pp. 1-5)

² Hawai'i also had a brief sandalwood trade roughly between 1800-1840 (Levin 2015, 47)

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from 100 years after Cooke's landing up until the mid twentieth century plantations were at full force forever altering Hawaiian agriculture (Kent 2015, p. 29) .The modern agriculture system in Hawai'i transitioned from what was once the "sharing of *hā* between farmer and a living landscape" to a detached industry from both its cultural origins as well as its "microelements and connective tissues" (Levin 2015, p.46).

This is, to a large extent, reflective of the current local food system in Hawai'i. According to a 2012 report by the United States Department of Agriculture (USDA) there were 4,282 farms on the Big Island using 2.8 km² of land and the majority of which were small scale being less than 0. 04 km² in size (U.S. Agriculture Census 2012). Even though the Big Island may have the environmental "capacity" to grow its own food, what is currently grown on a larger scale is mostly either crops not for consumption such as biofuels or seeds, food crops that would not exactly meet basic nutritional or dietary requirements like coffee or macadamia nuts, or crops for state export not necessarily for local consumption (Kent 2015, p. 31).

Further complicating this issue of local production is the challenge of competing land and wage prices which make it challenging for local farmers to compete with big agricultural companies (Kent 2015, p.29). As an island, food security and access is an ongoing state-wide concern for residents, so much so that the State of Hawai'i released the 2012 "Food Self Sufficiency Bill" to address the state's extreme dependency on food imports as well as to take measures on improving the local food economy stating:

The legislature further finds that Hawai'i's reliance on out-of-state sources of food places residents directly at risk of food shortages in the event of natural disasters, economic disruption, and other external factors beyond the State's control (H.B. NO. 2703, 2012).

Due to the modern food system, residents of Hawai'i heavily rely on imported foods further separating individuals from where their food comes from. The abstraction of the food system is of great concern because as Berry argued (2008, p. 13), society is experiencing a kind of "cultural amnesia" that is "misleading and dangerous". This is heavily problematic because it is contributing to a new generation that lacks the fundamental skills and knowledge of food and corresponding eating habits (Tansey and Worsley 1995, p.163).

This also sheds light on the current 'globesity' problem of the global trend of obesity (WHO 2016). Ironically along with increasing concern of global hunger and malnutrition is this issue of obesity (ibid). The condition itself is non-discriminative causing serious physical issues including heart conditions, diabetes, social and physiological problems. This matter of globesity coincides with poor eating habits and its related ailments in Hawai'i. Although Hawai'i only has the third lowest ranking for state obesity levels in the United States, national levels are the highest in the world (The Trust for America's Health 2013). The fact of the matter is that obesity levels in Hawai'i continue to rise at alarming rates. For instance, the rate of obesity was 9.2% among children aged 2 to 4 and 11.5% among youth age 10 to 17 in 2011, 13.4% among high school students in 2013 and 22.1 % among adults in

2014 (State of Obesity 2016). According to a study on youth obesity in Hawai'i, obesity levels have nearly doubled in the United States over the past few decades, contributing to serious health risks (Stark et al 2011, p. 27). Given this, statewide obesity levels remain a pressing issue for Hawaiians' health and draws attention to the need for better eating habits, increased physical activity, and access to healthier foods.

Moreover, this problem of the decontextualization of food transcends simply knowing where it comes from and underlines a human-nature divide – one that separates humans from the biological physical world. However, as Kirschenmann importantly reminds us:

Food is not an isolated thing—a mere commodity comprised of a list of ingredients or the numbers on a nutrition facts panel. Food always becomes part of the ecology from which it is produced (Kirschenmann 2008,p.108).

This is a critical concern because as Berry (2008, p. 311) pointedly stated, “how we eat determines to a considerable extent how the world is used”. In this light, food issues not only jeopardize individual health, but also the health of the environment. Food advocate, Nestle discussed the ethics of food and argued:

Food choices have economic, political, social, and environmental consequences that place improvements to the health of individuals or populations in conflict with other considerations (Nestle 2002, p. 665).

In this sense food is not such a neutral side dish, but instead infused with deeper political, social, and cultural meanings, hence the act of eating becomes one of humanity's most politically and culturally charged activities. Thus issues of food security, equal access to healthy foods, and combatting the obesity pandemic among youth is of utmost concern.

2.5 Aloha 'Āina: Significance of Land and Place in Hawai'i

Ua mau ke ea o ka 'āina: 'i-ka pono- the beauty of the land is perpetuated in righteousness
(The motto of the Hawaiian kingdom, and state).

Issues pertaining to food, agriculture and the environment have a strong bearing for Hawaiians because it intercepts with their worldviews, culture and identity. The Hawaiian worldview is one based on “interconnectedness” –everything is connected and transcends perceptions of and relations to land and place (as well as the ocean) (Kanahele 1986, p. 152). This way of life reaches back to the history of Hawaiians as island people. As one of the last places on earth to be settled, Hawaiian's ancestors travelled in large canoes across the Pacific from Eastern (present French Polynesia, to the far south of Hawai'i) Polynesia between approximately 300 and 600 CE developing a view that required the careful protection of natural resources to maintain the life of the community, strong values of interconnectivity of all life, and

a sense of sacredness of the natural world (Fisher 2015, p.7). *‘Āina*, unlike in Western thinking, is thus held in high reverence, tightly interwoven with one’s identity, self-esteem, *ohana*, genealogy, and history (Kanahele 1986, p. 181).

In the Hawaiian view, certain places become a matrix of memories, long family genealogies connecting the present to the past, and perhaps better understood as “storied” places (ibid). This is evident in the names of places and by knowing these names meant knowing where you came from and your history. Closely tied to one’s *ohana*, land and place are interwoven in one’s familial relations and community interdependence. For Hawaiians, people are both part of and reflections of their environments. For instance, Native Hawaiians used to bury the umbilical cords and placenta as a way for them to physically and spiritually connect to the land and place (Green and Beckwith 1924). For Hawaiians, land is not passive but alive - it “breathes, moves, reacts, behaves, adjusts, grows, sickens, dies” and is a manifestation of long genealogies, past lives, successes, and *mana*- supernatural power (Kanahele 1986, p. 186). Contrasting common Western thinking, land does not belong to any individual, but instead the individual belongs to the land itself (ibid.) From this connection comes a strong tone of environmental stewardship:

We are but stewards of the “*āina* and the *kai* [sea], trusted to take care of these islands on behalf of the gods, our ancestors, ourselves, and our children” (ibid, p. 209)

These sentiments are very much alive in the contemporary ethnically mixed Hawaiian context and are elucidated in concepts like *pono ‘āina*, *aloha ‘āina*, the Aloha spirit, and are heard when you turn on the radio and hear Hawaiian (Hawaiian reggae) songs like “Island People” by Loeka Longakit or “I’m Proud” by Bruddah Waltah, as well as enacted in political activism like the “We Are Mauna Kea” protests³. In discussing traditional Hawaiian culture it is necessary to remember that culture is not static or a snapshot in time, but instead is fluid, malleable, and forever changing shape and form. In this light, just as culture shifts, many modern Hawaiians are living *pono* between Hawaiian and Western perspectives (Fisher 2015, p. 18).

2.6 “Strangers in their Own Homes”

The period between when Cook first set foot on the beaches of Hawai‘i to the official annexation 1898⁴, saw great political, social, cultural and environmental exploitation, turmoil and transformations bringing about the onset of disease and serious impositions of Western religion, science, politics, law, economics, and language (Rohrer 2010). This was seen in the change in land systems to private ownership, the establishment of plantation towns and the sugar industry, changing

³ In 2015 protests and controversy erupted over the proposed \$1.4 billion project for building a 30 meter tall telescope on the summit of Mauna Kea on the Big Island causing road closures and halting construction. The site already hosts the world’s largest astronomical observatory, but is also one of the most sacred places for Native Hawaiians believed to be the site of origination (Fox 2015).

⁴ The overthrow of the Hawaiian government occurred in 1893 and was followed by a brief republic. Hawai‘i then became a territory of the United States in 1898 and then the 50th state in 1959 (Rohrer 2010).

demographics with the influx of migrant workers, the segregation of public schools and Hawaiian culture becoming taboo and something that needed to be eradicated. This caused serious cultural and social violence contributing for some a kind of internalized racism and leaving Hawaiians feeling as “strangers in their own homes” (Kanahele 1986).

Today Hawaiian culture is not completely ostracized from the public life. In fact there was a cultural Renaissance post WWII as a form of cultural independence and assertion of Hawaiian morals and beliefs (Fisher 2015, p. 18). This brought about a strong wave of Hawaiian pride and revival of traditional practices, defending the *‘āina*, and a renewed sense of place as evident in the revival of cultural practices and its inclusion in state curriculum, such as students learning the hula and the Hawaiian language, and the retrieval of traditional sailing practices (Fisher 2015, p. 20). Also, many interested in sustainability issues and environmentalism are beginning to embrace Hawaiian values of *pono*, relationships with *‘āina*, and agricultural practices (Chirico and Farley 2015). Though significant, the repercussions from the annexation for a large sum, remain a deeply, personal, sensitive, and painful issue resulting in some social animosity undermining the idea of a harmonious paradise.

These race relations and tensions between *haole* and Native Hawaiians should not go unmentioned. The Hawaiian population is quite multicultural in composition having a mixture of Asian cultures, Native Hawaiian or other Pacific Islanders, Caucasians and smaller African American and Native American populations. According to the 2014 U.S Census Bureau report released in 2015 on The Big Island’s population Native Hawaiians or other Pacific Islanders accounted for 12.7% of the population, Caucasians (alone or mixed) made up the majority with 34.3%, Asians composed of 22% of the population, and 11.6% Hispanic.

The question of Hawaiian identity thus is fairly complex eliciting many lines of argument. Who is Hawaiian? What does it mean to be Hawaiian or “part-Hawaiian”? Is it based on bloodlines? Is it based on cultural ties? Is someone Hawaiian if they follow traditions? Is it a matter of how long you have lived in Hawai‘i (Kanahele 1986, Rohrer 2010)? In a *haole*’s view, since Hawai‘i is part of the United States it is also their home and they have the right to be there (Rohrer 2010). Many *haoles* and residents of Hawai‘i resent the fact that they are not considered Hawaiian after living on the island for long periods of time because for many of these families and residents, they too call Hawai‘i home and describe themselves as *kama‘aina*, which can be interpreted as “old-timers” although it literally means ‘children of the land’. As with many issues pertaining to identity and ethnicity, race relations in Hawai‘i is quite a controversial and debatable topic which goes beyond the scope of this study. What is important is to highlight how remnants of colonialism and its cultural impacts run far and deep continuing to greatly impact Hawaiian food, diet, education, and the environment. Given this, it is key to remember Hawai‘i’s rich history and colonial experience, while respecting the fact that for many Native Hawaiians living with *haole* continues to be an emotional journey that should be treated with the utmost respect and reservation.

