Adult Perceptions of Student Involvement in Schoolyard Gardening

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ABSTRACT

The purpose of this research is to investigate through adult perceptions what factors have enabled and limited student participation in schoolyard gardening, and how to support student involvement in schoolyard gardening. It is a collective case study of three schools in the Toronto District School Board (TDSB, Ontario, Canada) that are currently running a schoolyard gardening project. Sixteen interviews were conducted during May and June, 2005, and photos of the three schoolyard gardens were taken. The results show that the common factors that have enabled student participation in schoolyard gardening at the three schools are teacher’s initiative and commitment, principal’s leadership and support, parental involvement and donations, and the TDSB’s EcoSchools program and workshops. The common limiting factors are time, money, and the unions’ “work-to-rule” issue. The ways to support student involvement include teachers integrating the gardening into the curriculum; parents making donations to the school and creating a family gardening culture; principals supporting in money or budget and taking the lead; the TDSB providing funding, awards, incentives, and more maintenance; and the Ontario Ministry of Education supplying funding, curriculum link, and teacher training.
To Mother Earth

You breed thousands of children

with your abundant bread;

Yet you expect nothing in return

but deep, deep respect.

– The Researcher, March, 2005
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract</td>
<td>ii</td>
</tr>
<tr>
<td>List of Tables</td>
<td>vi</td>
</tr>
<tr>
<td>List of Figures</td>
<td>vii</td>
</tr>
<tr>
<td>Preface</td>
<td>viii</td>
</tr>
<tr>
<td><strong>CHAPTER ONE: INTRODUCTION TO THE PROBLEM</strong></td>
<td>1</td>
</tr>
<tr>
<td>Background of the Problem</td>
<td>1</td>
</tr>
<tr>
<td>Theoretical Framework</td>
<td>11</td>
</tr>
<tr>
<td>Statement of the Problem</td>
<td>13</td>
</tr>
<tr>
<td>Statement of the Purpose</td>
<td>14</td>
</tr>
<tr>
<td>Research Questions</td>
<td>15</td>
</tr>
<tr>
<td>Significance of the Study</td>
<td>16</td>
</tr>
<tr>
<td>Scope and Limitations of the Study</td>
<td>22</td>
</tr>
<tr>
<td>Rationale for the Study</td>
<td>24</td>
</tr>
<tr>
<td>Organization of the Following Chapters</td>
<td>24</td>
</tr>
<tr>
<td><strong>CHAPTER TWO: REVIEW OF RELATED LITERATURE</strong></td>
<td>25</td>
</tr>
<tr>
<td>Holism in Schoolyard Gardens</td>
<td>25</td>
</tr>
<tr>
<td>History of Children Gardening</td>
<td>31</td>
</tr>
<tr>
<td>Continuity of Schoolyard Gardening</td>
<td>42</td>
</tr>
<tr>
<td>Chapter Summary</td>
<td>77</td>
</tr>
<tr>
<td><strong>CHAPTER THREE: METHODOLOGY AND PROCEDURES</strong></td>
<td>78</td>
</tr>
<tr>
<td>My Identities and Background</td>
<td>79</td>
</tr>
<tr>
<td>Research Design: Transformative Research</td>
<td>81</td>
</tr>
<tr>
<td>Interview Question Selections</td>
<td>81</td>
</tr>
<tr>
<td>Site and Participant Selections</td>
<td>84</td>
</tr>
<tr>
<td>Ethics Approvals</td>
<td>86</td>
</tr>
<tr>
<td>Data Collection</td>
<td>87</td>
</tr>
<tr>
<td>Data Analysis</td>
<td>88</td>
</tr>
<tr>
<td>Data Validation</td>
<td>90</td>
</tr>
<tr>
<td>Ethical Considerations</td>
<td>90</td>
</tr>
<tr>
<td>------------------------</td>
<td>----</td>
</tr>
<tr>
<td>Methodological Assumptions and Limitations</td>
<td>91</td>
</tr>
<tr>
<td>Dissemination</td>
<td>92</td>
</tr>
<tr>
<td>Benefits to the Participating Schools</td>
<td>93</td>
</tr>
<tr>
<td>Chapter Summary</td>
<td>93</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CHAPTER FOUR: PRESENTATION OF FINDINGS</th>
<th>94</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within-Case Analysis</td>
<td>95</td>
</tr>
<tr>
<td>Cross-Case Analysis</td>
<td>169</td>
</tr>
<tr>
<td>Holistic Analysis</td>
<td>175</td>
</tr>
<tr>
<td>Chapter Summary</td>
<td>219</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CHAPTER FIVE: REFLECTIONS AND RECOMMENDATIONS</th>
<th>220</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summary of the Study</td>
<td>220</td>
</tr>
<tr>
<td>Reflections on the Journey</td>
<td>226</td>
</tr>
<tr>
<td>Implications of the Study</td>
<td>232</td>
</tr>
<tr>
<td>Recommendations</td>
<td>237</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>References</th>
<th>257</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Appendix A: Interview Questionnaires</th>
<th>274</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix B: Verbal Scripts</td>
<td>277</td>
</tr>
<tr>
<td>Appendix C: Ethics Approvals</td>
<td>278</td>
</tr>
<tr>
<td>Appendix D: Thesis Defense Handouts</td>
<td>281</td>
</tr>
</tbody>
</table>
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Comparison of Amount of Student Participation at the Three Schools</td>
<td>170</td>
</tr>
<tr>
<td>2</td>
<td>Comparison of Enabling and Limiting Factors for Student Participation at the Three Schools</td>
<td>173</td>
</tr>
<tr>
<td>3</td>
<td>Comparison of Ways to Support Student Involvement at the Three Schools</td>
<td>174</td>
</tr>
<tr>
<td>4</td>
<td>Summary of Amount of Student Participation in Schoolyard Gardening</td>
<td>222</td>
</tr>
<tr>
<td>5</td>
<td>Summary of Enabling and Limiting Factors for Student Participation in Schoolyard Gardening</td>
<td>223</td>
</tr>
<tr>
<td>6</td>
<td>Summary of Ways to Support Student Involvement in Schoolyard Gardening</td>
<td>224</td>
</tr>
</tbody>
</table>
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Apple Tree in Our Backyard Garden, October 2005</td>
<td>xi</td>
</tr>
<tr>
<td>2</td>
<td>Interrelations of Holism, Postmodernism, Environmental Education, and Schoolyard Gardening</td>
<td>12</td>
</tr>
<tr>
<td>3</td>
<td>School A Front Garden, May 2005</td>
<td>113</td>
</tr>
<tr>
<td>4</td>
<td>School A Schoolyard Garden at the Back, 2000</td>
<td>114</td>
</tr>
<tr>
<td>5</td>
<td>School A Schoolyard Garden at the Back, May 2005</td>
<td>115</td>
</tr>
<tr>
<td>6</td>
<td>School B Butterfly Garden, May 2005</td>
<td>140</td>
</tr>
<tr>
<td>7</td>
<td>School B Butterfly Garden, May 2005</td>
<td>141</td>
</tr>
<tr>
<td>8</td>
<td>School B Butterfly Garden, May 2005</td>
<td>142</td>
</tr>
<tr>
<td>9</td>
<td>School B Butterfly Garden, May 2005</td>
<td>143</td>
</tr>
<tr>
<td>10</td>
<td>School C Front Entrance with Plant Decorations, June 2005</td>
<td>161</td>
</tr>
<tr>
<td>11</td>
<td>School C Front Lobby with Paper Recycle Bin, June 2005</td>
<td>162</td>
</tr>
<tr>
<td>12</td>
<td>School C Staff Kitchen with Recycle Bins, June 2005</td>
<td>163</td>
</tr>
<tr>
<td>13</td>
<td>School C Peace Garden and Children, June 2005</td>
<td>164</td>
</tr>
<tr>
<td>14</td>
<td>School C Peace Garden with New Mulch from the TDSB, June 2005</td>
<td>165</td>
</tr>
<tr>
<td>15</td>
<td>School C Peace Garden, June 2005</td>
<td>166</td>
</tr>
<tr>
<td>16</td>
<td>School C Kindergarten, June 2005</td>
<td>167</td>
</tr>
<tr>
<td>17</td>
<td>School C Hanging Tree with Waterballs, June 2005</td>
<td>168</td>
</tr>
<tr>
<td>18</td>
<td>School D Courtyard Garden, May 2005</td>
<td>230</td>
</tr>
<tr>
<td>19</td>
<td>Hart’s (1997) Ladder of Children’s Participation</td>
<td>233</td>
</tr>
<tr>
<td>20</td>
<td>Bartholomew’s (2005) Square Foot Garden 3’× 3’</td>
<td>242</td>
</tr>
<tr>
<td>21</td>
<td>Swing in a Child’s Garden</td>
<td>247</td>
</tr>
<tr>
<td>22</td>
<td>Child Climbing a Tree</td>
<td>251</td>
</tr>
<tr>
<td>23</td>
<td>Children Having Tea in a Garden</td>
<td>252</td>
</tr>
<tr>
<td>24</td>
<td>Children under a Tree</td>
<td>256</td>
</tr>
</tbody>
</table>
PREFACE

