

*Promoting Environmental Stewardship  
through Gardens: A Case Study of  
Children's Views of an Urban School  
Garden Program*

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This story contains a swear word. A word that makes its way into everyday conversation. Its use is completely taboo in schools—especially elementary schools. This word, used to add dramatic emphasis to an important point, is the f-bomb of swear words: *fucking*. As in, “Don’t touch that *fucking* fence.”

A group of high school students was hanging out one evening in the yard of a local public elementary school. The students came upon a small

wooden fence protecting a garden bed from potential damage during busy school day play times. The fence was starting to rot, so the boys decided that they would tear away at it and bash it down, muttering, “Let’s trash that fucking fence.” The one boy—overheard by one of the parents at the school—stopped his friends from the destruction by his strong directive: “I built that fucking fence. Leave it alone.”

The parent who witnessed the near destruction of the fence was actively involved in the school garden program at the elementary school in question. The parent shared this story to explain how children’s direct experiences with the school garden—in this case, building a fence to protect vegetables growing in a garden bed—promote their sense of ownership towards their school and their sense of stewardship towards the environment.

In light of the growing awareness of the impact of the planet’s dwindling natural resources, environmental stewardship is vital. In 1992, close to 2000 senior scientists from around the world signed a document titled *World Scientists’ Warning to Humanity*, calling attention to the damage humans were causing to the planet through unsustainable consumption (Suzuki, 2010). Since that time, human consumption of the planet’s natural resources has worsened (OECD, 2008). Even by conservative estimates, we would need five or six planets to sustain current North American lifestyles ([www.myfootprint.org](http://www.myfootprint.org)), much of which is related to food production. Therefore, fostering children’s relationships with nature to develop their sense of environmental stewardship and to increase their understanding about the production of

our food provides an important avenue for redressing unsustainable consumption (Upitis, 2010). The central purpose for the current case study was to determine how students develop stewardship habits through a school garden program.

## Literature

There are a number of contributions in the literature directly related to the present study. Accordingly, we examine three bodies of research in this review: environmental stewardship, the call for school gardens, and nature deficit disorder. The research questions are outlined at the end of the review.

## Environmental Stewardship

In order for children to develop habits of environmental stewardship, children must first connect to nature—including physical, emotional, spiritual, social, and intellectual connections. Some of these connections may lead to a sense of ownership, which in turn, may compel children to protect the places that they resonate with most. This process is both linear and cyclical, and is marked by small and large acts of connection and stewardship.

The ways in which environmental stewardship has evolved as an educational construct are varied. Not surprisingly, environmental education has embraced the notion of environmental stewardship directly. In their discussion of pedagogy and place, Tooth and Renshaw (2009) suggest there are five experiential elements essential to outdoor

and environmental education, namely, (a) being in the environment, (b) real life learning, (c) sensory engagement, (d) learning by doing, and (e) local context. All five of these elements were present in the school garden program described in the present study. Related constructs include environmental connectedness (Chawla, 1998, 2007, 2008) and environmental identity (Clayton & Opatow, 2003).

Regardless of whether one uses the term “environmental connectedness” or “environmental stewardship” or “environmental identity,” the question remains: how can a sense of stewardship be fostered through schooling? For well over a decade, Chawla (2008) has demonstrated that the most effective forms of environmental education are those that encourage children to know, value, and protect the diversity of life. She suggests that learning to value the diversity of life helps foster habits of stewardship, and is contingent on “*learning to see*: learning to see communities of plants and animals, details of their individual existence and interactions, and patterns of their ever changing habits” (p. 98). Our contention is that a well-developed school garden program could serve as a context for “learning to see,” especially when the five elements identified by Tooth and Renshaw (2009) are present.

### The Call for School Gardens

School gardens have long been heralded as a means of promoting a sense of environmental stewardship. School gardens were central to the pedagogical approach of Froebel’s Kindergartens, the first of which opened in Germany in 1837. One of the key philosophical principles that

grounded Froebel's pedagogy was the principle of unity, which calls attention to the interconnectedness of all things, including the spiritual, the human, and the natural worlds. Froebel believed that children have a natural need to cultivate and care for plants (Brosterman, 1997). Thus, gardening was a daily activity for children in Froebel's Kindergartens. In the early 20th century, advocates of the Nature Study movement sought to enliven science education through experiential activities in school gardens (Lawson, 2004). The use of school and community gardens as means to support local food economies and to promote civic pride grew in popularity throughout the first half of the twentieth century. Support for school and community gardens waned in the post-war economies of the 1950s but was renewed in the 1970s as a means of social and environmental activism. These activist efforts have evolved into the current movement towards the use of school gardens to enrich student learning (Lawson, 2004).

There is growing momentum in Canadian schools to support gardens as sites to connect children to nature. This momentum is supported by public and private organizations, and at all levels of government. In 2002, the government of Canada released a report and series of recommendations titled *A Framework for Environmental Learning and Sustainability in Canada*, resulting from a national survey to which 5,500 Canadians responded to questions about the environment and sustainability. Of significance to educators is the recommendation that the development of educational opportunities arising from the "naturalizing of school grounds and community spaces" (Government of

Canada, 2002, p. 12) is an important strategy towards the promotion of sustainable living.