All of this speaks to the significance of the use of school gardens in Hawaiian schools as it has close ties to Hawaiian values of living with the natural world and

strongly reflects attitudes that there should be a mutual, respectful, relationship. It overlaps with more traditional views of agriculture and sustainability that still thrive in Hawaiian culture (Wyche and Surry 2015, p. 235). Amidst the urbanization of the tourist industry, coupled with the transition from agriculture to service jobs, as well as a living memory of the stigmatization that agriculture once had with plantations, the focus of gardening (especially for younger generations) up until now, has been quietly shifted to the sidelines (Wyche and Surry 2015, p. 236). However, given the deep roots that land and place have in Hawaiian identity and culture, there is much more at stake. As Wyche and Surry noted (2015, p. 236), as a result of weakening connections that urbanization and modernity provoke, “ the connection can be lost in a single generation”. Given this, the Hawaiian school garden movement should not be confused with a romanticisation of a past of what was once a self -sustaining prosperous agricultural and fisheries culture, but instead, an opportunity to allow older generations to pass down knowledge to new generations while connecting *na keiki* to their land, identity, heritage and culture (ibid, p.236). Keeping all this in mind, the state of the food system in Hawai’i thus has wider cultural and environmental implications alluding to differing human-nature relationships.

2.7 Mechanized Not Realized: Gaps in Environmental Education

The current public education system in Hawai’i uses a statewide mandated curriculum including core subjects such as mathematics, science, English and history. There is mandatory annual statewide testing postulated under federal law measuring student performance, growth and proficiency in core subjects, skills, and readiness for university and career development (DOE 2016). It should be noted that there are some programs which undertake a more culturally relevant and Hawaiian based framework including: 1) Malama Honua, an explorative program rooted in culture and sustainability based on the “Worldwide Voyage of the Polynesian sailing canoes, Hōkūle’ā and Hikianalia” (“Malama Honua” 2016); 2) Nā Hopena A’o (HĀ), a holistic program grounded in a Hawaiian context teaching values, language, and dispositions of Hawaiian culture (“Nā Hopena A’o” 2016) and 3) a recently adopted more integrated science program called Next Generation Science Standards (NGSS) that claims to revolutionize science education and to equip students to take on global issues (“A revolution in science” 2016). However despite of these, the public education system remains to a large extent heavily focused on standardized testing and achieving high scores. Often this type of education is critiqued by progressive teaching academics for its silo-effect as well as being too exclusive and disadvantageous for students who do not necessarily measure up to the arbitrary yardstick of academic assessment (Orr 2011, Sobel 2004, Williams and Brown 2012).

Critics argue that there is a kind of intellectual alienation from natural settings that is especially evident in the modern classroom, highlighting some of the major gaps in current education. Bowers (1999, p. 198) noted a strong political tinge pervading in educational institutions and argued that they circulate dominant cultural ideologies based on those that were accepted by upper class groups behind the Industrial Revolution. Jackson (1989,p. 17) likewise critiqued modern education

for its socialization into traditional categorizations further encapsulating society into “dualisms and dichotomies”. Williams and Brown (2012, p. 13) maintained that current sustainability education in America has the tendency to fall into the “sustainability trap” pointing to how past attempts to mend these issues under the mask of “sustainability” too often rested under the belly of the “global economy” reflecting the same values and beliefs as current hegemonic modern liberal ideologies. This was evident in many past educational reforms, the hyper standardization of American schools, the need for the competitive edge of “achieving more and more”, and the ongoing fear that American schools are “at risk” conjuring up anxiety and the stigmatization of those students unable to measure up (ibid p. 4).

As for the natural sciences and environmental studies, though included in many school curricula, they are much more mechanized regarding the natural world (Orr 2011). According to Orr (2011, p. 226), current teaching of place fall under the umbrella of the kind of environmental studies that are more often than not terribly “sterile” and “pigeon holed” within academia language such as “ ecology, forestry, botany, soil science, and animal behavior”. Williams and Brown (2012, p. 5) claimed that current education reforms “imagine schools as no more than complex machines and overlook life itself”. Likewise, Louv (2008, p. 332) critiqued the natural sciences for being overly reductionist and infiltrated with “absolutes” while lacking tangibility and sensual realities. In turn, Orr pointed out (2011, p. 263) that the way students learn about their world is less engaging and instead seems more like a pile of “abstractions” on top of one another further distancing itself from the world’s “real problems” and the areas in which students “live and work”.

Adding to this, conservationist Ado Leopold argued (1949, p. 223) already in the 1940s that one of the core mishaps of environmental education is the lack of a “land ethic” and “ consciousness” of land, which teaches love, respect, and admiration for the world. Without a true understanding of the value of land other than its economic worth, environmental education will continue to fall short (ibid). These gaps in environmental education are concerning because as Tuan argued (1978, p.25) the natural world can be viewed as an “inarticulate teacher” that sends “messages [that] are too subtle to be understood by the immature mind”. He claimed that children have a natural “curiosity” about the ecological world, but this trait needs to be nurtured by adults through education (ibid). Thus all of this is highly problematic because the essence of education itself is jeopardized.

2.8 Education as the Sower of Change?

Given these caveats of the current environmental education system and the strong undertones of liberalism and modernity, it raises an important question of the purpose of education, particularly its role in teaching about environmental issues and food. The idea of education as the solution to society’s greatest problems, specifically environmental, tends to be criticized for being a tool that has been too heavily relied on. Though there is immense value in educating youth, there is also a need for a humble recognition of the political, cultural, and social structures that often hinder social change.

Durkheim’s view on school reform is a bit sobering, as according to him, education “can be reformed only if society itself is reformed” (Durkheim [1897]

2005, p. 340). This highlights one of the greatest fallacies of relying on education to fix social problems and strongly suggests that education, “is only the image and reflection of society” (ibid). Education emulates and replicates society; it does not produce it. Bowers (1999) echoed this skepticism and admitted that not only are public schools situated within the same social institutions which circulate these dominant ideologies, there are also many other deep cultural, social, and political hegemonies to overcome. However, despite these obstacles, there is a strong need to include a kind of educational reform that encompasses an “ecological design” (Bowers 1999, p. 203).

Along this line of thinking, Morris viewed the foundations of education as an “ethical enterprise” that can show youth to “value their world and the very ecosystems that sustain it (Morris 2002, p. 583). On a similar note, Williams and Brown believed (2012, p. 14) that education has the potential to “enrich life” and “challenge the very core of what it means to be human in the 21st century”. As Louv (2008, p. 487) remarked:

An environment-based education movement—at all levels of education—will help students realize that school isn’t supposed to be a polite form of incarceration, but a portal to the wider world.

It is apparent then that academics want to offer a more meaningful and engaging education, one that “brings life into the classroom” (Williams and Brown 2012) yet there remains some challenges to overcome.

To sum up, the backdrop of the Big Island school garden movement is a flawed food system, a school curriculum that may not effectively address environmental issues or relations with food, as well as culturally significant relationships with land. In exploring teaching children about food and ecological issues, we need to be sensitive to its complexity for children (and for most adults at that), and hence there are no easy solutions (Kriesberg 1999). Given the differences in each child’s moral development, it cannot be expected of young children to fully comprehend all facets of the issues at hand (ibid). Keeping this in mind then, the following section takes a closer look at garden based learning as an alternative form of pedagogy by exploring different theories of learning, human-nature relations, and sense of place.

3. Theoretical Framework of Garden Based Learning

3.1 Seeds of Wisdom: How Learning Occurs

Garden-based learning falls under a constructivist paradigm. Traditionally pedagogical theories tend to divide into two main streams of thought: the traditional, where learning is transmitted, and progressive where there is more emphasis on the individual (Dewey 1997, p. 17). A constructivist view of knowledge and education holds that learning is an active, malleable, and forever changing process, which positions the student (or learner) as a subjective actor who shapes their own realities (Kahn 1999, p. 50). Under a constructivist paradigm, learning is

achieved through personal experience and reflection (Moon 2009, pp.16-21). The theory of constructivist learning stems from the working of clinical psychologist, Piaget's cognitive development (1958) which views knowledge as "flexible in nature" (Moon 2009, p.17). Piaget's theory outlines that there are four stages of children's development and processing of knowledge (Figure 4) (Inhelder and Piaget 1958, p. xi)

Stage	Description
Sensory-motor (ages 0-2)	Action oriented using basic motor functions, senses and actions
Pre-operational (ages 3-6)	Uses symbols, words and images
Concrete Operations (ages 7-11)	Independent logical thinking
Formal Operations (ages 12-15)	Abstract and critical thinking

Figure 4. Summary of Piaget's Stages of Child Development. (Inhelder and Piaget 1958, p.xi.)

Each stage of development will dictate the extent to which the child is able to process new information (Moon [citing Piaget] 2009, p.17). The fourth and final stages of development are key because this is when children or young adults are capable of more critical reasoning and cognitive functions (Inhelder and Piaget, 1958, p. xi).

The central argument to constructivist learning is that learning is not an "accumulation" activity, but rather a process that either "influences change in what is already known or understood" or vice versa (Moon 2009, p.17). Early forms of knowledge are not lost but are "transformed into more comprehensive and adequate ways of understanding the world and acting upon it" (Kahn, 1999, p. 61). In this regard, learning can be better understood as a "process of changing conceptions" (Moon 2009, p. 17).

Moreover, learning is both individualistic, meaning that each learner holds a different interpretation and creation of experience based on their background (Moon 2009), as well as social as there are different external influences on learning (Bandura 1977). The learner is interwoven with the environment that they are learning within and by result, people become both the creators and creations of their environments and social systems. Different factors including 1) personal factors such as one's previous knowledge, expectancies and mindsets, 2) behavioral factors like their skills and abilities, and 3) environmental factors like social standards, place in community, as well as influence on others shape human behavior and learning (ibid). In this view, learning does not happen in an isolated vacuum, but instead is an active process situated in a milieu of cultural, social, environmental, and political factors. Under this framework, individuals should be given more agency in the generation of knowledge and create meaning from their experiences (Moon 2009, p. 12). Given this, instructors should guide or "mediate" the learning process rather than dictate instruction (ibid, p.12).

3.2 Hands-on the Shovel: Experiential Learning

Ma ka hana ka ike - in working, one learns (Hawaiian proverb).

Garden based learning is heavily hands-on and active. Experiential learning falls under this constructivist framework, encompassing a more subjective style of learning where the student gains knowledge by action or by doing (Moon 2009). John Dewey who reigns as one of the pioneer theorists of experiential learning was unsatisfied with the traditionalist education; one that he argued (1997, pp. 26 - 27) had the tendency to “condition, drill, and bore” students. Instead he called for a more engaging and progressive education that was more purposeful, rewarding and drew from experience (ibid, p. 28). This can be summed up in Kolb’s model of experiential learning (Figure 5) (Kolb 1984, p. 81).

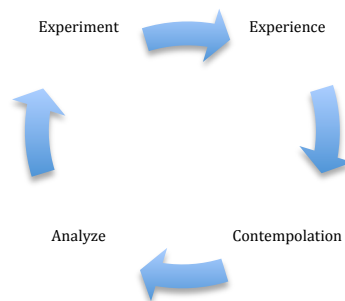


Figure 5. Kolb's Model of Experiential Learning. (Kolb 1984, adapted by the author.)