_A tree, swaying in the wind,
eastward, westward, southward, northward,
but her root is deeply embedded in the world.
Without wind, a tree cannot bring us cool,
yet no matter which direction the wind blew,
a tree always knew her root._

— The Researcher, “A Tree in the Wind,” October 2004

My initial interest in gardening may derive from my childhood experience. I was born in Beijing, and spent much of my childhood in Harbin, a city in Heilongjiang (meaning ‘Black Dragon River’) Province in the very north of China. Like many communist countries at the time, China did not have much food to offer to her citizens in the early 1970s.

We could not get many vegetables from the local stores. My grandma and parents used to grow green beans in a small plot, which later became a Vegetable Garden, right behind our communal building. We raised a few hens for eggs, and the manure was used for fertilizing beans in the field. I remember twice a week, my job was to chop up the vegetable wastes into smaller pieces for the hens. I also helped out in the field to collect the beans while my grandma picked them up from the stems. These stories are common for many families in China in the early 1970s. We learned how to grow and enjoy the taste of our own food.

My family moved back to Beijing in April 1978. We temporarily lived in my other grandma’s traditional Courtyard House in the northwest of Beijing. The food
variety and supply was still scarce in Beijing at the time, but we could not grow our own vegetables in the courtyard, and we really missed the taste of fresh food that we used to grow in Harbin. In the meantime, I was transferred to the nearby Liuhe Primary School, which was also located in a traditional Courtyard House complex. My memories about playing with other children in the courtyard are still vivid: we used to skip and dance over a chain of rubber bands or to kick the shuttlecocks (a game). During the winter months, we used to be so excited to see the snow flakes falling from the sky, and could not wait to build a snowman in the courtyard, or simply to snowball at each other. In comparison with the two other primary schools that I attended, the Yühóng Primary School in Harbin with an open green field, and the Xihéyàn Primary School in Beijing with a walled, bare earth play ground, the Liuhe Primary School that had a courtyard with trees left me the most profound memory.

Our family gardening tradition revived after my parents immigrated to Canada in 1997, and the gardens that we cultivate around our house grow more than 10 different kinds of vegetables and fruits: garlic, spring onion, fragrant-flowered garlic (Chinese chives), tomato, cucumber, balsam pear, coriander, pumpkin, beans, and Chinese wolfberry. We have also planted two fruit trees and a vegetable tree: apple, pear, and Chinese toon (toona sinensis). Spring and summer are our busiest but most enjoyable seasons when we can start reworking the soil and spreading the seeds, and in the fall we feel a sense of reward when seeing the harvest in the garden.

We thus have the pleasure and privilege of tasting our home-grown food again. The non-chemically treated tomatoes taste like 'heaven' which can never be compared with the ones that are bought from the supermarkets. The apples are hard to maintain
because of the insects. My mother then finds a way of making ‘apple and pear soup’ with a few pieces of orange skins and the fruit of Chinese wolfberry to add some flavour. This has become a welcome dessert after each meal. We have also placed two composters in our backyard for green waste recycles to be used for the soil in the spring. Over the years, we have learned how to preserve our abundant produce in bottles and jars to save for the winter months.

My professional background is architecture. Architects like to combine visuals with words. In the architectural field, we have a saying that ‘a picture speaks more than a thousand words.’ The following photograph was taken by my father in our backyard garden on October 8, 2005, showing the apple tree that I planted in 1998.
null
Figure 1. Apple tree in our backyard garden, October 2005.

(Photo by Junmin Zhang)
CHAPTER ONE: INTRODUCTION TO THE PROBLEM

We have forgotten who we are.

We have alienated ourselves from the unfolding of the cosmos.

We have become estranged from the movement of the earth.

We have turned our backs on the cycles of life.

We have forgotten who we are.

- United Nations Environmental Sabbath

This thesis examines adult perceptions of student involvement in schoolyard gardening in the Toronto District School Board (TDSB). I suppose the first question I pose is: why gardens? In my view, a garden is a form of art that is related to nature as well as culture. One source of their perpetual appeal to me is that in a garden, art and science, mind and nature, finally intersect.

Many world religions regard the planet earth as a garden. Christians believe that the ‘Garden of Eden’ once existed in Mesopotamia of the Near East, and the ‘Hanging Garden’ of Babylon has ever captivated human’s creative imagination. Daoists then believe that ‘there is Heaven above, there is Su-Hang below’ (Su is ‘Suzhou’ and Hang ‘Hangzhou,’ two Chinese cities well-known for their classical gardens). All these demonstrate human’s cosmological consciousness of the interconnection between the gardens and the universe from ancient time.

Background of the Problem

This research study is in response to the UNESCO’s (Environmental Protection Agency, 2004) call for environmental education to raise young people's environmental awareness and to reconnect them with the natural world. In this first chapter, I present an
overview of the background of the problem, which covers the following: 1) environmental crisis of the modern world; 2) human disconnection from the natural world; and 3) environmental education for the postmodern era.

**Environmental Crisis of the Modern World**

Our contemporary world is facing a big environmental crisis threatening our lives. The indications of the crisis are global warming, ozone layer depletion, deforestation, endless plundering of nonrenewable resources, massive disposal of inorganic substances, air, water, and soil pollution, and so on. In Canada, the problem is not less acute. As Houghton (2003) noted that when European settlers first came to Ontario in the late 1700s, more than 90% of the land was covered with densely wooded Carolinian forest. Today, around 80% of the woodlands south and east of the Canadian Shield are gone, removed to make room for farmland and urban development. Less than 6% of the south is original woodland, and only 0.07% of southern Ontario’s land base is forest that is more than 120 years old. Most of the remaining woodlands are fragmented, with many covering less than three hectares. These ecological islands are too young and small to allow for the optimal functioning of complex ecosystems. Small remnant habitats and isolated species populations are vulnerable to extinction. Since 1961, southern Ontario’s interior forests’ songbird populations have declined by more than 50% (p. 105).

Rachel Carson’s (1962/2002) publication *Silent Spring* marked the beginning of the environmental movement in the USA. In this book, Carson aroused a national debate on the use of chemical pesticide DDT, the responsibility of science, and the limitations of technological progress. The environmental movement grew out of her challenge. In 1970,
Americans celebrated the first *Earth Day* and subsequently the Congress passed the National Environmental Policy Act establishing the *Environmental Protection Agency*.

Since the 1970s, there are a number of environmental activists that have debated about the global environmental issues. For example, David W. Orr (1992) saw that there are three crises facing our world today: food shortage due to rapidly growing population; global warming and the exhaustion of fossil fuels caused by cheap energy; and global climate change owing to ecological thresholds and the limits of natural systems. He stated that “These three crises feed upon each other. They are interactive in ways that we cannot fully anticipate” (p. 3). Together they constitute the first planetary crisis that may cause the human species to become extinct. Rose and Nicholl (1997) believed that the cause of these crises is:

Our brains are very good at recognizing and reacting fast to sudden dangers. They are not good at recognizing danger brought about by gradual change. The brain has no sense of growing immediacy and therefore triggers no strong reaction. That’s why we have difficulty motivating ourselves to deal with the creeping threats of diminishing resources, pollution, urban decay; overpopulation – even of large-scale job losses. They are too gradual to register as life threatening.