Across the nation, models for curriculum and school programming have emerged that reflect the recommendations found in the *Framework for Environmental Learning* document. Examples include the British Columbia Ministry of Education's 2007 document, *Environmental Learning and Experience: An Interdisciplinary Guide for Teachers*, and the Ontario Ministry of Education's 2009 document, *Acting Today, Shaping Tomorrow: A Policy Framework for Environmental Education in Ontario Schools*.

One of the most effective school garden programs is that of The Edible Schoolyard in Berkeley, California ([www.edibleschoolyard.org](http://www.edibleschoolyard.org)). The garden, founded in 1995 by chef Alice Waters and former school principal Neil Smith, is a one-acre spread of bountiful organic produce located on the site of a former asphalt parking lot. Students and teachers grow an enormous variety of fruits and vegetables. Close to a thousand students attend the school, and every one of them is involved with the Edible Schoolyard. The garden is complemented by a kitchen classroom. Together, these two learning environments—the garden and the kitchen classroom—provide a setting for students to grow, harvest, and prepare seasonal produce.

In 2003, J. Michael Murphy conducted a study on the effects of the Edible Schoolyard garden-based curriculum (Murphy, 2003). Qualitative and quantitative data were derived from surveys and interviews with students, teachers, parents, and administrators as well as from school

grades, test scores and attendance records. Fifty 11-year-old children from the Martin Luther King Jr. Middle School were compared with 50 students in a control school; as well, 64 teachers from the two schools took part in the study. Over the course of a school year, the scores in mathematics and science for students involved in the school garden program showed significantly greater gains than the scores of students in the control school. The students in the garden-based program also made greater gains in understanding ecological cycles and showed an improved understanding of sustainable agriculture. Teachers involved in the garden-based program rated their school as more conducive to learning than the teachers in the control school, and they ranked compassion for living things as one of their top three teaching priorities. Murphy (2003) also found that the students who made the greatest gains in understanding fundamental principles of ecology also developed more healthy eating practices.

In addition to its on-site activities, The Edible Schoolyard has launched an impressive and extensive virtual gardening program, offering online resources to teachers and students worldwide. At the same time, others involved in the school gardens movement contribute to the resource repository as well, making it perhaps the most active school garden resource in the world.

New initiatives supporting school gardens continue to be launched. For example, on May 1, 2012, the School Garden Network, based in Manitoba, was established with the aim of connecting schools across the country, building a common resource base, and developing curricula

(<http://schoolgardennetwork.ca>). It is too early to tell whether this network will be effective—and it may take a decade before we know (networks, like gardens, take time to establish). But if the Manitoba School Garden Network has even a fraction of the effect of The Edible Schoolyard, it has the potential to affect the learning of many students across the country and beyond.

As ministries of education, school boards, and individual school communities have begun to take up the work of educating children for sustainable living, research into the relationship between the greening of school grounds and student experience has grown. Most typically, research is conceptualized in terms of the potential benefits to students resulting from the use of school gardens. For example, Dymont (2003) conducted a systematic investigation of 45 elementary, middle, and high schools in the Toronto District School Board on the influence and potential of green school grounds, and found that the benefits to students included increased pro-social behavior when learning and playing on green school yards, increased diversity of play opportunities, the promotion of social inclusion, increased safety, enhanced teaching and learning for teachers and students, and the promotion of environmental awareness and stewardship. In a more recent study, Ozer (2007) described benefits of school gardens in terms of improved academic performance through outdoor labs, enhanced student experience through the beautification of the grounds, and the promotion of healthy eating habits and exercise.



## Nature Deficit Disorder and School Gardens

It is widely agreed that children develop relationships with nature by being actively involved in natural surroundings, and that schooling should promote active engagement with the natural world (Chawla, 2007; Danks, 2010; Moore & Wong, 1997; Nabhan & Trimble, 1994; Upitis, 2010). But children's freedom to explore the natural world unsupervised has been dramatically reduced in recent years. Louv (2005) uses the chilling term *nature deficit disorder* to describe the growing disconnection between children and nature. He argues that there are four factors that contribute to a dearth of opportunities for children to connect with nature. The first is a heightened sense of street danger, compelling parents to keep their children indoors or within the boundaries of easily supervised playgrounds. The second is increasingly urbanized environments resulting in limited access to natural spaces. The third is an increase amount of daily screen time—including time spent on computers, handheld gaming devices, DVD players, cellular phones, and tablets—giving children incentives to stay inside. Finally, Louv argues that there is a culture of fear about wilderness and outdoor spaces in North America, fueled by media and litigation, which, he argues, has the effect of scaring children away from the woods, fields, and meadows. Kahn and Kellert (2002) echo Louv when they state: "the genesis of estrangement from nature lies in childhood and it is there we must begin to address the problem" (p. 17).

This estrangement raises an important question: how might schools create opportunities to support children's connections to nature, thereby

enhancing the possibilities for stewardship in the longer term? Danks (2010) invites us to imagine schoolyards that are ecologically grounded, “where children work on their lessons in an outdoor classroom, study rainfall patterns as water flows into their cistern, and track renewable energy as it is produced by their wind turbine” (p. 1). While this image might be familiar for those educators who work actively with their school communities to create such learning experiences, this image is far from the norm.