Experiential learning occurs in four stages: 1) tangible experience (like kicking a rock); 2) conceptualizing and thinking about that experience; 3) analyzing and forming new ideas based on that experience; 4) applying these theories in new experiences (ibid). According to Kolb, “learning is the process whereby knowledge is created through the transformation of experience (ibid, p. 38). In theory then, a student will learn more effectively via experience, reflection and cognitive processes of shaping their own realities and views of the world.

Experiential education, itself is quite complex and comprises of various interpretations dependent on the definition of experience itself. As Jackson (1989,p. 134) explained “we are continually being changed by as well as changing the experience of others”. Given this it is difficult to pinpoint or reduce experience to a single entity because it is a “boundless process” (Jackson 1989,p. 13). Though both traditionalist and progressive education comprise of various kinds of experiences, as Dewey noted (1997, p. 27), “the trouble is not in the absence of experiences, but their defective and wrong character”. According to Dewey (1997, p. 25-27), not all education is “educative” and makes an important distinction between “quantity” versus “quality” arguing that some experiences can pose just as many negative “mis-educative” effects as positive ones. For example, every action is arguably an experience whether it be reading a text in or writing notes. However, according to Dewey, what qualifies as a “right kind of experience” is one that invokes “immediate

agreeableness or disagreeableness and influences future experiences” (ibid). Therefore, positive experiences should involve of degree of permanence because “knowledge is continuously derived from and in the experience of the learner” (Kolb 1984, p. 27).

Adding to this conversation, Jackson (1989, p. 132) suggested that phenomenological experience cultivates an “embodied knowledge” where the corporal and moral domains are bonded together. For example, during his ethnographic study with the Kuranko in Sierra Leone, he noted how it was not a matter of simply learning by doing, but more significantly how knowledge essentially became directly connected to the action at hand and the link between thought, language and activity thus was inherently deeper in comparison to the more Western realms of abstractions (Jackson 1989,p. 132) In this sense then, garden based learning becomes more than an imitation game but an “embodied” phenomena.

Experiential learning is pivotal to school garden education particularly for its hands-on approach and student engagement. Students are able to learn by doing by putting their hands in the soil, participating in the preparation and planting of food, the overall cultivation and maintenance of the garden as well as the application of school curricula in real-life contexts.

3.3 Working in Dirt: Human-Nature Relationships

One of the main objectives of using school gardens is to bring learning and students outside of the conventional classroom setting. This largely in response to concern about the decreasing time children spend outdoors and in nature. Many studies suggest that a closer bond to nature has a plethora of positive transformative, spiritual, therapeutic, mental, emotional, effects on individuals (Louv 2008 and 2011, Wilson 2009,). Along this line of thinking, Louv (2011) coined that term “nature principle”, which emphasized the immense restorative powers of having closer relationships with nature. This concept insinuates that a stronger bond with the natural world is essential for not only the general physical, psychological and spiritual well being, but also for social interrelationships with individuals and communities and for human survival (ibid, p. 19). Louv boldly claimed that “the future will belong to” individuals who are able to reconnect to the natural world (ibid, p. 21).

Wilson ([1984] 2009) explored this human-nature relationship and the human affiliation with the natural world. He came up with the “biophilia” hypothesis, which inferred a biological and innate need to spend time with nature and other living things (ibid). This connection is a “deep and complicated process in [human] mental development” and our existence and spirits are tightly interwoven with it (ibid, p. 1). Given this, further disconnection from the natural world poses serious implications on both individuals as well as on the overall well-being of society. In looking at humans’ relationship with the sensuous world ecologist, Abram (1996,p.9) argued:

Humans are tuned for relationship. The eyes, the skin, the tongue, ears, and nostrils-all are gates where our body receives the

nourishment of otherness. For the largest part of our species' existence, humans have negotiated relationships with every aspect of the sensuous surroundings, exchanging possibilities with every flapping form, with each textured surface and shivering entity that we happened to focus upon.

Abram (ibid) suggested that what makes us human is our connections with what is not human, and in a world infiltrated with technologies, abstractions, and fragmentations, "only in regular contact with the tangible ground and sky can we learn how to orient and to navigate in the multiple dimensions that now claim us".

Moreover, amidst the ever developing technological advances associated with modernity and increasing urbanization, there is also a growing concern particularly over the alienation of children from the natural environment. Louv (2008,p. 97) similarly concerned with the fragmentation of society argued that children have been severed from nature in what he coined as the "nature- deficit disorder". It is a non-medical condition referring to the consequential impacts of the rift between modern Western society and natural environments resulting in worsening cases of emotional distress, physical illnesses, and behavioral and physiological problems (ibid). He argued that for a large sector of modern Western urbanized society, specifically children, nature (and consequently food) has become more of an abstract idea becoming increasingly distant from its physical realities (ibid, 300). He warned that this alienation from the natural world, especially in the classroom setting, is concerning because this broken bond may follow children into adulthood impacting their future sentiments centered on the environment and their communities leaving them feeling rootless and "lost" (ibid, p. 353).

Though the relationship between children and nature is certainly significant, Tuan (1978, p. 7) importantly cautioned not to be overly romantic about the powers of nature, pointing out that children's well-being largely depends on how they are raised by their families, nutrition, medical services, and the socioeconomic environment in which they are raised rather than whether or not they lived surrounded by buildings or woods.

However, in discussing human-nature relationships, it is necessary to ask what do we mean by the 'natural world'? For most, it refers to environments that have not been altered or made by man (ibid). However, in Western societies this dichotomous relationship between nature and humans did not really come to rise until the eighteenth century with the growth of cities that "lacked harmony and order", hence from this juxtaposition of cities and the natural world, nature started to be defined of what it did not possess –human works (ibid). Thus what is understood as 'the natural environment' is largely socially constructed and therefore cannot be viewed as absolute.

3.4 Being -in -the -garden

This brings up an important aspect of human-nature relationships that is often overlooked or taken for granted in environmentalism and environmental education. Many critics for instance have difficulty digesting the idea of nature as a distant 'other' separate from humans. In exploring ecological citizenship, Curtin (1999) touched upon the human-nature relationship. She critiqued (ibid, p. xiv) "radical

environmental philosophy”, which further forges a dualism between ‘nature’ and ‘humans’. By result, ‘nature’ is reduced to and treated as the “Other”(ibid). She was especially critical of first world perceptions assuming a separation from nature and argued that many other cultures and worldviews do not make such a distinction (much like in the Hawaiian sense) (ibid Chapter 1). Curtin (1999, p. 336) stressed the significance of the interconnectivity of humans and the natural world, claiming, “we all live in eco-communities [and] live in relation to a particular place”. In this sense, like food, humans are also inescapable from the ecological and natural world.

Dickinson (2013) also echoed Curtin’s arguments and was critical of Louv’s nature principle (Louv 2011) namely because his beliefs were rooted in an underlying dubious logic on human-nature connections. She explained (2013, p.317) that this “honorable” notion of needing to care for ‘nature’ feeds into the same logic that humans are something separate from the environment further perpetuating the same ecological problems they are trying to overcome.

Adding to this discussion, Ingold contested (2011) the notion that humans are ‘with’ nature, but rather, are ‘within’. He argued that what we have been used to calling, ‘the environment’, might be better understood as a “domain of entanglement” (ibid, 70), a “meshwork” rather than simply “interconnected points” (ibid, p. 63). In other words, like a spider web, things are their connections rather than separations. Similar to the Hawaiian worldview, as humans we are in a state of “dwelling”, which according to Ingold is “intransitive; and is about the way inhabitants, singly and together, produce their own lives, and like life, it carries on” (Ingold 2000, p. 10). For Ingold (2011, p.11) then, it is not a matter of humans being superimposed on the world but rather “being-in-the-world”.

This runs along the same philosophy of Heidegger’s (1962) German notion of “dasein” literally meaning ‘being-there’ (‘there’ referring to the world). Heidegger underlined how humans are forever entrenched in the world, and for him we are dasein always participating, interacting, and existing in something. Everything we do comes out of existing in the world (ibid). As Heidegger (1962, p.79) explained:

What is meant by "Being-in"? Our proximal reaction is to round out this expression to "Being-in 'in the world'", and we are inclined to understand this Being-in as 'Being in something' ... as the water is 'in' the glass, or the garment is 'in' the cupboard. By this 'in' we mean the relationship of Being which two entities extended 'in' space have to each other with regard to their location in that space.

In this light, everything is connected in the notion of Being-in-the-world, from the child in the garden, the wind blowing in one’s face, to the rock we kick, we are all encapsulated in existence with one another. In Heidegger’s view, any thought that deviates from this reality and tries to remove itself from “the everydayness of the everyday” is meaningless (Steiner 1978, p. 140). In this regard, the separation between humans and nature is merely an illusion; we are not living with nature but within it (Ingold 2011).

Be that as it may, this figurative disembeddedness of humans from nature continues to provoke critical and very real consequences (as evident in the current ecological crisis). Increasingly scholars are claiming that people are increasingly ‘cut

off from' nature (Kahn 1999, Louv 2008, 2011) causing a kind of void and need to connect. These problems call attention to the present relationships between humans and nature, and the tendency to fall into the fallacy of living with rather within the natural world. Taking this into consideration, it is essential to be aware of this paradox while further discussing school gardens and relations to the physical world.

3.5 Cultivating an Ecological Consciousness

A core principle of garden-based learning is teaching holistic systems and interconnectivity – that we are deeply enmeshed in the world. Underpinning garden based learning is this need for students to be reintroduced to “being-in-the-world” via “ being-in-the-garden” while cultivating a more empathetic care for the environment. Drawing on Morris’s idea (2002, p. 582) of an ecological consciousness, is a call for a more “ collective and integrative way of thinking about our relationship with the ecosphere”. Broadly speaking, consciousness facilitates human existence and integration in the life world (ibid, p. 572). Within an ecological framework, Morris (ibid) argued, an ecological consciousness reconnects humans with nature and brings “mind back with body”. In reconsidering the way we think about our entrenchment in the world, she summarized (ibid):

When thinking about re-conceptualizing cognition as ecological consciousness, one needs to stop and dwell on where we as human beings already are, to dwell on our consciousness -to dwell on the ways in which human beings are conscious.

Ecological consciousness thus relates to how we see ourselves in the world in relation to others (Mayer-Smith et al 2007, p. 82). In order to be attuned with the natural world means that one needs to have an ecological identity, which is forged from our relations with others and nature (Morris 2002).

On the topic of growing things, gardens, and improving human-nature relationships Ingold (2000, p. 86) suggested that it is contingent to the “terms in which human beings involve themselves in establishing the conditions for growth”. He underlined that what is needed is a change in outlook. Rather than viewing plants or animals as components of the natural environment for us (humans), we must think of humans and their respective actions as part of the environment for plants and animals (ibid, p. 87). This is a critical realization because as Ingold argued, it tears down the exclusivity of the human “social” world and opens up humans as parts of all living things. With this in mind, people, animals and plants (all on which we depend on) need be thought as “fellow participants in the *same* world”(ibid, p. 87). This notion is significant for pedagogical paradigms because it re-situates humans as “dwelling-in –the-world” and “encourages younger generations to value their worlds and the very ecosystem that sustains life “ (Morris 2002, p. 583).

It is important to note that this is by no means a complete dismissal of science, but rather, an acknowledgement that science too “is rooted in the same world” and despite its technical enhancements, “remains an expression of, and hence must be guided by, the qualitative world of our common experience”(Abram 1996, p. 30).