We need to find a way to make these problems urgent if we are to motivate enough people to take collective action. And we especially need to make these problems ‘come to life’ with our students, for it will be their generation who will have to find the solutions or live with the consequences. (p. 52)

The current environmental crisis is directly related to humans’ lack of environmental consciousness and their unethical conduct. It indicates a failure in our current educational
effort to teach young generations about environmental conservation and ecological literacy. The preparation of teachers in promoting environmental education has been recognized as a ‘priority of priorities’ (UNESCO-UNEP, 1990), but the current status of teacher education in environmental education remains at an unsatisfactory level (Bowers, 1995; Fien & Rawling, 1996; Holtz, 1996; Stables & Scott, 2002).

This lack of a teacher-training program in environmental education is not only demonstrating human’s lack of awareness of the critical global environmental condition, but also their unwillingness to acknowledge the critical environmental condition. This indifferent attitude towards the environmental issues is daunting; it may subsequently lead to human’s self-destruction, which is like a slow suicide.

Bowers (1996) contended that the challenge of fostering environmental education in the Western world lies in its deep cultural assumptions, the consumer-technological mainstream culture, which is reinforced by the liberal ideologies, and which guided the direction of educational reform over the last 100 years. Orr (1992) criticized the two prevailing social systems. He maintained that communism had collapsed because it could not produce enough; capitalism is failing because it produces too much and shares too little. Communism imposed an ascetic morality on its subjects, while capitalism has permitted the collapse of morality itself (p. ix). In Orr’s view, capitalism will inevitably fail because it has a tendency towards self-destruction. A business civilization will ultimately decline not only because of pollution and the plunder of limited natural resources for more business profits, but also because material goods only satisfy the instant consumer gratification and fail to satisfy deeper human needs, including those for truth and a meaningful life (p. 10).
Dr. Milree H. Latimer also argued that, over the long haul, capitalism is failing because of the very principles on which it rests, "...individualism, independent and 'greedy' access to wealth, aggressive free will. Each of these ideals has merit, when applied wisely; however, the nature of the human condition is such that acquisitiveness and desire sometimes cause wisdom to falter" (personal communication, January 12, 2005).

**Human Disconnection from the Natural World**

In many parts of the world, children are losing contact with nature in their daily lives, especially in urban areas where books, televisions, and computer games are substituting the real things, replacing children's exploration of the natural environment (Dannenmaier, 1998; Moore, 1995). Mowery saw this disconnection between children and nature in the school where she worked and in the children around her neighborhood:

I was at a conference recently, and a gentleman from the Aldo Leopold Foundation presented the results of a survey that found that on average young people could only identify four native plants in their neighborhood, whereas they could recognize 1000 brand labels. (Dunne, 2000, p. 13)

In our modern day of living, we often find ourselves secluded in windowless rooms; computers, electricity, air conditioning ducts, and heating shafts surround us. Our chosen environment separates us from the natural world of trees and flowers (Bowery, 2003).

Unfortunately, we cannot exist healthfully in this created environment. The American educational philosopher, John Dewey (1859-1952), in his book, *Experience and Nature* (1929/1958), contended that human beings are organisms within nature; they are part of nature, and this is due to the fact that our brains evolved from simple organs; we are in,
of, and from nature. Dewey's belief may be attributed to Charles Darwin (1809-1882), English naturalist, who established the theory of organic evolution known as Darwinism.

In 1859, Darwin published the first edition of *Origin of Species*. The influence of this evolutionary theory upon scientific thought and experimentation cannot be overestimated. Darwin's theory of organic evolution was developed as a reaction to the creation story in the Judaeo-Christian Bible. For Darwin, humans evolved from lower species and as an evolving form had better survival capabilities than their ancestors (O'Sullivan, 2001, p. 90). He called this process the 'Principle of Natural Selection'; there came the expression 'Survival of the Fittest.' Many accepted Darwin's theory of evolution and many denied its validity (Columbia Encyclopedia, 2003).

In response to the intellectual debate about creationism, human nature, and evolution, Steven Pinker (2002) criticized the metaphorical belief of the 'Noble Savage,' attributed to the philosopher Jean-Jacques Rousseau (1712-1778), which captures the romanticism belief that humans in their natural state are selfless, peaceable, and untroubled, and that blights, such as greed, violence, and cruelty, are the products of civilization (p. 6). Everyone can recognize the influence of this doctrine in contemporary consciousness. We see it in the current respect for all natural things: natural food, natural medicine, and the schoolyard naturalization initiatives.

Pinker's (2002) criticism of the Noble Savage is that human nature is not always 'good and kind,' it can be 'evil and destructive.' He used a metaphor to describe human aggression that it "was like the discharge of a hydraulic pressure and that evolution acted for the good of the species" (p. 124). Pinker went on to argue that the tribal warfare in the
prehistory (and the genocide in the case of Adolf Hitler) is a vivid demonstration of the aggressiveness in human nature. Pinker's view may be in conflict with Orr's (1992):

In many respects, the modern world suffers by comparison with earlier cultures....This is not to argue for a simple-minded return to some mythical Eden, but an acknowledgement that earlier cultures were not entirely unsuccessful in wrestling with the problems of life, nor we entirely successful. (p. 16)

The difference between Pinker's and Orr's view is that the former believed that a simple return to the 'Garden of Eden' would not automatically make the world a better place, whereas, the latter considered that earlier culture was not entirely unsuccessful in struggling with the problems of life from which we may draw lessons.

Nature and culture are interdependent (Krug, 1997) since many ancient philosophers drew inspirations from nature that helped shape the culture, such as the Chinese Daoism founder Laozi (flourished during the 600 B.C.). In his timeless guide to the art of living Dao De Jing (Tao Te Ching, 'The Book of the Way'), Laozi advocated that human beings should be in 'harmony with nature,' and that they should have 'non-action contrary to nature' (wu wei). This has become a part of the traditional Chinese culture for centuries. Being in nature can give human beings a sense of being part of the global pattern of life that connects them with all the living forms on earth. This feeling of being part of the whole may well be developed into a culture that will contribute to social transformation and environmental sustainability.

Modernity, whose tenet is based on an anthropocentric ethic, characterized by its belief in progress associated with the explosion in scientific knowledge and the promises of technology (Sauvé, 1999), cannot lead us to a sustainable future. Seeing the evidence
of the devastation of the modern world, it becomes clear that a different worldview of how we relate to each other, to nature, and to the cosmos as a whole is desperately needed.

**Environmental Education for the Postmodern Era**

The new feeling for the natural world was not an obsession for aesthetic reasons. As Comito (1978) pointed out, "It was, rather, an intense questioning of the sources and the articulation of the world's wholeness, its identity" (p. 126). The nature of a being is defined in terms of its origin, the seed from which it grows, and neither of these can be considered apart from its particular environment, its *place* in the universe. Humans bring themselves into contact with the forces that govern their world only by openness to the world, only by submitting themselves to particular moments of experience. The return to nature is ethically as well as intellectually important because it is a return to one's origins and, therefore, to one's proper dignity, virtue (pp. 29-30, 74-75). Gardens are places in which humans come home again, in which they realize that 'art itself is nature' (pp. xi-xii). The very notion that *art is nature* resembles the postmodern ideology, which was born in the field of art and architecture in the early 1970s, and has ever since become a powerful concept to be debated about in the Western academia.

The postmodern architects abandon the modernist search for inner meaning of present disorder, and assert a grand construction of historical continuity and cultural identity. In the field of architecture and urban design, postmodern designers advocate the study of cultural heritages and vernacular landscapes more than from the pursuit of some abstract, theoretical, and doctrinaire ideals. Postmodern architects promote the construction of community, diversity and complexity, rehabilitation of urban parks, and
Humans live daily in the built environments, and the postmodern architectural expressions have profound impacts on the way we live and think. In Orr's (2002) view, "buildings and landscape reflect a hidden curriculum that powerfully influences the learning process....The curriculum embedded in any building instructs as fully and as powerfully as any course taught in it" (pp. 127-128). As such, the postmodern architecture has inevitably transmitted its ideology to the field of education.