In a study by Titman (1994), it was found that children resoundingly preferred natural over built environments within which to play and learn. Children identified positive elements of school grounds, which included trees, grass, wild animals, and “places that you can climb, hide, explore, or make a den in” (p. 25). Children also identified negative elements, which included garbage, damaged things, tarmac, and “places that are boring” (p. 25). Through reading the care and attention that the adults give to the school environment and grounds, or lack thereof, children determine what is and what is not valued. The central implication of this study is that the adults who are responsible for the management of the school can create pro-environment messages by naturalizing and caring for the school grounds and the implementation of school-wide green initiatives that communicate an interest in children’s experience and a concern for the environment. In a more recent study, Wells and Lekies (2006) interviewed 2,000 adults throughout the United States, ages 18–90, about their childhood experiences with and their adult attitudes to nature. Wells and Lekies

found that childhood participation in both wilderness (e.g., camping) and domesticated (e.g., caring for plants) experiences with nature have a positive relationship to pro-environmental attitudes in adulthood.

## Research Questions

Collectively, the studies examined confirm that early experiences in positive outdoor environments play an important role in developing life habits and practices—practices that can only be sustained when people have a sense of stewardship that becomes part of their way of living. Accordingly, this descriptive case study was designed to determine how a well-established school garden program might promote environmental stewardship in students. Two specific research questions guided this study: (a) Do children’s experiences with their school garden program, as depicted through photographic narratives, enhance environmental stewardship?, and (b) What programmatic, social, and administrative structures contribute to making school garden programs sustainable over time?

## Method

### School Site Selection

This qualitative case study was designed to identify and examine one well-established school garden program at an urban public elementary school in Southeastern Ontario where environmental stewardship was a key aspect of the broader school ethos. The garden program at this

school was deeply embedded within the school culture and supported by teachers, the school board, and the local community. It was comprised of four main features: (a) naturalizing the school property and ongoing modifications to school and garden design, (b) annual cultivation of herb, flower, and vegetable gardens, (c) bringing the gardens into the classrooms through a parent-led K-6 harvesting and cooking curriculum, and (d) a longstanding Garden Club involving approximately 25% of the school populations, teachers, and volunteers who together provided leadership, labour, and resources for the school garden program.

Naturalizing the north-facing schoolyard was achieved by (a) replacing the asphalt play surfaces with mulch, (b) developing an extensive composting and recycling program, (c) creating sunny and shaded places to sit or play with natural elements such as stumps and logs and with linking paths between the quiet places and larger play areas, (d) native tree plantings, and (e) the design of numerous annual and perennial gardens, most of which run around the perimeter of the schoolyard and along the front of the school. The flower, vegetable, herb, and butterfly gardens feature hardy perennials (e.g. echinacea, daylilies, native grasses) and easy to grow annual vegetables (e.g., tomatoes, basil, potatoes).

In addition, there are photovoltaic panels on the school building itself used for solar power. More recently, the school community designed and constructed a new kindergarten play space. Because this program was almost two decades old when the research was conducted, it provided an ideal setting to determine both the aspects of environmental stewardship

present in students' lives as well as the structural features contributing to its long-term success. However, its unique features also mean that the results from this work are not generalizable to other school garden programs. Our goal with the case study is to provide a rich description of how students in one school benefitted from this approach.

### Participants

Prior to data collection, ethical clearance was obtained from the university and the school board. The study took place in 2010, from March to October. One of the students was interviewed again in the fall of 2012.

Two researchers attended weekly Garden Club meetings for six weeks to become familiar with the program and to acclimatize students to the researchers' presence. During these Garden Club meetings, the researchers spoke with all 40 students involved in the club (out of a school population of 220 students), gaining a general understanding of how the Garden Club operated and of students' interests and commitment to the school garden program. Field notes were systematically recorded during these meetings. After a period of several weeks, letters of information and consent forms were distributed to members of the Garden Club inviting students to take part in more intense interviews and explorations about the school garden program. Parents of eight students returned the consent forms; informed assent was also obtained from the eight students. The students included four students from Grade 4 (two boys and two girls), two girls from Grade 5,

and two girls from Grade 6. Informal conversations with key informants (the school principal and Garden Club leader) helped us identify six adults who were also willing to take part in the study: the lead gardener, two parent volunteers, and three teachers representing the day care, primary division (Grades 1 through 3) and junior division (Grades 4 through 6). In the final stages of writing the paper, one of the older children who had been involved in the study two years previously examined all of the photographs and read through the results, as reported, to ensure that the perspectives of the students were authentically represented to the best of her knowledge. The results we report on in the present paper are comprised almost entirely from the student data; reporting on parent and teacher data is beyond the scope of the present investigation.

### Data Collection

Data were comprised of participant observations, semi-structured interviews with student and adult participants, and photographs taken by students. The researchers also recorded observations while participating in weekly garden club meetings, noted informal conversations, drew diagrams of the school yard space, and collected information about the history and development of the school garden program. All of the interviews with students were conducted while walking through the schoolyard, during which time students answered questions and took photographs. Students were given digital cameras and asked to photograph any schoolyard and garden features they found

meaningful (positive or negative) and were invited to describe why they took the photographs. The interview tours were audio-recorded using a handheld recorder and explored the following issues: (a) participants' responses to the school gardens, (b) participants' experiences with the Garden Club, (c) favorite activities associated with the Garden Club, (d) spaces they liked and disliked, and (e) tensions associated with the schoolyard and gardens.