3.6 Rooting Learning: Situating 'Place' in Education

It is through close and intimate contact with a particular patch of ground that we learn to respond to the earth, to see that it really matters...Everybody has a ditch, or ought to. For only the ditches – and the fields – the woods, the ravines can teach us to care enough (Pyle 2011,p. 4).

Building on and extending theory on school gardens, another key component is sense of place. Theories on place attachment and meaning have much to offer in the discussion of improving relationships with food and the environment by providing a framework for understanding the significance of connecting to a place while cultivating meaning, and transforming bonds with the natural world and communities.

Place-based learning emphasizes local community and environments as the foundation for teaching different ideas in school curricula such as mathematics, social studies, science, cultural studies, and language arts (Sobel 2004). It has been praised for being much more engaging, relevant, affective and a meaningful education by reconnecting learning to the locale and dismantling the divide between schools and communities (Orr 2011, Sobel 2004). For Orr, place-based education holds a plethora of significance and potential for transforming relationships with the environment. He explained the valuable holistic nature of the study of place claiming, “places are laboratories of diversity and complexity, mixing social functions and natural processes” (ibid, p. 266). It facilitates a wider scope for interdisciplinary studies, which allows students to “lengthen perceptions of time” (ibid).

Orr (ibid, p. 263) made a strong point that the concept of place can be dubious and thus has been widely avoided in current curricula. What a place means and how it is defined can be debatable and vary tremendously among subjects. However, Orr (ibid, p. 264) argued that one of the main reasons why ‘place’ has been mostly overlooked in our education system is because our society itself is displaced. By focusing on and utilizing the locale, place based education attempts to combat the compartmentalization of current academic instruction by reconnecting students to their schools, communities and environment and in turn, deepen their sense and care of the environment, encourage higher levels of civil engagement, instill a degree of local responsibility, and offers more relevant and meaningful ways of learning.

3.7 Growing Sentiments: Place Attachment and Meaning

Theory on place attachment and meaning stems back to earlier geographic theory of “topophilia” developed by Tuan ([1974] 2013), which refers to the emotional bonds between people and their physical environment. In other words, it refers to the connection between people and places, or the level to which a place holds significance to individuals (Low and Altman 1992, p. 3, Kudryavtsev et al 2012, p. 231). Individuals attribute meaning to the different physical environments via memories, experiences, or interactions, and as a result become attached to that meaning (Rollero and De Piccoli 2010, p. 237). ‘Place’ as a concept in turn, shifts from a material environment to a matrix of meaning subsuming place identity,

rootedness, environmental embeddedness, community sentiment and identity (Manzo and Devine-Wright 2014). Attachment to a place depends on both the subjective understanding of 'place' as well as the sentimental consciousness towards it. Theory on place attachment is significant because it holds ties with pro-environmental behavior (Gosling and Williams 2010) community identity and sentiment (Hummon 1992, Keyes 1998) as well civil engagement and empowerment (Keyes 1998).

It has been widely theorized that a stronger attachment to a place fosters positive attitudes and actions towards communities and the environment. Heise (2008, p. 32) pointed out how a sense of place became a large component of environmentalism arising out of tensions between globalization and modernization and the local, popularizing the slogan of "think globally act locally" resulting in a wider call for localism and deepening a sense of place among environmentalists and activists. Heise (2008, p. 45) in referring to philosopher Arnes Naess' work on deep ecology, pointed out that that this is because problems at the local level tend to resonate deeper than global ones because of the flux of cultural, ethical and sentimental allegiances that form at the local level. Simply put, one feels more drawn and obligated to take care of their locale rather than the global abstract entity.

Thomashow (2002, p. 5) further explained that it is not a matter of simple "allegiance" to a place, but rather it is because one's locale provides the best resources for people to understand what happens around them. He used the term "place-based perceptual ecology" in referring to "learning how to observe, witness, and interpret the ecological patterns of the place where you live" as an approach to connect local understandings at a global level (Thomashow 2002, Chapter 4). In other words, observations and reflections are often more impactful at home where people are most likely to spend a lot of time, develop relationships, and create memories (ibid, p. 5). Moreover, a stronger sense of place is crucial for one to be able to conceptualize and understand greater global environmental issues. For instance:

Your weather forecast will be derived from your observations of cloud formations, the smell of the air, the taste of the moisture, the activity of the birds and insects, the light in the sky. The Weather Channel will provide a context for what you have directly observed (ibid, p. 85).

According to Thomashow (ibid, p. 73), the more acquainted one is with a place, the more they will come to see the significance of the connection between their own place and others. Thus a deeper sense of place is helpful for understanding food and environmental issues that can be too abstract to grasp and go beyond time and space, by providing a basis of knowledge through reflections of daily observations and experiences with said place, serving as a reference and context.

In a study on farmers' connections to nature, place attachment, and pro-environmental behavior and attitudes, Gosling and Williams (2010, p. 303) suggested that a stronger connection with nature coincided with a heightened

degree of empathy and willingness to take care of the environment. Similarly Uzzel et al (2002) underlined the importance of the interrelation between place identification, identity, social cohesion and higher levels of caring for the environment. Place identification refers to the distinctive characteristics of a certain place that residents can identify with – an identification *of* a place so to speak (ibid, p. 29). Place identity on the other hand, as a component of social identity comes from "processes of [social] identification, cohesion and satisfaction" (ibid). Uzzel et al (2002, p. 50) explained then that socially cohesive communities that have enhanced senses of social and place identity would hold pro environmental attitudes and behaviors compared to communities with weaker ties. However, keeping in mind that it is contingent on the community itself as well as the nature of the environment.

Extending this, Ehrlich and Ehrlich stressed (2004, p. 325) the importance of localization against the backdrop of globalization highlighting the deep connections to identity:

Localization can strengthen that sense of place, that attachment to an immediate environment that is still a major part of the identity of most human beings. An understanding of local surroundings permits many people to gain awareness of the ecosystem services upon which their lives depend.

The importance of place and identity resonates in how Shepard explained “knowing who you are is impossible without knowing where you are” (Shepard 1977, p. 32). Likewise, Hummon (1992, p. 258) contended that experiences with local places could symbolically reconstruct it as an “extension” of the individual becoming a locus of personal memories, narratives, and meanings. Local places and communities are quite complex and are infused with varying meanings as well as serve as “symbolic locales with distinct cultural identities” (ibid, p 259). However, identification with and attachment to a local place inescapably encompasses emotions and attachment on different scales: from self- representation via place meanings that either strengthen or weaken individual confidence or self-worth, to the cultivation of profound emotional ties and loyalties (ibid, p. 258). By result social identities become entrenched in and proliferated via local environments, strengthening the emotional allegiances for individuals and places (ibid, p. 259). In short the ways in which people regularly relate to and conceptualize the qualities and characteristics of their communities is closely interwoven with “community sentiment” (ibid, p.263).

Along the same line of reasoning, Keyes (1998, p. 122) explained that being a part of the public life benefits the individual because it provides a level of social integration and collectiveness, leading to a stronger sense of rootedness, belonging, and a commonality. When individuals feel like they are part of a collective whole, it leads to healthier and more robust communities (ibid). Furthermore, when individuals feel like have something to contribute to the community it empowers them by increasing self-value, instilling a level of pride and overall social-well being (ibid, p.133). In this regard then looking at sense of place is useful because it

provides a multifaceted understanding of people's attachments to and sentiments for their communities as well as their social identity, well-being, and feeling of belonging.

Moreover, Thomashow (2002, pp. 76-77) claimed these stronger and more meaningful ties makes people more compelled to take responsibility for their place and communities. This connection can go beyond space and time, in what Thomashow (2002, p. 71) called "place-based transience". Even if you reside somewhere short term or long term, he suggested (ibid) that whether you live in a place for one day or a hundred years, you still feel as though you have a responsibility to give something of yourself in return.

Similarly 'bioregionalism' also lends key aspects to the discussion of human-nature relationships and sense of place for garden based learning. It is a framework that focuses on:

[The] relationships between human communities, government institutions and the natural world, and through which to plan and implement environmental policy (McGiddens 1999, p. i).

Rooted in a philosophy of place attachment, bioregionalists hold that as members of unique communities, people cannot avoid interacting with and being affected by their specific location, place and bioregion (biophysical or geographic features) and so are inevitably embedded in nature (ibid,). In this frame of light, similar to Thomashow's (2002) arguments, bioregionalism is relevant to environmentalism, particularly in dealing with global problems by utilizing local knowledge and understanding of one's particular locale.

Bioregionalism is also akin to identity and place. Through the construction of meanings ascribed to places, comes a "community of place" (Lipschutz 1999, p. 114). Thus this process has the potential to forge different places into a "collective" "mosaic" which ultimately will help elucidate higher value because there is collectively "more at stake"(ibid, p. 115). As a result, community and place become "mutually constitutive". This is significant because through place attachment comes an idea of a "whole project" (ibid).

That being said, some critics question the notion of a sense of place all together and argue that the definition of "place" itself is too vague, contingent to social constructions, and are deeply intertwined with social and economic processes that shape and dictate experience of place (Buell 2005 see Chapter 3, Harvey 1996 pp.293). Given this, Harvey stressed (1996 pp. 320-323) that place as a social construct plays into various webs of power that precariously contribute to issues of representation producing and reproducing social differences. Therefore the idea of creating identities and communities based on specific features of a place is problematic and poses possible coercive and dangerous risks that can be potentially politically and socially disastrous (ibid, p. 323). Given this, when it comes to discussions of a sense of place, meaning and attachment, it is important to be aware of the interplay of politics and be cautious of who is involved and how it is constructed.

Moreover, given these issues of localism, Heise (2008, p. 55) suggested it may be more accurate to call for a sense of “planet” rather than “place” because learning in a globalized context is beneficial for learning through differences as well as opening up to different ways of knowing. She explained that a sense of planet infers a better sense of how “political, economic, technological, social, cultural, and ecological networks shape daily routines” (ibid). Taking this into consideration, the point of place based instruction in a school garden framework it not to advocate a dualism between the local and global, but quite on the contrary, to undertake a more reciprocal holistic approach utilizing the local as a means to help understand the global and vice versa.

Given this, a sense of place and attachment remain extricable aspects of garden based learning, and are formed in the doing and being in the school garden. In theory then, garden based learning holds that a stronger connection to a place in education and is conducive to forging an ecological consciousness, sense of belonging, social well-being, and identity.

Taking all this into consideration, school gardens in theory are more meaningful pedagogical sites that have the potential to reconnect individuals to their environments while impacting relationships with communities, food, and the environment. The problem of the decontextualizing food system coupled with the alienation of children and modern Western society from the natural world brings up an important question then, how do we hinder this perpetuating distancing and fragmentation? Garden based learning can serve as another pathway to fill the void in environmental education and addresses these issues of disembeddedness and human-nature relationships.

This brings us to next part of this investigation and our case study on the Big Island. To further explore the impacts of garden based learning this study applies theoretical perspectives of experiential learning, human-nature relations, place attachment and meaning as well as place-based pedagogy. Returning to our main research question, how are school gardens impacting relationships with food and the environment? To pursue this further we will travel to the Pacific to visit teachers, students and others involved in the local school gardens movement on the Big Island.