The postmodern educators promote multiculturalism or cultural pluralism that celebrates variety and difference (Clark, 1996; Sauvé, 1999). They also stress timeless aesthetic principles and search for ways to express such aesthetics of diversity (D. Harvey, 1989). The environmental education movement and schoolyard gardening movement are such expressions of postmodern ideology. Orr (1992) compared the goals of modern and postmodern education and set the agenda for postmodern education:

Education in the modern world was designed to further the conquest of nature and the industrialization of the planet. It tended to produce unbalanced, underdimensioned people tailored to fit the modern economy. Postmodern education must have a different agenda, one designed to heal, connect, liberate, empower, create, and celebrate. Postmodern education must be life-centered....Postmodern education has to do with the integration of schooling and active learning, a juncture that has occurred under modern conditions less often than one might suppose or wish. (pp. x-xi)

Environmental education was born as a reaction to the impacts of progress associated with the exploitive capitalism. It aimed at resolving and preventing the problems caused
by human actions on the biophysical/ecological systems. Environmental education is transformative; it is similar to education for democracy in that both stress experiential learning and authentic learning (‘learning in the real world’). Environmental education should be a crucial component of education, not a mere accessory. As Sauvé (1999) asserted:

It is important to include environmental education in a comprehensive educational framework that is not reductive, that allows it to take its full place in order to work towards its own goals, and that integrates it in an optimal way with other dimensions of contemporary education. (p. 11)

During the 1980s, environmental education gradually entered the postmodern era. However, environmental education, if it occurs at all, is offered as an elective course, often in science or geography, or as an extracurricular activity (Russell & Burton, 2000). As Sauvé (1999) noted, for many educators, environmental education was often mistaken as ‘naturalistic romanticism’ and was often limited to ‘nature education,’ focusing only on the personal experience of the environment as nature, or limited to the consideration of ‘waste management,’ or ‘citizenship education.’ Moreover, in the absence of adequate resources and conditions, environmental education has generally not been satisfactorily implemented. Sauvé (1999) clearly saw the problem of environmental education and argued that environmental education is disturbing because it is associated with social and educational criticism that challenges common ideas and practices; it requires an effort of deep commitment and transformation. However, the nature, the legitimacy, and the importance of environmental education cannot be questioned.
Theoretical Framework

The schoolyard gardening movement situates itself within the environmental education movement. Schoolyard gardening connects children with nature, with the earth, with themselves, with each other, with the community, and with the great universe. It helps to raise children’s environmental awareness. The schoolyard gardening movement is a complementary reaction to the computer literacy that has been ground into the brains of the children in the last 2 decades. Schoolyard gardening activity by and large may not contribute to economic profits or productivity, but it does contribute to long-term environmental conservation and ecological restoration for Mother Earth.

The schoolyard gardening movement also situates itself within the holistic educational philosophy and the multiple intelligences theory that stress the development of the whole child. In his groundbreaking book, The Holistic Curriculum, John P. Miller (1996) emphasized the importance of ‘mindfulness’ in developing the body and mind connection. Many physical tasks in gardening require an awareness to connect the mind and body (Andrews, 2001). Learning occurs through the actions of planning, designing, fundraising, digging, planting, harvesting, tasting, and even selling of the produce at the end of each fall. During this process, curriculum can be incorporated into gardening; a child can achieve academic learning as well as many practical skills. Thus, the mindfulness can best be cultivated through the gardening activity among the children.

Figure 2 is a schematic diagram showing the interrelations of holism, postmodernism, environmental education, and schoolyard gardening. Though somewhat simplistic for explaining a complex subject, this diagram is useful as a basis for discussion. For example, the ecological and environmental issues are part of the
Figure 2. Interrelations of holism, postmodernism, environmental education, and schoolyard gardening.
postmodern art education for adults, but are also part of the science education in the Ontario curriculum (1998) for elementary students (Grades 1-8). Nonetheless, postmodernism does not purposely divide art from science (see Bergquist, 1993); therefore, environmental education can be considered as both art and science, and as such, listing it under postmodernism is acceptable. This diagram is meant to show that the practice of schoolyard gardening is guided by the theories of holism, postmodernism, and the practice of environmental education that were discussed above.

Statement of the Problem

This thesis examines the factors that have enabled and limited student participation in schoolyard gardening through the perceptions of adults. Previous research findings revealed that there is a lack of student involvement in schoolyard gardening, especially in the initial planning and design stage (e.g., Doyle & Krasny, 2003, p. 105; Dyment, 2004, p. 119). Heidi Campbell, TDSB/Evergreen School Ground Design Consultant, expressed that she would like to see a higher level of student involvement in all phases of school ground greening initiatives (Dyment, 2004, p. 122). Dyment (2004) found that students in the Toronto District School Board (TDSB) are not involved in school ground greening nearly as much as they should be (p. 125). Her interviews with parents, teachers, and principals in five TDSB schools revealed that ‘age, time pressures, and curriculum demands’ were the three main factors that had restricted students from participating in schoolyard greening. However, Dyment neither studied the amount of student participation, nor did she research into the enabling factors that had contributed to student participation. Furthermore, she did not tackle the question on how to tap into student’s enthusiasm to increase their participation in schoolyard gardening.
One of the biggest potential outcomes of schoolyard gardening is allowing children to acquire skills related to democracy, participation, and citizenship during the gardening process. In 2003, a survey found that 227 Toronto schools out of 558 responded to the call from the Department of Environmental Education at the Toronto District School Board to be involved in school ground greening initiatives (Houghton, 2003, p. 132). However, there are still more than 50% of the schools not yet participating in this movement. While conducting the student interviews in 2004 for the research project *Building a School's Capacity as a Learning Community* for Dr. Coral Mitchell of Brock University, I frequently heard students complain about their outdoor environment in six out of the seven schools that we interviewed. This has made me realize that this area needs further research, emphasis, and promotion.

So far, there have been three Canadian research studies in this area, each with its particular emphasis: Bell (2000) on 'school-based habitat restoration;' Simone (2002) on 'schoolyard naturalization;' and Dyment (2004) on 'greening school grounds.' There has been no detailed Canadian research study on adult perceptions of student involvement in 'schoolyard gardening.' As Dyment (2004) pointed out, there are still many gaps in the existing literature of the impacts of school ground greening programs, as well as the factors that enable and limit student participation (pp. 5, 47, 49, 126, 212, 225). This research has explored the findings by Dyment in greater depth and detail.

**Statement of the Purpose**

The purpose of this research is to investigate through adult perceptions what factors have enabled and limited student participation in schoolyard gardening, and how to support student involvement in schoolyard gardening. This is a follow-up study of the
Canadian researcher Janet E. Dyment’s (2004) Ph.D. dissertation *Greening School Grounds in the Toronto District School Board: An Investigation of Potential.* It is a *collective case study* of three TDSB schools that are currently running a schoolyard gardening project. It included interviews, drawings, photographs, and field notes.

**Research Questions**

Based on the research problem and the research purpose discussed above, I developed the following three investigative research questions:

1. From the perceptions of adults, what is the amount of student participation in schoolyard gardening and at what stage are students mostly involved?
2. From the perceptions of adults, what are the factors that have enabled and limited student participation in schoolyard gardening?
3. From the perceptions of adults, how can schools maximize the enabling factors and minimize the limiting factors for student involvement in schoolyard gardening?

These research questions guided the design of the interview questionnaire for the three schools and the TDSB/Evergreen representatives, as well as the organization of the data analysis. Further two research questions were developed for the education officer at the Curriculum and Assessment Policy Branch of the Ontario Ministry of Education:

1. Why does the Ontario Curriculum not support Environmental Education elements?
2. How could the Ministry of Education incorporate Environmental Education elements in the curriculum in future?
Significance of the Study

Gardening should be as important as English and Math. Reading, writing, and gardening should be our new pedagogical goal in the 21st century. We not only need to teach children literacy, numeracy, but also ecoliteracy (Berry, 1990; Bowers, 1995, 1996, 2002; Capra, 1997, 1999; Center for Ecoliteracy, 1999; Orr, 1992, 2002). And a good place to teach children ecoliteracy is in the schoolyard gardens.

In his book, Ecological Literacy, Orr (1992) stressed the importance for a curriculum reform. The reason, in his words, is that “The crisis cannot be solved by the same kind of education that helped create the problems” (p.83). As will be documented in the literature review, in the last 30 years, many thousands of schools worldwide have incorporated gardening into the curriculum. Schoolyard gardening has multiple benefits which have been continuously recognized by a fast growing number of schools, and “Perhaps the main benefit is that schools with gardens are healthier schools producing healthier young people with healthier attitudes to life” (Journey to Forever, n.d., p. 1).