*Photographic Narratives: Eliciting Children's Perspectives.* The use of visual strategies in research with children is but one way in which researchers are attempting to better determine children's points of view as they undertake research on, for, and about children (Christensen & James, 2008; Creswell, 2012; Green & Hill, 2005; Hallett & Prout, 2003; Thompson, 2008; Titman, 1994). Indeed, the use of visual strategies—most notably photo elicitation—has gained prominence in recent years as reflected in an abundant and growing literature (Clark-Ibáñez, 2007; Cook & Hess, 2007; Peterson, 2009; Rasmussen, 2004; Thompson, 2008). Using a camera can be an empowering experience; when "...children take pictures to describe their opinions and feelings about their lives, they are active. They are creating meaning..." (Rasmussen, as cited in Einarsdóttir, 2005, p. 527). The freedom to take personally relevant photographs also shifts the locus of power to the student, away from the researcher. When interviews are incorporated with photographs, students have an opportunity to interpret and explain the photos they have taken (Einarsdóttir, 2005).

While teachers or parents may influence what photographs are taken and also influence the narrative surrounding the photographs, many image-based researchers do not see this as a limitation because they “...view all data as constructs developed through the relationship of the researcher, research participants, research context, and means of data generation” (Moreland & Cowie, 2005, p. 77). Drew, Duncan, and Sawyer (2010) point out a number of difficulties inherent to conducting research with children that visual strategies address, most notably, that visual strategies can aid in leveling an adult/child hierarchy, and, in doing so, foster a sense of ease and comfort for the child participant, and an increased sense that their perspectives are valued. Through 68 in-depth interviews of children who had participated in a research project involving photography, Drew, Duncan, and Sawyer found that children valued such methods because they were fun, promoted positive feelings about the research, and promoted communication and focus during interviews.

### Analysis

Standard qualitative approaches were used to analyze the data (McMillan & Schumacher, 2010). To begin with, the eight student interviews were transcribed verbatim. Each of the three members of the research team coded two interviews to establish an initial set of 84 codes, comprised both of open and *a priori* codes from the literature (Creswell, 2012; McMillan & Schumacher, 2010). Inter-rater reliability was 85%. Following this initial coding, the 84 codes were merged, retained, or



eliminated and the remaining six student interviews were coded in order to identify themes and patterns, following the notions of McMillan & Schumacher (2010) who demonstrate how qualitative data analysis is a cyclical process that constantly returns to the data in order to modify and validate the codes, themes and patterns. Data were entered, stored, sorted and coded using *Atlas.ti* qualitative data analysis (QDA) software. Within the QDA document, a field log was used to track decisions, and record ideas that emerged throughout throughout the analysis process.



Figure 1. Garden Path, photo by Alice

The children's photographs were first examined through the eyes of the children. During the walking tours, researchers asked what was depicted in the photos. For example, a photo that was identified as the "garden path" by a child might equally have been identified as low-lying greenery or a shaded area by someone who was not familiar with what the child was attempting to portray. The two

photos that appear in figures 1 and 2 respectively indicate this potential ambiguity. Figure 1 was identified as "the garden path" by one child (Alice), whereas another child (Lucas) identified a similar photograph

with a path, shown in Figure 2, as “the butterfly,” referring to the



Figure 2. The Butterfly, photo by child Lucas

decoration on the chain-link fence, making no reference to the path at all.

After the children provided the photo descriptions, the photos were then classified according to these categories and sorted

and tallied using *Atlas.ti*. The observational data and adult commentaries were used to enhance the description of the design, layout, and features of the gardens and the researchers’ understanding of the central pillars and historic development of the school garden program.

Through this analysis process, five themes emerged as important to the first question, namely, the factors contributing to the enhancement of *environmental stewardship*. These five themes were (a) connecting with nature, (b) building the garden, (c) planting, (d) caretaking, and (e) harvesting. Three themes emerged as important in relation to the second question regarding *long-term success*, namely, (a) parental involvement, (b) Garden Club structure, and (c) community connections. These themes are described and discussed in the following section.

## Findings

The findings are organized in terms of the two research questions, beginning with children's photographic narratives relating to environmental stewardship. These narratives emerge from the collections of photographs produced by the children, researcher observations, and the individual interviews that took place in the context of the walking tours. The annotations in brackets attribute comments to particular students, who are identified by pseudonyms. For example, the annotation Jane, 6-0310 refers to a child whom we call Jane, who was in Grade 6 at the time of the interview, which took place in March 2010.

### Environmental Stewardship

We have made the argument that in order to become stewards of the environment, children must connect with the natural world. But they must do more than connect: they must also become active agents in shaping their natural environments. Accordingly, the findings related to environmental stewardship are presented under five sub-headings, the latter four of which represent children's active involvement with shaping and harvesting their garden.