4. Materials and Methods

4.1 About the Schools and Teachers

There are three different types of schools in Hawai'i: 1) private schools where students pay tuition 2) public schools that are funded by the state, and 3) charter schools that are independent public schools. Teachers from these garden programs received help from the Kohala Center as well as Food Corp Hawai'i. Each garden program or classes are up to the discretion of the teacher. The following is a summary of the different school gardens on the Big Island featured in this study (Figure 6). The individuals from the school garden movement include Miss Katie, Miss Mary, Miss Sarah, Miss Julie, and Principal Annie. For the sake of confidentiality I have used different names.



Figure 6. Map of the School Gardens. (Map adapted by the author, 2016.)



Figure 7. The Main Entrance into Mala'ai Garden. (Photo by the author, 2015.)



Figure 8. View from inside of Mala'ai Garden. (Photo by the author, 2015.)

Waimea Middle School (Mala'ai Garden)

Located in Waimea, this culinary school garden has been in operation since 2005 integrating regular classes in the garden. There are two garden teachers who work with regular teachers in preparing lesson plans that match up with what students is currently learning in with classroom with the garden. Classes run on a daily basis and rotate between grades and subjects. The garden has many components including a cooking area, chicken coop, fruit trees, vegetable gardens, native Hawaiian plants, germination station, and compost (Figures 7,8 and 9).



Figure 9. Cooking Station at Mala'ai Garden. (Photo by the author, 2015.)

Waimea Country School Elementary

Also located in Waimea, students at this school have been working in the soil since 2008. Their current garden teacher has been running garden classes with regular teachers on a daily basis. This garden has few garden beds, compost area, and mulberry tree.



Figure 10. Horticulture station at Hōnaunau Public Elementary School Garden. (Photo by the author, 2015.)

Hōnaunau Public Elementary

Located on the slopes of the southwestern side of the island, Hōnaunau's school garden has been run by the current garden teacher for the past six years (Figures 10 and 11). Classes usually run on a daily basis however due to the recent dengue outbreak the garden was temporarily closed for instruction (much to the disappointment of the students). There are still garden based lessons taking place outside of the garden either in under tents or in a classroom.



Figure 11. View from Inside Hōnaunau Public Elementary School Garden. (Photo by the author, 2015.)

Konawaena High School

Also in the same neighborhood, this school garden is part of a wider agricultural program and works in partnership with culinary classes to harvest fresh vegetables for a school lunch salad bar. The garden program uses aquaponics, livestock, and vegetable gardens.



Figure 12. View of Kohala Elementary School Garden From Behind the School. (Photo by the author, 2015.)

Kohala Elementary School

Moving up to the town of Hawi on northern coast of the island, this large school garden is located steps down from the school and has a number of different vegetable garden beds, compost, and a large workstation (Figure. 12). It has been around since the 1950s but was only reintroduced to school six years ago.

4.2 Position as the Researcher

First and foremost, I am not a farmer nor avid gardener, and I certainly lack a green thumb that many gardeners are bestowed with. Before coming to the Big Island I did not have much previous knowledge about school gardens. However, as a human ecologist, I was mainly interested in human relationships with the natural world and how it contributes to pro-environmental attitudes and behaviors.

For my internship and fieldwork I was warmly welcomed by the Kohala Center as well as different local school garden leaders to learn more inductively about the school garden movement in Hawai'i for a period of five months from September 2015 to January 2016. I entered the field as a *haole* and as a Canadian from the mainland and hence was an obvious outsider. This was a critical position having its fair share of advantages and limitations especially for accessing and talking about certain topics with local Hawaiians. I was aware of the history and social tensions while in the field; however, people for the most part were very willing and proud to show off their garden programs. Subsequently my outsider position enabled me to have new and less biased view.

Furthermore, underpinning this study is the ontological stance that how we experience and understand the world is to a large extent based on subjective perceptions, beliefs, and experiences of a certain reality. That being said, this study also acknowledges the very real environmental problem based in a world external of social constructs. However, in the spirit of using school gardens as an alternative pedagogy, different meanings, social constructions and ways of knowing and experiencing the world are fundamental.

4.3 Design

This study follows a convergent parallel design using mixed methods including both qualitative and quantitative. This kind of method is advantageous for getting unique yet “complementary” data on the same issue at hand and thus offers a more robust analysis (Creswell and Plano 2011, p. 77). This study has a three strata blueprint including perspectives of school gardens from the teachers and administration, students’ surveys, as well as my ethnographic data. From this we can gain a stronger and more thorough understanding of the impact of school gardens on students’ relationships with food and their environments.

4.4 Big Island School Gardens as Case Study

In exploring the school garden movement it is important to keep in mind that this study is case sensitive—the representation of the Big Island’s context from this study does not necessarily apply to all school gardens. However, using case studies can be beneficial for research because it provides a unique position in realistic situations that can be useful for future studies (George and Bennett 2005, p. 76).

4.5 Collection of Data:

I was very overt in the data collection process. I made sure that my informants were aware of the fact that I was in Hawai’i to collect data on school gardens for my master’s thesis in order to make sure that they can give their fullest consent. Given the sensitive issue of working with children in fieldwork, I approached my research with respect, caution and worked in full accordance with school protocol and teachers instruction, which required getting a background check and TB test.

4.6 Participatory Observation

For my study I visited a total of six school gardens (elementary, middle, and high school) working alongside various school garden leaders and students. Over the course of five months I spent most of my time at Waimea Middle School and oversaw different garden lessons, as well as participated with groups of students in a range of classes working on a variety of tasks including:

- Planting native plants
- Making art stamps from banana tree stocks
- Harvest herbs to make herbal ice tea
- Laying out weed mat
- Prepared snacks for the class from the garden
- Harvesting different vegetables
- Preparing garden beds for planting
- Trimming hedges

I did participant observation because it provides unique insight into what actually happens rather than what tends to happen (cf. O'Reilly 2009). This gave me valuable on- ground access and understandings on how school garden classes run as well gave me multiple perspectives from teachers, volunteers, kitchen staff, and students. Moreover, my time spent at Waimea Middle School enabled me to build a good rapport and trust with students especially after being dubbed as the "plaid wearing visitor from Canada". Though it was expected that I be respected as an elder, I was unlike other volunteers or teachers and did not come across as such a strict authority, so therefore was less intimidating. This turned out to be a great advantage because it gave me much more leeway in getting to know the students, joke around, and allow them to open up to me, hear their stories and opinions on school gardens. To a large extent my role as a participant was quite dynamic, shifting between moderate and active participation depending on the school (cf. Spradley 1980). For instance, my time at Mala'ai Garden was much more active whereas at other schools where I did not have such long term relationships were more moderate.

4.7 Interviews

In addition to working in the field, I also interviewed local school garden leaders and one principal about their perspectives of their school gardens programs. Since I wanted to gain a holistic perspective on their impact, I met with a principal who provided an administrative view and teachers who gave fruitful insight from a more on-the ground perspective of the day-to-day workings of the programs.

Communities on the Big Island were quite tightknit so there was a challenge of accessing "gatekeepers" in the field (cf. O'Reilly 2009, p.57). Given this, I conducted a convenience sampling technique to take advantage of the contacts I did have in a short amount of time, which allowed me to slowly gain more insider access through recommendations from other interviewees (cf. Creswell 1998, p.256). I conducted a mixture of formal and informal interviews. The former utilized a semi-structure schema with prompt questions such as:

- What are your perspectives of their school garden?
- How do you see the impact of gardening on students' social and academic behavior?
- What is the role of your school garden within the community?
- What are some of the challenges and successes?

The informal interviews (better known as "talk story" in Hawai'i) proved to be quite useful especially in allowing conversations to flow naturally and bring up information that I would otherwise not have pursued. Due to the fact that for some of these interviews I was either literally in a field, talking with teachers while they worked, or was working myself, I was unable to record all of the interviews but instead took vigorous notes. That being said, only two interviews were recorded.

4.8 Surveys

Besides the interviews, I also handed out a survey to 15 intermediate (grade seven and eight) middle school students. The first part of the survey was more structured asking participants to rate their answers (from strongly disagree to strongly agree) on statements regarding how they liked to work, (in groups or alone, outdoors or indoors), how the garden made them feel, their attitudes towards the environment, whether they ate fruits and vegetables from the garden, their overall interest in gardening and whether or not they have a garden at home. The second part included three open-ended questions:

1. What have you learned from the garden?
2. What do you consider to be the best part of the garden?
3. For what reasons do you think working in the garden is important?

The overall goal of the survey was to gain a sense of how students experienced and viewed their school garden as well as to see what they have taken away this program. I was sensitive to the fact that some of the kids might have been influenced by teachers or prompted. For example, was I getting the answers they thought I would like or has the teacher fed them these types of responses? This was difficult to confirm since I could only access students at school. My main issue was the small sample size (15 participants). This was largely due to accessibility and ethical reasons. Since I was working mainly with these kids during my fieldwork. I felt it was more appropriate than going to another school where I have no previous contact with the students. Despite this, the findings from the survey complimented my findings from participant observation and the interviews, thus providing another angle for analysis.

4.9 Data Analysis:

In interpreting the data I looked for common themes and patterns allowing the data to speak for itself. Common to ethnographic methods, full objectivity is not always possible. Given this, I was aware of my position as a school garden volunteer and my potential bias during my analysis. In defending the use of qualitative data, however, Davies and Spencer summarized:

Our own personal interests and psychic uncertainties of course affect the topics we choose, and the issues to which we are drawn [...] we should acknowledge that our own proclivities could be impediment or advantage when writing about certain topics (David and Spencer 2010, pp. 233-234).

This was certainly the case for me as a kind of hybrid between an insider and outsider because I was able to provide some new insight allowing for more credibility and validity (cf. Narayan, 1993, p. 679). In brief then, even though this kind of qualitative data might be more difficult to generalize compared to quantitative data, it does portray more real-life context of the given subject.

5. Findings and Analysis

The garden classes included a variety of lessons ranging from learning about chemistry through nitrogen in the soil, learning about compost, growing lettuce and then building salad spinners, using basic arithmetic for math class as well as serving as a muse for art lessons. Findings from the student surveys, interviews as well as my own observations indicated that many students have learned and enjoyed learning about basic gardening skills, ecological knowledge, and their local environments.

Teachers claimed that their school gardens allowed students to begin to gain a deeper sense of place and be more aware of their local surroundings. Students demonstrated an impressive wide range of knowledge of native plants, how to take care of them, how much soil is required, where to plant, as well as companion planting. One good example of their gardening knowledge was during a grade 1 class where a group of seven year olds walked me around the garden pointing and identifying various plants (some I have never even heard of) despite their young age. Miss Julie noticed how her school garden enabled students to observe their environment and to be able to decipher between plants and not necessarily “see a clump of ‘green’ when outside”.