Pivnick (1994) contended that, “In a garden we must live within the limits of nature instead of forcing it to bend to our will. This requires patience, an ability to listen to nature’s wisdom, and develops a respect for nature” (p. 8). This passage echoes Henri Frédéric Amiel’s (1821-1881) saying that “A modest garden contains, for those who know how to look and to wait, more instruction than a library” (as cited in Stoddart, 1999; p. 51). We live in a historically critical period of time. We are in the transition from ‘cenozoic to ecozoic’ period (T. Berry, 1990; O’Sullivan, 2001). Therefore, we must make unparalleled changes now in the way we relate to nature and to each other in order for humankind to survive in the 21st century.
In the past few decades, there have been established a number of non-profit organizations that facilitate the schoolyard gardening movement. In the UK, a “Learning Through Landscapes” program was initiated in 1990, and it soon spread across the Channel to Europe and rapidly to the world. Organizations, such as Evergreen (1991) in Canada, the Center for Ecoliteracy (1995) in the USA, Learnscapes (1997) in Australia, and the International EcoSchools programs (1994), continue to grow in their scope and profile. According to EcoSchools International (2003/2004), “There are about 12,000 EcoSchools in 30 countries in Europe, Africa, and in South America at present. This number is growing as more and more schools take up the challenge and work towards improving their environment through education and action” (p. 1).

Countries that have established the EcoSchools programs are: Belgium, Bulgaria, Canada, Chile, Croatia, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Kenya, Latvia, Lithuania, Malta, Netherlands, Norway, Portugal, Romania, Russia, Slovenia, South Africa, Spain, Sweden, Turkey, UK - Scotland, UK - England, Northern Ireland and Wales (EcoSchools International, 2003/2004; Toronto District School Board, 2004). By the end of the 20th century, it became the fastest growing environmental education movement around the world (Coffey, 1996; Dyment, 2004; Hutchison, 2004; Stikeman, 1996).

Stimpson and Wong (2001) reported that in Guangzhou, China, environmental education is integrated with the existing subjects in the mandatory school curriculum, and that there are also informal, extra-curricular activities that emphasize the application of environmental cognition through industrial visits and school greening programs. Blum (1988) described that the environmental education was integrated with school curricula in
Israel from elementary schools (6 grades, ages 6-12), to junior high schools (Grades 7-9, ages 13-15), and to senior high schools (Grades 10-12, ages 16-18). Adams (1991) reported that the National Curriculum in the UK has made the study of environments compulsory for all school children ages 5-16 in England and Wales. Therefore, students could investigate various environments, such as the home, the garden, the housing estate, the sports ground, and the park. In Canada, Houghton (2003) wrote:

Toronto’s schools’ gardens represent one part of a movement to support the growth of ecological literacy. The Toronto District School Board, Canada’s largest and first to have a dedicated department of environmental education, has made an important contribution towards focusing formal curriculum in the classroom in a similar direction. (p. 20)

Working together, teachers, students, parents, and local community have designed vegetable and herb gardens, bird and butterfly gardens, prairie gardens, and pond and bog gardens, as well as built outdoor classrooms, amphitheaters, tree houses, and other play and learning environments to complement these naturalized spaces (Houghton, 2003; Hutchison, 2004; TDSB, 2000/2004).

Gardening is an important part of dealing with the environmental problems. For example, Wendell Berry (1982) criticized the environmental damage made by the nuclear power plant built at Marble Hill, near Madison, Indiana, USA. He promoted “organic” gardening as an alternative to generate resources and as a solution to the energy problem:

The best kind of gardening is a form of home production capable of a considerable independence of outside sources...a garden restores the body to its usefulness – a victory for our species....A garden gives the body the dignity of
working in its own support. It is a way of rejoining the human race…. Gardening is not a discipline that can be learned once for all, but keeps presenting problems that must be directly dealt with. It is, in addition, an agricultural and ecological education, and that sort of education corrects the cheap-energy mind. A garden is the most direct way to recapture the issue of health…gardening speaks powerfully of the abundance of the world. (pp. 167-169)

Thomas Berry (1989) also suggested:

Our children need to learn gardening. The reasons for this reach deep into their mental and emotional, as well as into their physical survival. Gardening is an active participation in the deepest mysteries of the universe. By gardening, our children learn that they constitute, with all growing things, a single community of life. They learn to nurture and be nurtured in a universe that is always precarious, but ultimately benign. They learn profound reasons for the seasonal rituals of the great religious traditions…. Elementary education especially might very well begin and be developed in a gardening context. (p. 3)

One of the greatest religious teachers of all time, J. Krishnamurti (1895-1986) asserted:

If you are in harmony with nature, with all the things around you, then you are in harmony with all human beings. If you have lost your relationship with nature you will inevitably lose your relationship with human beings…. The highest function of education is to bring about an integrated individual who is capable of dealing with life as a whole. (as cited in Holistic Education, 2003, p. 1)

Physicist and systems theorist, Fritjof Capra (1997, 1999) also expressed:
As we move towards the twenty-first century, the great challenge of our time is to create ecologically sustainable communities, communities in which we can satisfy our needs and aspirations without diminishing the chances of future generations. We need to become ecologically literate, and the best place to acquire ecological literacy is the school garden. (1997, March 15, p. 5)

...Learning in the school garden is learning in the real world at its very best. It is beneficial for the development of the individual student and the school community, and it is one of the best ways for children to become ecologically literate and thus able to contribute to building a sustainable future. (1999, March 20, p. 8)

In recent years, there has been a growing body of literature on the educational values of schoolyard gardens. For example, in Landscapes for Learning: Creating Outdoor Environments for Children and Youth, Stine (1997) analyzed 11 case studies of schoolyard greening or gardening initiatives, and eight of which are located in California. Houghton’s (2003) A Breath of Fresh Air: Celebrating Nature and School Gardens is one of the few Canadian publications of its kind that showcased 27 school gardens built in Toronto, Ontario during the 1990s, and illustrated how these school gardens facilitated teaching and learning experiences for both teachers and students.

participation using the metaphor of a ‘ladder,’ and further suggested ways to achieve higher and more meaningful children’s involvement in the environmental projects.

Among the numerous case studies on the topic that are published in books and journals, some of the cases indicated that schoolyard gardening help young people develop a love for the land and a bond with nature (Mock, 1994; Moore, 1995; Morris, Briggs, & Zidenberg-Cherr, 2000; Pivnick, 1994; Stine, 1997). Children’s participation in making their small world will increase their knowing and feeling that they can participate in shaping the big world tomorrow (Sobel, 1990, 1993/2002).

Ethnic food gardening could teach students about their own cultural heritage and celebrate Canada’s multiculturalism (Marturano, 2000; Thibault, 1994). Gardening could develop children’s skills in growing, buying, and preparing food (Moore, 1995). Gardening could teach children healthier eating habits (Center for Ecoliteracy, 1999; Morris et al., 2000; The Edible Schoolyard, n.d.). Children who planted and harvested their own vegetables were more willing to taste than children who did not participate (Morris, Neustadter, & Zidenberg-Cherr, 2001).

Schoolyard gardens could be used as outdoor classrooms and be incorporated into the curriculum to teach children art, astronomy, biology, botany, chemistry, drawings, ecology, entomology, geography, health, horticulture, language arts, math, music, permaculture, physical education, science, social studies, and vermiculture (Coffey, 1996; Denman, 1996; Keteyian, 2001; Potter, 1994; Reading & Taven, 1996; Thibault, 1994). Students attending schools with naturalized schoolyards had better academic achievement than students who did not (Simone, 2002).

Gardening inspires children’s creative imagination (Krupa, 1994). Schoolyard
gardens could provide students the setting for free-hand drawings while appreciating nature and having a pleasant aesthetic experience (Adams, 1991; Canaris, 1995). The beauty and aesthetics of the schoolyard gardens can create a ‘sense of place’ that invites teachers and students to work, study, and play (Novak & Purkey, 2001). Medicinal gardens could offer opportunities for students to conduct scientific investigations and develop a detailed research portfolio and presentation (Camp, 1997).

Schoolyard garden curriculum could expand to include recipe and journal writings and community outreach letter writing, asking for donations, thus improve student’s writing skills (Canaris, 1995). The schoolyard garden enabled the students to learn about the world in a real, hands-on way (Phillips, 1997), and as such it had a profound influence on their behaviours, physiological changes, and mental functioning (Cheskey, 1996).