*Connecting with nature.* Berleant (2005) observes that while landscapes—such as gardens—

Figure 3. Shade tree, photo by Zoe 110

might mean different things to different people, the aesthetic meaning is often commonly recognized and valued. He notes that people experience landscapes either through observation or engagement. We might glance at and observe the beauty of a garden, or we might actively work to care for and nurture the plants growing in the garden. In this way, children first experienced and described their sense of connection to nature through their daily, informal interactions with naturalized schoolyard elements. These elements include the trees, flowers, and vegetable gardens that beautify the schoolyard and support dynamic learning experiences. Children's comments were both about the abundance of plants and trees in the yard, and also, the concomitant lack of asphalt. One Grade 5 girl



Figure 4. A Beautiful place, photo by Jane

observed, "Well, it is just pretty. And it is better than just grass or just dirt, or pavement on the yard because then that is not very pretty" (Alice, 5-0310). Photographs taken by the children often depicted elements of the gardens that they considered to be beautiful. Over half of the children's photographs were of their favorite blooms, vegetable plants, trees, and pathways. One of the photographs of a tree in the yard, providing shade for the picnic bench, appears below. Five of the eight students in the study photographed this tree.

Other children's informal interactions with the naturalized elements of the schoolyard occur through play. Participants spoke of the many different opportunities for play and social interaction on their schoolyard.



Figure 5. Jumping logs, photo by child Alice

The schoolyard has hard surfaces for bouncing balls, quiet spaces for conversations, natural structures for creative play, and gardens for planting and harvesting. Some children take part in all of

these activities. As a Grade 4 boy commented, "It is fun because you can play soccer and you can plant plants, too" (Lucas, 4-0510). The young children interviewed spoke about how their sense of imagination was sparked through their playful use of various logs and stumps, which are placed strategically around the schoolyard. One Grade 6 student told the story of a jumping game she loves to play with her friends, where they imagine the mulch on the ground to be a pond and they hop from one "lily pad log" to another (Jane, 6-0410). In observing the students, it became apparent that children of all ages gravitated towards the logs, engaging in all sorts of imaginative play. Figure 5 presents a photo of what one of the Grade 5 girls called the "jumping logs" (Alice, 5-0410).

Children described their sense of connection to nature through their active participation in the Garden Club. Once a week during the lunch hour, children are invited to help tend to the vegetable and flower

gardens. Tending to the gardens includes planting, harvesting, and maintenance. Other activities include making bird feeders to support the local bird population. Cooking the harvested produce is another important seasonal activity for the children. In the early spring, the whole school participates in tapping the maple trees for sap in order to make maple syrup. In September, parent volunteers and teachers work together to make pesto with the younger children and salsa with the older children. Students spoke enthusiastically about the food making and tasting. One Grade 4 student said that harvesting and cooking is “like a reward. You work hard and then you get a reward” (Carly, 4-0510).

Children had positive emotional responses to the school garden program. Words such as *freedom*, *happy*, and *fun* appear frequently in children’s interview transcripts. Children also spoke about how the school garden program promoted a sense of wonder through the observation of growing cycles. One junior-aged girl marveled that when “you plant something, a few days later there is a sprout coming out. It is like the seed popped out and it is growing” (Anne, 6-0510).

Cultivating positive emotions and experiences at school connect children to their learning (Immordino-Yang & Faeth, 2010). Children who are engaged in a school garden program – whether formally or informally – are having daily and repeated



Figure 6. Composters, photo by child Henry

experiences connecting to nature that support their sense of environmental stewardship, teaching them to care for the things that they like and are engaged with.

This notion is echoed by how children reported their experiences with the school garden program. For example, 15% of the photographs taken by children were of the school's composters, and identified as such by the students. Students talked about how important it was to compost food scraps to provide nutrients for the gardens. One student said: "I learned all the things that are important to nature, and we can help it and keep it alive" (Carly, 4-0610).

*Building the Garden.* From its inception, the school garden program has been rooted in the belief that students would take ownership of the garden spaces. One of the leaders of the project from the early days credits the Evergreen School Ground Greening Project (<http://ebw.evergreen.ca>) with influencing her vision for the school garden: "One of Evergreen's philosophies is that kids have to be involved in the decision making. Kids would say, 'Where do I put this?' and we would say, 'Well, where do you think it should go?' " The commitment to involve students in all aspects of garden development did not stop with ideas and planning. In 1998, at the time of a devastating ice storm that affected Southeastern Ontario and beyond, downing power lines and trees for hundreds of miles around, the garden committee collected tree branches that had fallen in a nearby park. They decided to make these branches into fences for the garden. The students went to the park (which was something of a disaster area at the time!)

and brought back big branches. They were provided with power drills and safety glasses and proceeded to build the fence themselves. And the pride was long-standing—enough to engender the defense of the fence outlined in the opening of the paper.

This sense of ownership and pride that the students take in their schoolyard is reflected in their use of personal pronouns when describing the plants and trees and other features of this place. These are not “the trees,” but “our trees.” It is not someone else who looked after the trees. Rather, the students say, “We can help it and keep it alive” (Carly, 4-0510). Sometimes the relationship is defined in even more explicit terms, “This is my pathway... this pine tree I love. We are trying to save it. We probably will” (Zoe, 4-0510). This strong sense of ownership that students described is engendered, in part, through their experience of being included in all aspects of the entire cycle of gardening. Students described their experiences in terms of the processes of planting, caretaking, and harvesting.