Classes in the garden were much more contextualized and hands on. For instance, students had a very active role in the process by preparing, designing, growing, and maintaining the garden. At Kohala Elementary, each class had their own “themed” garden bed such as, “smoothies” or “salsa” beds that the students had designed, grown specific plants for, and harvested at the end of the year for a snack. The students were not only excited and engaged, but also had to learn how to cooperative with one another in order reach a consensus. Miss Sarah also noted the importance of the aspect of experiential learning:

Our garden program is largely garden work based- I really believe in the Hawaiian saying of “maka hana ka ike” that in working, one learns. By doing hard, industrious work in the garden, students get to see the impact they have by participating in a community effort to create a beautiful and bountiful garden.

Miss Julie likewise explained that students were gaining a sense of place as well as starting to understand the concept of community and the significance of being connected. For example, her students were learned about community by planting native Hawaiian plants along a stream for a local watershed project. She also explained that students always walked around the garden (both during and after class) picking, tasting different vegetables while also counting caterpillars, making other observations and even had long discussions on their favorite vegetables and different gardening methods.

Miss Mary used the garden as a way to teach about natural systems by teaching the concept of consequences and what happens if you do not weed or water the garden. She explained that this also teaches the importance of taking responsibility and personal initiative by having to care of your garden. She let student really get involved in the maintenance and care for the garden and

emphasized that the point was not necessarily to grow a beautiful garden, however to offer a place for students to learn and get involved in the process. She did not use a rigid structure but instead wanted the garden to dictate the lessons from what needed to be weeded or watered at that time.

Some of the lessons from the garden even transcended home. For example Principal Annie recalled a certain parent who did not arguably have many environmentally friendly habits and seemed likely would never change. However, after her kids attended classes in the garden, she proudly announced that her family had started a vegetable garden of their own and that she had grown the lettuce for her children's lunches.

Findings from the surveys also suggested that students were quite engaged and interested in gardening. Figures 13 and 14 show that the majority of students want to grow their own garden as well as learn more about gardening.

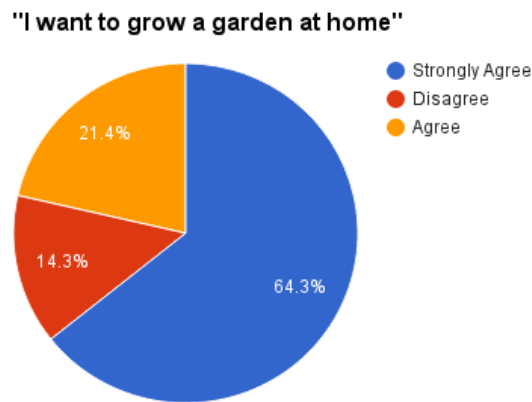


Figure 13. Students' Responses to "I want to grow a garden at home".

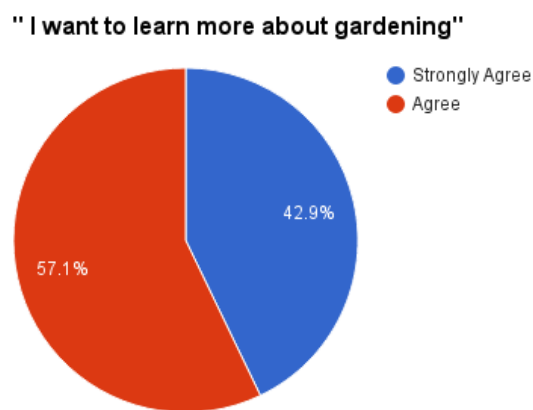


Figure 14. Students' Responses to "I want to learn more about gardening".

5.3 Connecting to Communities

Another key finding was that the school gardens played a role in the larger community. For example, principal Annie proudly pointed out how the garden had a positive impact on the local community and stressed that it was a major component of the program. She explained that the garden helped foster a sense of cohesion and showed kids that it is part of a long-term commitment with their larger communities. Likewise, Miss Katie also noted a sense of community engagement with her garden. For example, she developed a couple of partnerships with local businesses where her students sold taro leaves that they had grown themselves to a local cafe across from the school. Supporting this idea of community, Miss Sarah concurred that:

The garden is a place that is shared by the entire school community and the Waimea community, it not only gives students a sense of responsibility to care for the land, plants and animals but also to care for their community and how those two things are intertwined.

The school garden seemed to foster a sense of community and belonging two fold, by 1) the garden as a community itself and 2) the garden being part of a greater community. The former, referring to how having class in the garden created a cohesive feeling of being part of a working group that involved sharing harvested food, requiring students to work together and support one another. For example, students were expected to contribute to the overall well being of the garden and then could collectively enjoy the harvest. The latter referring to the role the garden played in the community outside of school, which may include the parent community and or town itself. A good example of this was the “Super Kitchen” dinners hosted by Mala’ai Garden and volunteers at Waimea Middle School held in the local community center where any person was invited to come and enjoy food from the garden and local farms. In this case the school garden played a significant role in the community.

Furthermore, a sense of community engagement and the importance of working with others were also evident among the students. For instance, one student believed that learning in a school garden was significant because “we get to help our community and our school and let people be healthy”. Another student echoed this sentiment explaining that what they enjoyed most was contributing, working and helping others. When asked about what they saw as the best part of the garden, one student simply answered, “ the people”. Two students responses even indicated that they were developing more critical connections and developing life long skills. For example, they said that they thought working in the garden was important because “ it helped you prepare for life and helped the environment”.

5.4 Social Well-Being and “Avenues to Shine”

Another key finding that emerged was that the gardens seemed to be providing opportunities for students to thrive and succeed in an alternative educative frameworks by allowing some kids to feel part of something and proud.

As Figures 15 and 16 show, the garden fostered high degrees of self-esteem and positive emotions.

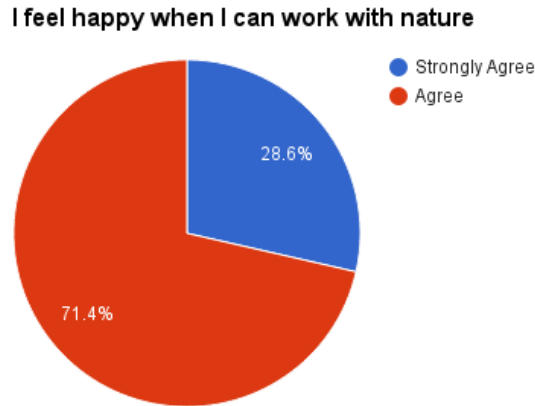


Figure 15. Students’ responses to "I feel happy when I can work with nature".

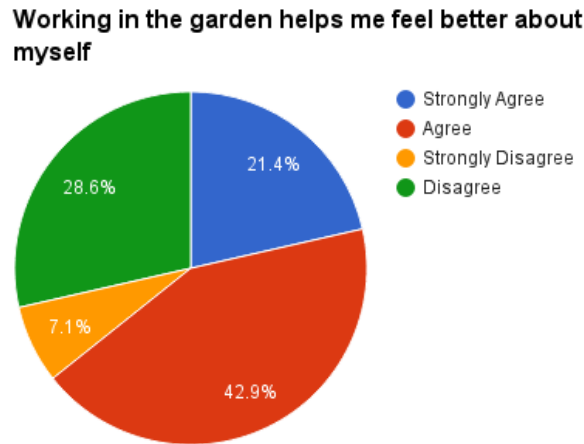


Figure 16. Students’ responses to "working in the garden helps me feel about myself".

Many of the students indicated that working in the garden made them feel better about themselves and happy when they had garden class.

Miss Katie also supported this and strongly emphasized that the garden fostered a sense of responsibility and degree of pride for her students. This was highly evident when students went to the cafe they grew food for and were proud to

say that the lau laus (Hawaiian dish) they were eating were from *their* garden. Additionally she told an anecdote of two third grade students who had serious behavioral and psychological issues but ended up excelling becoming “masters” in the garden. For once in their lives they were being praised in school. Miss Katie explained how the garden served as an “avenue to shine” and truly helped the kids who do not fit into the cookie cutter standards of regular curriculum. These “shining” moments were also strongly evident among some of the more difficult students who had trouble following instructions during class. Despite their challenges, they turned out to be some of the most interested and motivated participants. For example, some of these students even came back to the garden during their lunch break to ask for seeds to bring home to start their own garden or inquire about a plant they wanted to learn more about. Many of the teachers also noticed the positive impact on the students. For example, Miss Sarah explained how passionate her students were about their garden:

I can honestly say that almost all of my students love garden class. They may not remember the lesson, but if they leave middle school with the positive feelings and joyful memories of growing, cooking and tasting food that is healthy for them, their community and their environment, we have done our job.

This was significant because in a way the garden seemed to be contributing to the creation of positive memories and enriching experiences for the students. This was one of the main goals of the garden teachers to make sure that garden class did not get stigmatized as a chore, but instead an opportunity to connect kids to their environments while having fun.

5.5 Caring for the Environment and “*Living Pono*”

Miss Katie explained that her classes revolved around the idea of *pono* and respecting the garden and each other. She noticed how kids were more aware of their physical surroundings involving a kind of environmental consciousness, stewardship, and awareness for example, either by not bashing plants around or caring about all living things whether it is a small insect. Miss Katie also noted how her students took initiatives and demonstrated pro-environmental attitudes and behaviors. For example, a group of her students piloted a successful paper-recycling project where they collected old paper from classrooms and then used it for compost and soil in the garden. Kids even went around the school and gave presentations on the importance of recycling and taking care of the *‘āina*. Miss Katie also noticed how motivated, engaged, and excited they were and even how upset they would become when some classes did not recycle as much as they thought they should have.

Likewise, Miss Mary also explained how younger students started to develop a sense of responsibility for their garden and ecological consciousness by not wanting to kill a bug just for the sake of it. She added how some of the older students were beginning to recognize and realize how their actions are part of larger global issues by for example, learning about cause and effect and the impact and results of our actions. Similarly Miss Katie noted the significance of low scale initiatives and

how bottom-up strategies can truly make a difference. Even though some of the younger students were too young to critically think about larger global issues, she saw the garden as a significant way to establish an environmental awareness, conscience, and respect among students.

A strong environmental ethos was also found among the students' responses. As Figure 17 shows the garden motivated the majority of students to take care of the environment. For example, when asked for what reasons do you think working in the garden is important, one student said "*malama honua*", the Hawaiian concept to take care of the earth. When asked what do you consider to be the best part of the garden, another student responded, "treating our Earth with care". Other students claimed that they enjoyed taking action and the best part of the garden was "that we actually do something good to the environment". Along this line of thinking, another student answered that main thing that they have learned was, "that you have to get down and dirty to do something good for the environment".

Working in the garden makes me care about the environment

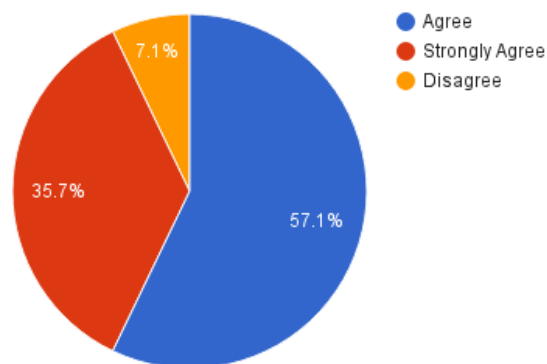


Figure 17. Students' responses to "working in the garden makes me care about the environment".