Schoolyard gardens could also teach children important civic virtues and reduce antisocial behaviour, such as violence, bullying, vandalism, and littering (Coffey, 1996). Through schoolyard gardening, students could learn about ecological literacy, environmental ethics, biodiversity, and the importance of habitat preservation (Dunne, 2000; Dyment, 2004; Harvey, 1989a, 1989b; Mock, 1994; Pivnick, 1994; Stimpson & Wong, 2001). They also learned about themselves, the value of teamwork, and their community (Canaris, 1995; Dunne, 2000; Moore, 1995).

**Scope and Limitations of the Study**

The scope of the study is explicitly expressed in the title *Adult Perceptions of Student Involvement in Schoolyard Gardening*. It is a qualitative research that featured three case study schools in the Toronto District School Board. This research took on a
holistic approach, which included perspectives of the school principals, the most involved and less involved teachers, the parents, the TDSB/Evergreen representatives, and the education officer at the Curriculum and Assessment Policy Branch of the Ontario Ministry of Education. The total number of interview participants was 16 individuals.

During my literature review, I have tried to include as much information as possible regarding the schoolyard gardening initiatives around the world, because I find that previous literature reviews have focused predominately on cases in the English-speaking countries which are, in my view, not a holistic approach to the environmental issue. The environmental issue is, indeed, a global one, and the success in dealing with this issue requires a global effort of all the nations on earth. This inclusiveness complies with the holistic philosophy as well as the UNESCO's Environmental Education principles (see Chapter Two). My broad approach to this study is supported by Orr (1992), who argued:

There are, I think, several reasons why ecological literacy has been so difficult for Western culture. First, it implies the ability to think broadly, to know something of what is hitched to what. This ability is being lost in an age of specialization....Real ecological literacy is radicalizing in that it forces us to reckon with the roots of our ailments, not just with their symptoms. For this reason, I think it leads to revitalization and broadening of the concept of citizenship to include membership in a planetwide [researcher highlights] community of humans and living things. (pp. 87-88)

However, due to time constraints, this research could only be conducted in one geographic location, and a number of factors have limited the research findings:
1. The case studies were limited to one school board: the Toronto District School Board;
2. The cases were limited to three selected schools from the school board;
3. The interviewees were limited to the school principal, the most involved teacher, a less involved teacher, and a parent volunteer, but no student was interviewed;
4. The student interviews, if conducted, might generate some different answers;
5. The validity of the answers depended on the interviewees’ honest response to the questions during the interview.

Rationale for the Study

Studying adult perceptions of student involvement is a good way to tackle this issue since the power and decision-making rest very much in the hands of adults. Moreover, interviewing students would require additional parental consents and audio transcriptions, which could be difficult to accomplish within the timeline for a Masters thesis. A follow-up study should be conducted on student perceptions of their involvement in schoolyard gardening.

Organization of the Following Chapters

This chapter introduced the background of the problem, the theoretical framework, the research problem, research purpose, research questions, significance of the study, scope and limitations of the study, and rationale of the study. Next, I will review the literature related to schoolyard gardening (Chapter Two). It is followed by a description of the research methodology and procedures (Chapter Three). Then I will present the findings and results from the research (Chapter Four) and will conclude with my summary, reflections, implications, and recommendations (Chapter Five).
CHAPTER TWO: REVIEW OF RELATED LITERATURE

I thought the earth remembered me,

she took me back so tenderly,

arranging her dark skirts, her pockets

full of lichens and seeds.

I slept as never before, a stone on the river bed,

nothing between me and the white fire of the stars

but my thoughts, and they floated light as moths

among the branches of the perfect trees.

– Mary Oliver, “Sleeping in the Forest”

The purpose of the literature review is twofold. First, it provides the theoretical foundation, as well as the cultural roots of the current schoolyard gardening movement, and further sets forth my belief that “What is rooted is easy to nourish. What is recent is easy to correct” (Laozi, 600 B.C., Dao De Jing, Verse 64). Second, it helps me identify gaps in existing literature, and pointed out the direction for my research. This chapter contains three major sections: 1) holism in schoolyard gardens; 2) history of children gardening; and 3) continuity of schoolyard gardening.

Holism in Schoolyard Gardens

Some educators consider that the schoolyard gardening movement situates within the holistic educational philosophy, along with the multiple intelligences theory. In both Eastern and Western cultures, the word ‘holistic’ has traditionally been associated with theology. Theology is the study of God’s divine law; some people accept it as a science...
that affects the health of humankind. Its aim is to connect, tap into, and realize the perfect
harmony within mind, body, and spirit (American Institute of Holistic Theology, 2004).

In the Chinese culture, ‘holistic’ has long been associated with medicine and
naturopathy, such as the concept of qi (vital energy), acupuncture, and medicinal herbs.
During the 1970s, an emerging body of literature in science, philosophy, and cultural
history provided a comprehensive description of the concept of ‘holistic education’ – a
perspective known as holism (R. Miller, Paths of Learning, 2004).

Holism holds that the whole is greater than the sum of its parts (Princeton
University, 2003). When applied to education, it stresses the development of the whole
child through direct contact with nature. The aim of holistic education is to educate body,
mind, and soul, not just mind alone. However, Stables and Scott (2002) contend that
“Paradoxically, education for the whole child requires an acknowledgement that there is
no whole truth” (p. 56).

Ron Miller is among the best known and best informed interpreters of the holistic
education movement. He is the founder of the journal Holistic Education Review (now
Encounter: Education for Meaning and Social Justice). In his remarkable book, What Are
Schools For?, R. Miller (1997) states that, “Holism is, literally, a search for wholeness in
a culture that limits, suppresses, and denies wholeness” (p. 7). He provided an in-depth
analysis of the cultural roots of American education and made a passionate critique of the
contemporary educational system. He also traced the history of the holistic education
movement and made a holistic analysis of the theory and practices of pioneering holistic
educators since the 18th century; these include: Jean-Jacques Rousseau (1712-1778),
Johann Heinrich Pestalozzi (1746-1827), Friedrich Froebel (1782-1852), William Ellery
Channing (1780-1842), Ralph Waldo Emerson (1803-1882), Henry David Thoreau (1817-1862), George Ripley (1802-1880), A. Bronson Alcott (1799-1888), Francis W. Parker (1837-1902), John Dewey (1859-1952), Maria Montessori (1870-1952), and Rudolf Steiner (1861-1925), who founded the ‘Waldorf School.’ All these holistic educators called for ‘education for human potential’ rather than for societal needs.

John P. Miller (1996) is another major contributor in generating theory and practice of holistic education in contemporary North America. In his book *The Holistic Curriculum*, he agreed that:

Holistic education attempts to bring education into alignment with the fundamental realities of nature. Nature at its core is interrelated and dynamic. We can see this dynamism and connectedness in the atom, organic systems, the biosphere, and the universe itself. Unfortunately, the human world since the industrial revolution has stressed compartmentalization and standardization. The result has been the fragmentation of life. (p. 1)

John Miller (1996) emphasized that there are three aspects in holistic education: balance, inclusion, and connection. Balance means to keep the child’s emotional, physical, aesthetic, and spiritual development in proportion to his/her intellectual development.

Inclusion means to link together three educational orientations: transmission, transaction, and transformation. John Miller further explained that, “Transformational learning acknowledges the wholeness of the child. The curriculum and child are no longer seen as separate but connected” (p. 7) and that the ultimate goal of holistic education is to “move away from fragmentation to connectedness” (p. 8). His point was clearly made in the following statement:
The focus of holistic education is on relationships: the relationship between linear thinking and intuition, the relationship between mind and body, the relationships among various domains of knowledge, the relationship between the individual and community, the relationship to the earth, and the relationship between self and Self. In the Holistic curriculum the student examines these relationships so that he or she gains both an awareness of them and the skills necessary to transform the relationships where it is appropriate. (p. 8)

John Miller (1996) also stressed the importance of ‘mindfulness’ in developing our body and mind connection. Many physical tasks in gardening require an awareness to connect the mind and body (Andrews, 2001). Thus, gardening as a physical activity is a good way to cultivate children’s mind.