*Planting.* The planting of seeds in the garden was a strong focus. One Grade 4 student said, “We made this little garden and put in popcorn kernels and lima beans and grain or wheat. So far the grain is growing, but nothing else. I see a little sprout from the popcorn kernels (Lucas, 4-0510)” and another commented, “I find it cool that you plant a seed and then a week later you say, ‘there’s a plant there!’ “ (Carly, 4-0510). Both of these comments reflect the students’ connection to the beginning stages of plant growth. This connection can become very personal, “Say



you planted a tree, and then you would be able to *know* that tree” (Carly, 4-0510).

*Caretaking.* Perhaps because of their connection to the early stages of plant growth, students did not seem to mind the caretaking aspect of gardening. Consider the pragmatism in this statement, “Some people think you have to weed just once and the weeds won’t come back. But they do. You have to take care of it” (Zoe, 4-0510) and the intimacy of this relationship, “You kind of get to know that I helped plant this plant. And this is a plant I helped survive” (Lucas, 4-0510).

Interestingly, in some school gardens, children are not expected to weed. This is the case for the Edible Schoolyard Project described earlier (Winslow Carroll, personal communication, November 3, 2011). The reason? Children don’t like to weed. But our findings indicate that some students, in fact, enjoy weeding immensely, realizing that weeding contributes to the overall success of the plants and the garden. Even if they do not enjoy, as one student calls, “Zenning out” (Zoe, 6-0711) while weeding, there is learning to be had in the process.

Another student reported that even during play time she and her friends were aware that the plants are vulnerable, “Sometimes we play and jump or something, but we don’t hang on them because they are babies” (Jane, 6-0510). For all of these young students there is evidence of having imaginatively accepted the responsibility involved in their relationship to their garden and their plants.

*Harvesting.* Students referred to the pleasure they experienced at being able to harvest the produce from the vegetable garden and eat the

resulting food products. Salsa made from their tomatoes and red peppers was very popular, “Last year our class made salsa with green tomatoes and we got to eat it. The tomatoes came from here where you can see the garden is blank ... (we) took other plants around the garden like parsley and other things to give it flavor” (Carly, 4-0410). Notice again the use of personal pronouns as this student explains how maple syrup making becomes a group activity, “We tap the maple trees when it’s wintertime and we make maple syrup ... and we taste it on little pancakes” (Henry, 4-0410). Another child added, “And it tastes really good because we made it!” (Carly, 4-0410). This notion of food being appealing when one

prepares it is crucial to the success of changing eating habits for children as well: children are much more likely to sample food that they have made, even if the flavours are new, than if they are served something unfamiliar by



Figure 7. Tomato harvest, photo by Zoe

another cook (Hermann et al., 2006; Winslow Carroll, personal communication, November 3, 2011). The other aspect of this particular activity that is so crucial is that includes all five characteristics identified by Tooth and Renshaw (2009) as important to developing a sense of place and stewardship, namely, connections with the community, real life and sensory experiences, doing active work, and being involved with the natural world. Similar comments were made about the tomato harvest, captured by the photo in Figure 7 by one of the Grade 5 girls.

### Factors Contributing to Long-term Success

There is abundant literature indicating that maintaining school gardens is a difficult and not always successful venture (Danks, 2010). Usually factors like school administration are singled out as important, along with the need for proper financial resources (Upitis, 2010). But we find, here, that there are more important factors that contribute to the long-term success of this venture. The administration, while supportive, is basically “hands-off” —there have been many changes in leadership over the past two decades, but without exception, the school leaders have recognized an important aspect of the school, praised it and supported it, but remained at arm’s length from the actual planning and implementation of school garden activities. Similarly, while adequate resources are often identified as crucial, this garden thrives on what appears to be a meager but self-supporting budget based on fundraising efforts and small grants. So it is not administration and resources that are most central to the success of this particular school garden program. Rather, it is parental involvement, the structure and presence of the Garden Club, and the community connections that are central to the long-term success of this venture.

*Parental Commitment.* The garden program began in the mid 1990s when a parent of two children at the school attended a schoolyard naturalization workshop presented by the Evergreen Foundation. This experience prompted her to mobilize the support necessary to transform her children’s schoolyard from a dusty and barren asphalt space to a more natural environment. Since that time, an ever evolving group of

parents has been involved in planning the gardens, maintaining the gardens over the summer months, working directly with the students in the gardens and on class-wide curriculum projects, fundraising, and running the Garden Club. In conversations with the students (both the eight directly involved in the study as well as informal conversations with other students in the school), the role of parents was identified time and again by the students as one of “the most special things about this school” (Nel, 5-0310).

*Garden Club Structure.* To enhance the students’ exploration of these schoolyard elements, parent volunteers established the Garden Club. Student participation in this weekly lunch-hour program led by parent volunteers is voluntary and children are free to attend as they wish. The Garden Club remains responsible for designing, planting, maintaining, and harvesting the gardens. The Garden Club parent volunteers also visit all of the classrooms throughout the school year to cook with the children and to teach them about gardening.

But there is more to the Garden Club than organization of the gardens and school curriculum. The Garden Club serves as a communications hub for the gardens and related projects, as parents, teachers, and students alike “go to the Garden Club leader” (Anne, 6-0510) when there is an issue to deal with or a cause for celebration. It also serves as an administrative structure for anything dealing with the gardens, and survives changes in school leadership, volunteers, and other changes brought by the vestiges of time. It is an organic structure—always present, but changing over the years to serve many purposes:

communications, archives, brainstorming, teaching, planning, coordination, fund-raising, and general administration.