This correlated with what many of the teachers aimed to teach their students. For instance, Miss Sarah explained:

The garden is a place where students can learn to be kind and respectful to 'all living things' and engage with plants, animals, and insects they may not encounter elsewhere. We hope to cultivate student interest and a sense of "kuleana" or responsibility in caring for the land or *malama 'āina* through working in the garden.

5.7 Interconnections and an Ecological Consciousness

Additionally it was apparent that some students were beginning to make critical connections about their role in larger global environmental problems as well as

their connection to the earth. For example, Miss Sarah noticed the development of a stronger ecological consciousness:

[The students] may not be able to fully comprehend the environmental challenges our world is facing today, but by building a relationship with land and food and participating in the garden program, they are exposed to experiences that show them that we as humans are dependent on the land for resources and that they depend on us to take care of it.

She claimed that students started to see themselves as a part of nature, as having a role to play in it, instead of viewing it as something completely separate from them. She used a good example of how this concept is shared with students:

Mala'ai's tradition of bringing in a local cultural practitioner for a lesson on taro with the 6th grade class at the beginning of each year. He teaches them about the kumu lipo- or the Hawaiian creation story- and the story of Haloa, which says that the kalo is the elder brother of the kanaka (the first Hawaiian man- and therefore all Hawaiians) and like an elder brother, you must respect and care for kalo and it will care for you.

5.8 The Garden and Connecting to Food

All of the school gardens grew varieties of fruits or vegetables including kale, broccoli, pineapple sage, passion fruit, bananas, and yacón (root plant), but not all of them could produce enough for regular consumption. Teachers claimed that their garden programs were exposing kids to new foods, teaching where food comes from, how it is grown, and in one case, teaching about the global connections of the larger food system. This was also supported in the student responses. As Figures 18 and 19 show, the students do consume fruits and vegetables grown in the garden.

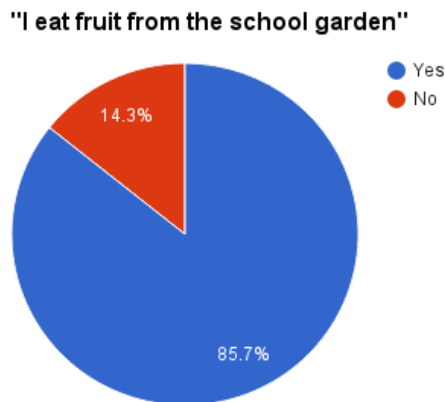


Figure 18. Students' responses to "I eat fruit from the school garden".

"I eat vegetables from the school garden"

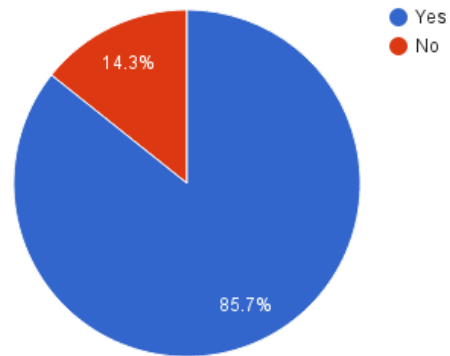


Figure 19. Students' responses to "I eat vegetables from the school garden".

In fact, eating snacks they had grown and prepared proved to be one of the best features of the garden for the students. However, this was not the only positive aspect as some students explained that they learned how to grow their own fruits and vegetables. Another student was excited about learning where some of their favorite snacks actually come from. A good example of this was one student's "aha" moment that popcorn actually came from corn (not microwavable packages). Taking this a step further, another student's response indicated that they were starting to make connections about health saying that working in the garden was important because "you needed food like fruits and vegetables" whereas another student answered it taught them how to live healthily and sustainably by living off of food from the garden.

Miss Mary stressed that allowing kids to eat from the garden introduced them to new nutritious foods. For example, in some classes they made homemade pesto from broccoli. She explained how the garden made kids try new foods by incorporating it into their lessons via taste tests. This way the students were able to have more of a say and develop personal opinions resulting in them tending to care more about what they ate. She emphasized that "if they grow and cook food themselves, they will eat it". Miss Mary also explained that her students picked and ate raw broccoli from the garden; and not only enjoyed it, but even requested more at home.

Miss Sarah also recalled how many students told her "I didn't think I would like this, but I did!" or asked, "Why can't the cafeteria serve the garden's food for lunch"? She further explained how Mala'ai Garden provides a fresh, nutritious snack to every student during each garden class. Many of these snacks are new and unfamiliar to students, but because they are involved in the process of growing and preparing (and because it is one of their garden rules to keep an open mind) they

were (for the most part) willing to try it. She expressed that she hoped this openness to new foods would be something that could transcend home as well as could follow them into adulthood.

Adding to this, Miss Sarah touched upon the significance of school gardens as potential gateways for healthy eating habits and behaviors. For instance, she claimed by providing delicious healthy snacks, students will develop a palette for these healthy tastes. Furthermore, after learning how expensive health care costs were and how chronic disease like cancer, diabetes and heart disease could be prevented by diet and lifestyle choices, one student even told her, “now I understand that paying extra for healthy and organic food can actually be cheaper in the long run.” More importantly she noted the importance of providing opportunities for less privileged students to eat healthier, explaining that a lot of students do not have access to fresh, local foods because of “socioeconomic and cultural barriers”.

5.8 Problems and Challenges

Different challenges and limitations of school gardens were highlighted during the study. Firstly, it was apparent that both adequate training as well as time management were key issues. Since school gardens were not part of statewide curriculum, it was difficult for teachers to always maintain high-test scores among their students while working in the garden. As an extra-curricular program, time in the regular classroom takes precedence over garden classes. As a result, classes in the garden are quite short (roughly 40 minutes) which makes time management and getting through a lesson plan challenging for the teacher as well as the students.

Secondly, consistent funding for garden programs turned out to be one of the greatest obstacles. This made it hard for teachers to always get the support needed for tools, seeds, and other resources as well as their job security. For example, Miss Katie had to be proactive about finding grants and outside funding for her garden. This was challenging because funding is often inconsistent, random, and hard to access. One teacher also expressed concern over the irony that something such as garden based learning, which is based on teaching about sustainability, is so unsustainable itself. This speaks to the major issue of grassroots projects such as school gardens in working under dominant structures

Third, even though working in the garden and growing different produce certainly helped expose kids to new foods it did not necessarily change their diets or preferences entirely. In fact, some of the students would go to a local food court and eat fast food during their lunches or even the school lunches themselves would serve unhealthier foods including hamburgers or pizza. It is significant then to recognize that there are much more complex political, social, and cultural obstacles in the way including the fact that students, as children, are dependent on food from their home and school lunches highlighting issues of food access and knowledge.

Furthermore, not all of the schools were created equally as some schools were located in wealthier communities and so did not share or have the same kinds of benefits. In fact, the schools were vastly different depending on whether they were private, public, or a charter school and which district they were a part of. For example, Waimea is a much wealthier community compared to Hōnaunau that is a more agricultural working community. Given these socioeconomic differences, the

priority of the school garden takes different precedence in the school and community due to time, money, and access. For instance, at Hōnauanau volunteers are inconsistent as families apologized explaining that “if we didn’t have to work we would come and help”, whereas in Waimea, volunteers were much easier to come by.

Lastly, the attitudes of some of the students and members of the communities were not all in full support of school gardens. Considering the age range from young children to adolescents, not every student was keen on gardening and some days certain students would reluctantly participate. Just as garden based learning serves as an alternative pedagogy, there are many ways of learning that might be more fitting for certain students. Similarly, not every parent whole-heartedly supported their child working in the garden and did not believe in such a progressive education. For instance, some parents preferred to prioritize the more conventional preparation for state testing and did not see the value of learning in the garden if their kids were not going to be “landscapers”. This is significant because it underlines some of the societal beliefs that dominate in society of how education should be as well as the need to be able to clearly measure academic success based on specific standards.

In summary, the findings showed that the majority of students enjoyed spending time outdoors and working in nature. Students tended to be happy and had higher levels of self-esteem after working in the garden. It also allowed students to try and eat fruits and vegetables while also sparking interest in future gardening at home. Despite their age, many students were beginning to make connections to the benefits and richness of garden based learning as evident in the breadth of responses varying from basic answers to quite advanced responses connecting Hawaiian culture, pro-environmental behavior, depicting the importance of the role of the individual in society, and the significance community cohesion.

6. Discussion

6.1 Significance of School Gardens

Building on and extending past research on school gardens, this study found that garden based learning poses a milieu of impacts on the ways students work with, care for, and experience their physical surroundings and food. The findings support previous studies (Skelly and Zajickek 1998; Skelly and Campbell Bradley 2007) that students who participate in this type of pedagogy seem to develop a sense of place by becoming more familiar with their local environments and thus have more opportunities to learn to respect, be aware of, and identify with it. For example, in the case of the Big Island schools, this deepening sense of place was realized in different dimensions—from students identifying invasive and native species, understanding plant life cycles, thoroughly knowing their school garden from top to bottom, and to making connections on a cultural level, with the spirit of “pono ‘āina” resonating among many students. More than just garnish on top of current education, the school gardens’ roots run much deeper, providing a positive learning setting and much more place based context. This helps foster the development of an

environmental ethos through caring for one's locale as well as allowing for better understandings and connections to healthy sustainable foods.

Given this, garden based learning may be relevant to discussions on how to improve local food economies. For instance, one of the general critiques by food advocates in the local food movement is that society is disconnected (psychologically) from our food due to its industrialized nature (Tansey and Worsley 1995). Berry suggested (2008, pp. 311-312) by people seeing where food comes from, growing it themselves, and becoming immersed in the process can contribute to significant changes in the relationship between food and society. Along a similar line of thinking Goodman et. al (2012, p. 45) claimed that this stronger connection between the consumer and food product is paramount because the way the consumer approaches understanding their food is as significant as "farmers' knowledge networks in the creation of an alternative food system". According to Tansey and Worsley (1995, p. 180) in order to mend some of the problems in the overall food system, there is an urgent need for an education that informs younger generations about skills that are needed to make informed decisions and selections within the complicated matrix of the modern food system.

Going back to the earlier example mentioned in this study of the student's "aha" moment that popcorn actually comes from corn is significant because underlines the current state of how for many people in the industrialized food system relate to and understand their food. For this particular student, popcorn magically transformed from kernels into a fluffy snack in the microwave and had little to do with its biological reality. My point here is not to protest microwavable popcorn, but rather to critique the overall social conditioning of the acceptance of the decontextualization of food from its ecological properties. Learning in the school garden is significant because it embeds students in the growing process that inadvertently helps them become more aware of ecological interconnectivity as well as fostering a sense of responsibility for its welfare. This is certainly one of the strengths of school gardens on the Big Island.

However, though it is apparent that they have some magnitude of influence on human-food relationships, this study discovered that it is limited. The fact of the matter is that participants are still children who eat candy and drink soda, but perhaps even more crucially, there are much more complex political bureaucratic, and social barriers that prevent drastic transformations. In the case of the Big Island for example, access to healthier unprocessed foods is hindered because of high prices and availability. Even though there are many local farmers markets that sell local produce, they are either targeted towards tourists or are only open at specific times, making it difficult for working families to get to. This was the reality for some of the less wealthier working communities who had less time and means to access healthier foods.