Holistic education aims to call for an intrinsic reverence for life and a passionate love of learning through direct contact with the environment. Holistic education recognizes that the well-being of humans is directly related to and dependent on the health of the planet. Holistic education is based on the premise that each person finds meaning and purpose of life through connections to the community, to the natural world, and to spiritual values, such as compassion and peace (R. Miller, Paths of Learning, 2004).

Our contemporary ecological crisis, the consequences of nuclear destruction and chemical radiation, the greenhouse effect, the depletion of the ozone layer, air and water pollution, and the extinction of species and rain forests are perhaps local in origin but are global in impact. People began to see that by serving local interests these problems cannot even be understood, let alone resolved. The earth has to be seen as a whole.
Educators, ecologists, and theologians, like Wendell Berry, Thomas Berry, C. A. Bowers, and David W. Orr, all suggest that seeing the interconnectedness of all things within nature is the basis of the new mind that the world needs for its survival, and that the creation of this mind is the first responsibility of education. If education is to reflect this, then the traditional division between disciplines has to go, and the world needs to be understood from the largest possible wholes and not through the fragments (Forbes, 1996).

In most holistic schools, every child is seen as an expression of, an arena for, or an entity containing the sacred, and must be recognized and treated as such. Many holistic educators express that the sacredness inherent in each child is something that the educator should help each child to discover. This leads many to feel that education is only partly a process of transmitting – it needs to be mostly a process of unfolding, teasing out or bringing out (Forbes, 1996), that is, a process of transforming.

In this regard, Howard Gardner’s (1993) *Multiple Intelligences* (MI) theory echoes two themes in holistic education and the holistic view of human nature: learning takes place in many capacities of the child, not just the verbal-numerical capacities; and that this learning process is different for everyone (Forbes, 1996; Hutchison, 1998). Gardner believed that human beings had evolved to be able to perform at least seven separate forms of analysis: linguistic, logical-mathematical, musical, spatial, bodily-kinesthetic, interpersonal, and intrapersonal intelligences.

Gardner added the naturalist intelligence to his list in 1995. He described a naturalist as someone who is able to recognize flora and fauna, to make other consequential distinctions in the natural world, and to use this ability productively (Hoerr,
The naturalist intelligence has to do with observing, understanding, and organizing patterns in the natural environment. The schoolyard gardening activity will likely help children develop their naturalist intelligence. Furthermore, Gardner suggested that there might be other possibilities including spiritual and existential intelligence.

Tobin Hart (2003) explored children’s spiritual intelligence by conducting 5-year (1998-2003) in-depth interviews with more than 100 individuals and families, and gathered written accounts from hundreds more children, parents, and adults who recollected their childhood experiences. Hart concluded in his extraordinary book, *The Secret Spiritual World of Children* that “Children have a secret spiritual life. They have spiritual capacities and experiences – profound moments that shape their lives in enduring ways” (p. 1). The schoolyard gardening activity may also help children nurture and nourish their spiritual intelligence.

Many elementary schools in Ontario have applied the MI theory to their educational practice. While conducting interviews with 50 students for the research project *Building a School’s Capacity as a Learning Community* in 2004, I frequently heard from the students that the application of MI theory to their classroom teaching had greatly enhanced the understanding of their own strengths and weaknesses and, therefore, had helped them build self-knowledge and self-esteem.

In an interview with Durie (1997), Gardner expressed his concern about the possible misinterpretations of his MI theory by others. He said that MI could not be an educational end in itself, “MI is, rather, a powerful tool that can help us to achieve educational ends more effectively” (p. 1). The MI theory allowed educators to plan educational programs that would enable children to realize desired end states (e.g., the
musician, the scientist, the civic-minded person). It helped teachers to reach more children who were trying to understand important concepts in the disciplines.

Holistic educators also make schools places where the students can develop their emotional intelligence (Rose & Nicholl, 1997), where they can learn the necessary skills for building fulfilling relationships for their adulthood, where open, honest, and respectful communication is practiced; where differences between people are appreciated; where interaction is based on mutual support and not on competition and hierarchy; where the common good is the responsibility of each individual; and where the decision-making process is democratic and is accepted by everyone (Forbes, 1996).

In addition to Gardner’s (1993) *Multiple Intelligences* theory, Gregory Bateson, Humberto Maturana, and Francisco Varela articulated the concept of ecological intelligence. Bowers (1995) compared the ecological view of intelligence with Gardner’s individually-centered view of intelligence. He argued:

This new (actually, ancient) view of intelligence would involve a basic change in the criterion for determining what constitutes intelligent behavior...an ecological view of intelligence would use long-term sustainability of the Earth’s ecosystems as the primary criterion. Unintelligent behavior would then be seen as any behavior, way of thinking, and moral judgment that degrades the environment...an ecological view of intelligence would lead to a more inclusive approach to education. (pp. 126, 132)

**History of Children Gardening**

This section looks at the cultural roots of children gardening in North America. It starts by tracing the educational use of the ancient Indian forest colony, and then reviews
the contributions of the War Gardens during World War I and the Victory Gardens during World War II. Children’s gardens in the USA and children gardening in Canada in the early 20th century are described. A brief overview of classical literature on children gardening is presented.

*Forest Colonies in Ancient India*

Many people may think that schoolyard gardens is something new, appearing only recently in the 1970s or 1980s. For example, Dyment (2004) repeatedly stated that greening school ground is “a new landscape initiative” (p. 143) and that it is “a relatively new phenomenon” (p. 223). However, my literature research revealed that it is not a new initiative or a new view of nature in a global sense when we look at the broader picture of comparative history. When we say this is ‘new,’ we run the danger of overlooking the contributions of other civilizations and of attributing too much to Western modernity (Goody, 1995).

Although the German educationalist Friedrich Froebel (1782-1852) has won more publicity than any others by stating in 1826 that, “My school shall be called Kindergarten – the garden of children” (The Froebel Gallery, 2003, p. 1). Thereafter, many Western writers credit Froebel as the first who invented the concept of ‘garden of children’ (e.g., Dannenmaier, 1998, p. 14; Hutchison, 2004, p. 110). Nevertheless, according to Ray (2003), the ancient Indians had a much earlier record of learning in their natural forest colonies. As Ray told us:

Actually, the seats of ancient Indian culture and civilization were in the forests, far from capitals, cities and villages. Populated places were not convenient for learning and meditation. The wise sages and hermits lived in *tapobanas* or forest
colonies. Aryan civilization along with Vedic wisdom flourished amidst sylvan solitude. The truth-seeking human spirit obtained full freedom there by virtue of sylvan beauty along with the vast terrain, majestic mountains and flowing rivers. The sights of sunrise and sunset and of the nocturnal sky full of stars and planets added to their communion with nature and infinity.

...Pupils were sent to such tapobanas for training and tutelage under the Gurus. Learning the Vedas, associated with a sense of wonder, creative imagination and spiritual traits found easy flow and articulation in the forest. Plain living and high thinking were the motto of the sylvan colonies. But those colonies were never like monasteries. The pupils enjoyed the company and affection of their master’s family. They tended the cattle, milked the cows, collected firewood and fruits. On the whole, they looked after their master and his family and guests. They did not have to pay money for their studies. (p. 151)

This detailed description gives us an historic account of the origin of schoolyard gardens. A few thousand years have passed by, but ‘a school in a garden’ has remained as a classical ideal, which is exemplified in Bernard’s remark that ‘more is learned under the shade of trees than is taught in all the schools.’ The implication, as Etienne Gilson (1952) pointed out, was that the natural scene, with which the monk was permanently in contact, had been “integrated even into the mystical life itself” (as cited in Comito, 1978, p. 42).

We may well assert now that learning in gardens is deeply rooted in the history of human civilizations. This builds a solid foundation for the establishment and the spread of the schoolyard gardening movement around the world in recent decades. As Orr (1992) argued:
...the study of other cultures offers a tantalizing glimpse of how culture can be linked to nature through ritual, myth, and social organization. Our alienation from the natural world is unprecedented; healing this division is a large part of the difference between survival and extinction. (p. 17)

North America is a relatively new settlement compared with other continents. This requires us to have a modest attitude to learn from other civilizations.