*Community Connections.* The transformation of this schoolyard was guided over many years by capable leadership, the support of teachers and four successive school administrations, and a dedicated team of volunteers. The success of this school garden program is also a result of cogent short and long-term planning, effective school-community connections, financial support, and ongoing student and teacher enthusiasm. Regular meetings are held to jointly identify priorities, to navigate large-scale design and construction projects, and to guide the selection and placement of trees and indigenous flowerbeds. These initiatives are supported by sponsorship from local business owners, community grants, and fundraising activities at the school, such as a spring sale of tomato plants students grow from seed during the winter months. Children's participation in Garden Club activities helps secure parental assistance with a variety of after-school and weekend projects. In essence, this extensive school garden program reflects the needs, interests, and values of the community. The combined efforts of the school and community have resulted in a schoolyard that feels and functions like a backyard through which students have the opportunity to discover the beauty and complexity of living ecosystems. In order to further explore these broadly described features, we turn to specific examples to illustrate more deeply how the garden program has contributed to students' abilities to connect with nature and take

ownership of aspects of the garden, engendering the sense of stewardship described in the opening vignette.

### Discussion

Conversations with the participants revealed that garden program enhanced children's experience of school by connecting them to nature in ways that promoted their sense of environmental stewardship. This school garden program provided conditions to spark children's imaginations and develop their powers of creative thinking. Nabhan and Trimble (1994) remind us that, from the perspective of children, natural spaces are like "Lilliputian landscapes" (p. 4) to be explored and delighted in. Playful, imaginative activity is the fabric of childhood. Children need opportunities to use their imagination to develop their capacity for empathy and to imagine future possibilities. School garden programs can provide the conditions for children to develop this capacity through active use of imagination as grounding for their sense of environmental stewardship, and the present example provided evidence of the same. Robinson (2009) speaks to the important role that schools have in developing children's imagination. He argues that the push for skill-based education misses the mark because we cannot know the future and, therefore, we simply cannot know what kind of skills children need in order to live into this unknown future. He asserts that the only skill that will serve children well is that of imagination. The potential of school gardens as a means to foster imaginative thinking was illustrated, for example, by the children who turned logs and stumps

scattered about the schoolyard into an adventurous game of lily-pad hopping.

Most North American schoolyards are traditionally designed to promote children's gross motor development through playground structures and pre-set games that are painted onto hard tarmac surfaces. In contrast, a school that has made the commitment to create gardens and to naturalize their yard provides a wealth of social, exploration, and play opportunities for children. Research on play indicates that children prefer school grounds with high degrees of challenge, novelty, and complexity (Malone & Tranter, 2003). Our study bears this out. Interestingly, a school garden that provides a complex play opportunities doesn't necessarily *look* as organized or as pleasing as a designed playground space. The school garden we investigated is, from the critical adult eye, not much more than a broad expanse of mulch with strategically placed trees, garden beds, pockets of shrubbery and flowers, and unformed play structures scattered about such as stumps, logs, and benches. But, unlike adults whose conscious experience of life radiates outward like a lantern, children's consciousness is like a spotlight, focused on their immediate experiences and surroundings (Gopnik, 2009). In this way, the children who shared their perspectives on and experiences with their school garden were sharing aspects of their experience that the garden directly afforded them.

The idea of an *affordance*, first described by James Gibson (1979), is the functional relationship between an element of nature (such as a tree branch) and the organism using it (such as a child reaching for the

branch). The affordance is neither the branch nor the child, but in the relationship between the two (Chawla, 2007). Chawla (2007) discusses this idea with regards to the kinds of opportunities for play and discovery that a school garden might offer, or *afford*, children. She describes a cycle of experience in which children positively interact with their environment in ways that promotes engagement and learning, leading to increased environmental awareness. The cycle begins with a child having the freedom to explore the environment; positive encounters with the environment leads to further self-directed exploration. Over time, these encounters become more challenging and rewarding, leading to increased motivation for further exploration and challenge. Chawla points out that for children, nature is endlessly novel. A stick never floats down a creek the same way twice, and so, a child can be captivated by a floating stick, a hundred times over. Chawla asserts that this cycle of experience leads to a growth in environmental knowledge and competence—the basis of environmental stewardship.

In the literature reviewed earlier in the paper, we noted the emphasis Louv (2005) places on children spending time in wild areas. While some might question whether school gardens would be the kinds of environments that Louv would promote, Chawla's assertion that even a simple natural phenomenon can be endlessly novel is, we believe, something that both wild and tame gardens cultivate. Further, while there were clear planted areas in the school garden under investigation, there were also areas that were deliberately left to run wild. Indeed, when we were reviewing the present paper several years after the data



were collected, the older student who reviewed the photographs and results (at the time of review, 12 years old) exclaimed, upon seeing the first photograph of the garden path, "Oh! I'd forgotten how beautiful the yard was at [our school]. And wild!" (Zoe 7-0113).