Moreover it is also important to recognize that 'food' is also cultural. What is considered healthy, nutritious, and tasty is largely pertinent to one's culture. For example, in Hawai'i some local favorites include Spam (canned ham) or musubi (Spam on rice wrapped in seaweed), which by no means has much nutritional value. Hence dealing with changing or improving perspectives of food and diet is

incredibly complex and is a politically and socially loaded venture (Alkon and Agyeman 2011, p. 12).

Furthermore food advocates Alkon and Agyeman (2011) criticized local food movements for putting too much emphasis and dependency on the local as the sole solution. To assume that in order to create a sustainable food system by “voting with your fork” per say is quite problematic because it does acknowledge the ongoing covert structural and historical violence induced by waves of colonialism and the larger global economy (Alkon and Agyeman 2011, p. 6). This is relevant to many communities on the Big Island, as there remains a level of stigmatization of agriculture among older generations due to the history of plantations on the island. For example, in one of the interviews, one teacher explained that for some of the older generations of local Hawaiians, farming is still associated with the hardships of plantation life and thus do not want the same for their children.

Therefore in regards to connecting *na keiki* to the land as well as other broader aims of pursuing a more just and sustainable food system, there must be a recognition of 1) the social injustices and structural violence hindrances as well as 2) a greater cultural sensitivity and a commitment to working with local communities by going “deeper” and “respecting local knowledge wherever and whenever it is found (Alkon and Agyeman 2011, p. 201). Given this, future research into the socioeconomic disparities of different schools would be beneficial in uncovering some of these hidden social barriers to the equitable access and implementation of similar programs.

That being said, much of the foundations of garden based learning, particularly the learning by doing, notions of environmental stewardship, and the holistic framework parallel Hawaiian values of interconnectivity, *pono ʻāina* and *ohana*. This was evident in some of the schools where there was a greater prominence of Hawaiian teachings, such as the case where students learned about the significance of *kalo* (taro) to the Hawaiian creation story, growing native plants or harvesting *kalo* for local Hawaiian dishes. Although not every teacher directly taught about Hawaiian culture, either because they felt uncomfortable or were insufficiently equipped to do so, it is intriguing to see how Hawaiian values and beliefs are being integrated in public schools. Given the history and sociopolitical tensions between Native Hawaiians and *haoles* in Hawaiʻi, school gardens seem at least symbolically significant for teaching cultural sensitivities and awareness, as well as passing down Hawaiian morals, beliefs, and dispositions to new generations. It would be interesting and valuable to further study these relations and explore to what extent school gardens on the Big Island could serve as cultural mediators?

Furthermore this study also has implications for discussions about the role of environmental education and raises the questions in what ways and to what extent can garden based learning be applied as an instrument for change? It is critical not to put too much dependency on education in hopes that it will fix everything. Similar to the food movement, there remains powerful social, cultural and political barriers. For example, this was strongly evident in many bureaucratic loopholes, the challenge of getting garden based learning recognized as a legitimate form of education, as well as the constant difficulty of sustainable funding.

This coincides with one noticeable trait that came up during the study regarding gender and school gardens. The majority of garden teachers, coordinators, and those involved with research were all in fact women. Where there were cases of male teachers, they were mostly referred to as 'agricultural' instructors rather than gardeners. This brings into question the role of gender in these movements as well as feminist concerns over representation and the hierarchal placing of agricultural studies over gardening. It draws attention to how gardening and agriculture may differ in their cultural capital and or valued as expert versus non-expert knowledge. For instance, agriculture may seem more masculine and professional; whereas gardening has the tendency to be associated with more female traits and 'mother-nature' relationships. Given this, the question of gender and representation would also be another valuable point of departure for research in gaining recognition of garden based learning as a legitimate pedagogy.

Moving forward, echoing other environmental education scholars (Sobel 2004, Orr 2011), this study suggests that there is merit in utilizing a more contextualized, ecologically framed education. Though school garden teachers may not necessarily be raising a revolutionary thought among students, but going back to notion of learning as a process (Moon 2009), garden based learning is slowly having an impact on them. For instance, in the case of the Big Island, what was significant about growing different fruits and vegetables was not necessarily changing students' diets overnight, but rather using holistic processes from seed to plant allowing students to develop stronger bonds with their food and local places thus motivating them to take responsibility and action for them. In developing more intimate attachments and meanings, they incidentally help students cultivate both an ecological consciousness and conscience.

However, recalling that experience is quite enigmatic and is dependent on our partialities (Jackson 1989) it can be difficult to measure. This was one of limitations of this study because it was only possible to see the impacts of the gardens from the public sphere. However with that said, instances where kids were applying what they had learned outside of the garden, such as piloting recycling programs, wanting to grow their own gardens, requesting their families to cook broccoli for dinner, to simply not wanting to kill "innocent" caterpillar, indicated that the students were gaining a sense of environmental ethos from working in the gardens.

Moreover, by being part of the school garden community, some students were empowered both socially and academically, feeling proud, and having higher levels of self-esteem. This is significant because there is something to be said about the role of pride as a means of motivation to take care of communities and engage in environmental endeavors. More often than not, when discussing how to fix or to ignite initiatives to combat some of the world's greatest environmental problems, campaigns usually appear more negative than positive. As various scholars (Thomashow 2002; Hummon 2002; McGiddens 1999) theorize on place attachment and meaning, if we feel more connected to or value a local place, there is a much stronger chance that we will take more action to protect it. In the case of this study, students, teachers, and principals were undoubtedly proud of their school gardens,

being integrated with their school and social identity and becoming a social outlet and special place for them.

The interweaving of identity, pride, community sentiment, and ecological cohesion—including the ways we feel attached to certain places, value them, and view it as something other than a commodity— is significant because these instances of being-in-the-world (Ingold 2011) address some of the greatest social, environmental, and health, pathologies at their very core. Drawing on Leopold’s views of environmental education (1949), how can we expect anyone to stand up for communities and the environment if there is no land ethic? As Wei summarized (2012, p. 26), “we value what we love. If our children are to be creators of value and save our planet, then they must be given the opportunity to love the earth”. This highlights a strong need for the next generation to be aware of, connected to, and feel responsible for the world around them. In spite of its limitations, garden based learning as a kind of educative tool, can help younger generations make such connections. As Anderson (1996, p. 184) stressed:

In the end, education of the public, and especially of the young, is the only hope. They must be made aware of these issues and of these moral codes. They must at least have the option of adopting them. They must have the best possible access to the glory of the natural and human world, so that they can make choices in the full knowledge of what we can lose.

As human beings, we are inescapably bound to the physical world, from the air touching our faces, the ground upon which we walk, to the billions of atoms that make up our corporal composition. This does not mean that simply acknowledging that we are part of the natural world or planting a vegetable garden alone will by any means mend all food system’s issues or environmental problems. Nonetheless, it is more about the ascribed meaning and value of being familiar with, experiencing, and being a part of a place and local environment —the dirt on your hands so to speak — that can contribute to changing perspectives and hopefully make something worth saving.

Although not every school has the same tropical environment conducive for year round planting as the Big Island, a garden based pedagogy has much to offer to those interested in teaching about ecology and place, whether it be on teaching life cycles, cause and effect relationships, ecosystem interactions, or cultural studies—the possibilities are endless. As a holistic pedagogy rooted in experience and place, garden-based learning offers an alternative more meaningful way to engage students.

This study suggests then by working from the ground up, the Big Island school gardens are bringing the natural environment to the forefront, connecting kids to their places while offering a more significant gateway to building community sentiment and connections. Despite its infant stage, this study agrees with other suggestions (Page et al 2007, Hawai’i DOH 2013) that within its limits, the school garden movement on the Big Island has great potential as a resource to engage younger generations with their local places and environments all while fostering an

environmental ethos and exposing them to new foods linking health, communities, and the environment.

7. Conclusion

Returning to the main research question and sub-questions, how do school gardens as pedagogical sites impact students' relationships with food and the environment on the Big Island? In what ways does garden based learning foster a sense of place? How does this affect students' ideas, understandings, and meanings of food and their environments? In what ways do school gardens impact social wellbeing? In what ways does garden based learning support *living pono* for students, the environment, and communities?

School gardens as sites of learning are certainly having a plethora of positive impacts on students, teachers, and local communities. By becoming more familiar with one's place, either from spending more time there, developing personal relationships with it, or creating positive memories, students are better able to connect with their local environments and communities.

Working in the school garden allows students to contextualize their learning including both about the food they eat as well as its environmental contexts. By learning hands-on and being part of the growing process from seed to plate, as well as tasting and discussing what they have grown themselves, students can see where, how, in what conditions, and why their food grows and seeing that like us, it is ecological. The knowledge gained through learning by doing, forges deeper understandings, perhaps even an embodied experience that may follow these students into adulthood. Likewise, by learning through and with their local places, school gardens take larger more abstract concepts like global warming and put it into tangible contexts for students, for example, learning what happens to the plants during a drought. In this sense then, through gaining a better sense of place, students can start to cultivate a sense of planet.

The school gardens also serve as avenues for success and self-confidence. With a less rigid structure, students are able to apply themselves and what they learn in the regular classroom in real-world settings and are able to thus thrive in untraditional ways. In this light, the school garden can be seen as empowering students allowing them not only feel proud about what they have grown, but also themselves. Moreover, perhaps even more compelling, it lets them feel like a part of something more – either a community in a school, their town, or even a larger global one.

Returning then to the Hawaiian the notion of *living pono*, school gardens help encourage and support students to live in balance and righteously on many levels pertaining to themselves, communities, health, and the environment. By being involved in the growing and care of their gardens, students form more intimate relationships and thus coupling with more personal attachments and meanings comes a higher level of care, respect, value of, and sense of stewardship for the environment. This shows students that the world is not as fragmented as it seems, but instead to a large extent “we are what we eat” and as humans we are a part of a greater ecological community. In this sense, the school garden helps forge a sense of

interconnectedness and teaches students to *live pono* in terms of health, respect for the earth, and for one another.

To conclude, there is a strong need to change the current food system. Based on the fact that eating is an environmental activity, we need to transform how we relate to, understand, and connect with food and our environments. Amidst challenges of climate change, urbanization, a society where we are overstuffed and hungry, it is important to look at the root causes. There is much at stake as food is the foundation of culture, transcending time and place, and is a vital commodity holding deep value and significance.

Working in Hawai'i has shown the significance of school gardens and the different impacts they are having on students. Garden based learning should not be reduced to an idealization of connecting to nature but rather, it is about sustainable futures, fairer and robust local food systems, facilitating healthier communities, selves, and the environment. As an alternative to regular institutional schooling of sitting at a desk, it allows students to make real world connections, a sensual experience letting them touch, taste, and smell the outside world. Thus, school gardens are more than just creating a new generation of farmers. Beyond the shovels, weeding, and watering plants is something exciting. They are the locus of health, environment, and culture. It is naive to believe that school gardens solely will catapult Hawai'i into a completely alternative food system due to powerful structures, political barriers, and dominant cultural hegemonies. However, it is a step in the right direction. With that in mind, as a way of laying down the trellis for change, this study is rooting for school gardens as a way to connect, and thus we eagerly anticipate watching this movement grow.

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