While the aim of providing children with opportunities to connect with nature is, unquestionably, a sound one, it is important to remember that the agenda to developing attitudes and behaviors in children that lend themselves to a sense of environmental stewardship is an adult agenda (Wake, 2008). Wake points out that adults can be hypocritical in our environmental attitudes, which can be confusing to children. As teachers, we might be strong in delivering a lesson to children that we need to care for the Earth, but in fact exhibit behaviors that aren't consistent with that message. Wake cautions educators who are involved in the work of school gardens to "ensure these gardens do not become an overbearing educational vehicle for righteous adult agendas" (p. 431). This is an important reminder that school gardens should be, first and foremost, for children. This sense of orientation to the children and their interests was highly evident in the school garden program we researched. Children are actively involved in all aspects of decision-making, they have the freedom to choose to participate in Garden Club as they wish, and the organically distributed natural elements of the grounds afford rich opportunities for repeated discovery.

There are other benefits related with the school garden program we documented. The presence of a garden provided children with a variety of choices for being active during the recess and lunch hour. Daily

physical activity (DPA) is currently required in Ontario schools as a means to promote children's health and physical fitness. Gardening is physical by its very nature. Taking part in gardening meets the DPA requirements in an authentic way.

### Ongoing Challenges

While there are many positive benefits of school garden programs, such programs are not free from difficulties. Students noted that there



Figure 8. Basketball hoops, photo by child

can be a conflict between the sports activities in the playground and the gardening demands. One student illustrated this conflict by taking a photograph of the basketball nets on the side of the school, explaining, as part of her

photographic narrative, that sports were just as important to her as the gardens, and that sometimes she had to, reluctantly, choose between the two. Another difficulty she identified during the walking tour was that there could be inadvertent damage to the gardens during sports, as balls often fly out of the play area into the gardens.

However, there were also times when students integrated



Figure 9. Blue house and bench, photo by child Henry

play with the features of the garden, such as the “blue house,” used for hiding when playing games but also a focal point for entering one of the gardens. This was a favourite place for a number of students. The photo



Figure 10. Outdoor classroom, Edible Schoolyard, Berkeley, California (author photo)

of the blue house and bench is by one of the Grade 4 boys.

There is also the challenge of connecting curriculum directly with gardening—partly, as one teacher noted, because of the tension between indoor

and outdoor learning. In the case study reported in the present paper, there were no formal outdoor teaching areas. Also, as noted earlier, membership to the Garden Club is optional. While parent volunteers visit every classroom, and while all children take part in, for example, the composting program, the range and depth of experiences vary depending on whether children choose the extended work that accompanies being a member of the Garden Club. Having examined other successful school garden programs, including a site visit to the Edible Schoolyard in Berkeley,<sup>1</sup> it is our view that the most successful programs in terms of curriculum are those where (a) there is an outdoor teaching space, (b) students are required to take part, and (c) teachers are expected to integrate the gardening activities with the standard

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<sup>1</sup> [www.edibleschoolyard.org](http://www.edibleschoolyard.org)

curriculum. In the case of the Edible Schoolyard, this curriculum integration occurs for the science, mathematics, and social studies (Winslow Carroll, personal communication, November 3, 2011).

A second challenge associated with long-term gardening programs is that of sustaining the momentum once the original visionaries are no longer involved. In both the current case study and the Edible Schoolyard, the original visionaries are still involved in the work, albeit on a tangential basis. Both programs also rely on a diversified set of activities and sources for ongoing funding, volunteerism from community members, grant support, student and parent led activities, and in the case of the Edible Schoolyard, support from a foundation. In addition, there are clearly defined roles and responsibilities for the staff and volunteers associated with both gardens, which evolved over a period of several decades.

### Limitations

Case studies afford researchers the privilege of interacting with many members of the school community over an extended period of time. That said, there are limitations to this type of study as well. Most notably, it is not possible to generalize from a descriptive case study. Also, because participation was voluntary and we sought to work with students who had committed to the Garden Club, we worked with a small number of students in depth. However, we spent many months at the school and were able to interact informally with most of the school's population, and in addition, adult members of the community were also able to

enhance our learning. Thus, despite the limitations, the findings of this study support the contention that children can make deep connections to the environment when they are given opportunities to learn under the conditions specified by Tooth and Renshaw (2009), namely, in a local community context supported by parents and other community members, possibilities for real life learning (such as cooking) and hands on work (all aspects of gardening), as well the sensory engagement that being in a natural environment engenders.

### Summary Statement

For nearly two decades this school garden program has provided children with opportunities for direct, hands-on learning in nature. Resulting from the commitment and passion of a strong team of parent volunteers, teachers, and administration, this program has fostered meaningful interactions amongst community members and peers, and has provided an effective structure for connecting students to nature. While case study results are not generalizable, there are at least three of the contributions this case study makes to the literature on school garden research and curriculum scholarship. First, it examines a program that has been sustained for decades, surviving changes in administration and school practices, and there are few such examples in the literature. Second, it uses a student-centered approach to data collection, and thus contributes to a growing body of work on both photo elicitation techniques and student sensitive research. Finally, it provides successful example of a curriculum model where parents take the lead in creating

and delivering a gardening and cooking unit across all school grades on an annual basis.

The evidence shows that the school garden program has helped foster children's sense of agency. Like the boy who wanted to protect *his* fence, we protect the things we think are important and feel connected to. This connection has had many positive benefits to the children of this school; most significantly the kinds of nature experiences through which a foundation for developing abiding connections to nature that can well serve them, and their communities, throughout their lives.

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