**Classical Literature on Children Gardening**

During my literature research, I found that the earliest book on this subject is Gertrude Jekyll’s (1843-1932) *Children and Gardens* (1908/1982/1990). In this book, Jekyll recounted her childhood gardening experience at home in England and, based on her firsthand knowledge, she made numerous recommendations for children and their parents who plan to cultivate their home gardens, from the types of seeds suitable for growing in the English climate, to the wonder of germination, the shapes and smells of fruits and flowers, the maintenance tips and techniques, and the fun and games to have in a garden. She wrote with great sensitivity and simplicity, complementing her enchanting book with many attractive drawings, paintings, and black-and-white photos by herself.

Another classical literature on children gardening, beloved by generations, is the timeless novel *The Secret Garden* (1911/1938/1962/1990) by Frances Hodgson Burnett (1849-1924). The story begins with the orphaned Mary Lennox sent to live with her hunchbacked uncle at Misselthwaite Manor in Yorkshire, England, where she discovered the most mysterious wonder of all – a secret garden, walled and locked, that had been neglected for years. The story is about how the three children, Mary, her friend Dickon, and her cousin, Colin, restored the garden to its original splendor. They worked their
magic on the garden, and in turn the garden worked its magic on the children and everyone around them. It is a richly imaginative story about how gardening can bring about genuine transformation for the gardeners.

The earliest Canadian journal on this subject was entitled *Children's Gardening* (1907-1945 v.), which later was bound into a book called *Elementary Agriculture and Horticulture and School Gardens in Village and Rural Schools*. The book is located in the Department of Ontario Historical Education Collection of the OISE/UT Library (University of Toronto Libraries Catalogue, 2005).

**War Gardens during World War I**

During World War I (1914-1918), the United States Bureau of Education (1917-1919) encouraged children to grow food in school gardens and school-supervised home gardens to increase food production for the support of the soldiers at war and for the boys and girls of Western Europe. There came into being the *United States School Garden Army*. Through the school, millions of American children were awakened to the educational value of gardening as a patriotic effort of wartime and an undertaking worthwhile at all times (Earthly Pursuits, 2003).

From the start, the *United States School Garden Army* allied with the *National War Garden Commission* for the conduct of the work for which it had been organized. This affiliation covered food production through gardening and food conservation through home canning and drying. Supervised by competent instructors, the school children of New York City produced some excellent results in the gardens which they planted in various sections of the city. A good example was the garden in Thomas Jefferson Park, 114th Street and East River, where a large number of children were
actively involved. The interest in gardening was thus awakened and the practical knowledge of gardening was acquired by the young gardeners. School gardening was regarded as one of the most important national benefits of the wartime and it had an immeasurable influence on American citizens (Earthly Pursuits, 2003).

**Victory Gardens during World War II**

During World War II (1939-1945), millions of North Americans were encouraged to plant Victory Gardens to grow their own food so that agricultural production could be channeled to feeding Allied troops abroad. “Plant a Victory Garden: Help Win the War!” was the rallying call as urban dwellers in the United States and Canada converted backyards, empty lots, and rooftops into gardens to grow hundreds of thousands of tons of fruit and vegetables. Governments and corporations promoted this call for self-reliance (Victory Gardens, n.d.).

Victory Gardens came in every shape and size. People in all areas, rural and urban alike, worked the soil to raise food for their families, friends, and neighbours. The call to plant a Victory Garden was answered by nearly 20 million Americans. These gardens produced up to 40% of all that was consumed (Victory Seed, 2004, p. 3). Victory gardening enabled more supplies to be shipped to the troops around the world. As Axis troops suffered massive shortages, the Allies were kept well supplied and the Victory Garden program was credited with helping to win the war against the Nazi threat (Victory Gardens, n.d.). Thus, the war garden, and its successor, the victory garden exerted a huge influence on the North American people in the wartimes.

When the fighting of World War II ended, so too did the government’s call for people to produce their own food. It was a policy that was dropped very quickly. Since
many people did not plant a Victory Garden in the spring of 1946, and the agriculture industry had not yet come back up to full production, there were food shortages that summer (Victory Seed, 2004).

**Children’s Gardens in the USA**


The first public teaching garden in the United States was the Brooklyn Botanic Garden’s Children’s Garden, established in 1914, and had offered children the opportunity to touch nature as well as to learn the skills and arts of agriculture. The teaching garden continues to draw children from New York City and has inspired the establishment of other such gardens nationwide. The other well-established children’s gardens that Dannenmaier (1998) listed are: the Michigan 4-H Children’s Garden at Michigan State University in East Lansing with 60 theme gardens; Longwood Gardens in Kennett Square; Pennsylvania with one of the first interactive children’s landscapes; George Washington’s River Farm in Alexandria, Virginia; the Phipps Conservatory in Pittsburgh; and the New York Botanical Garden in Bronx. The Botanical Garden’s new Everett Children’s Adventure Garden is the largest and most comprehensive children’s landscape in the USA – eight acres for learning and play (p. 17). Cosgrove (1994) then discovered that one of the longest and most successful school garden programs was the one that ran in Cleveland, Ohio, from 1900 to 1975.
Children Gardening in Canada

The history of Canadian school gardening movement began in Ontario and the Maritime Provinces at the turn of the 20th century and later spread westward. It was advocated by the early educational reformer, James Wilson Robertson, whose mission was to improve rural life by applying practical knowledge to locality and making farming more attractive to children. His vision was shared and financially supported by Sir William Macdonald, a Montreal tobacco merchant and philanthropist. Their campaign was often referred to as the Macdonald Movement, and school gardening was one of the most successful elements of the movement.

As Martin (2000) noted, it began as an experiment with 25 schools in Nova Scotia, New Brunswick, Prince Edward Island, Quebec, and Ontario. Teachers received special training to help supervise students’ gardening activities. Children planted school gardens, and were encouraged to start a home garden. Sutherland (1978, p. 194) reported that “Each pupil had his or her own garden and, as well, the girls shared a kitchen garden and the boys experimental farm crop plots” (as cited in Martin, 2000, p. 85). The results were impressive in that the young gardeners in Ontario were not only more willing to remain in school, but also achieved higher marks overall on the standard provincial high school entrance exams (Library and Archives Canada, 2001; Martin 2000). Sherwood (1910, p. 900) wrote:

In 1906, in Carleton County, in schools without gardens 49 per cent of the candidates passed, while those who came from the five schools to which were attached gardens 71 per cent were successful. Apparently the work with the hands
in the garden increased the capacity for work with books. (as cited in Library and Archives Canada, 2001, p. 1; Martin, 2000, p. 85)

Another statement made on Rittenhouse School Gardens in Lincoln County, Ontario was that, “We are convinced that garden work assists largely in forming the foundation for a firm will and self-reliant action, or, in other words, for moral character” (Compiled by Goymer, 1911, p. 51; as cited in Library and Archives Canada, 2001, p. 1). However, the socio-economic status of the schools that had gardens was not indicated.

**Environmental Education Treaty (or Alternative Treaty)**

In the early 1980s, the grassroots school ground greening and schoolyard gardening movements re-emerged in North America and around the world, in response to the UNESCO’s call for environmental education. But what exactly is environmental education? The concept of environmental education was first proposed in the Charter of Belgrade (UNESCO, 1976) and later in the Tbilisi Declaration (UNESCO, 1978). The International Forum concentrated on education and produced a *Treaty on Environmental Education for Sustainable Societies and Global Responsibility*. This treaty, often referred to as the Alternative Treaty, was created at the Rio World Conference on Environment and Development (UNCED, 1992; UN, 1997) and was developed in agreement with international non-governmental organizations (INGOs) from five continents. It consists of 16 principles of environmental education that are equitable and sustainable. It embraces a broad educational scope and provides a concrete illustration of a transformative educational vision:

1. Education is the right of all; we are all learners and educators.
2. Environmental education, whether formal, non-formal or informal, should be grounded in critical and innovative thinking in any place or time, promoting transformation and construction of society.

3. Environmental education is both individual and collective. It aims to develop local and global citizenship with respect for self-determination and the sovereignty of nations.

4. Environmental education is not neutral but is value-based. It is an act for social transformation.

5. Environmental education must involve a holistic approach and thus an interdisciplinary focus in the relation between human beings, nature, and the universe.


7. Environmental education should treat critical global issues, their causes and interrelationships in a systematic approach and within their social and historical contexts. Fundamental issues in relation to development and the environment, such as population, health, peace, human rights, democracy, hunger, degradation of flora and fauna, should be perceived in this manner.

8. Environmental education must facilitate equal partnerships in the processes of decision-making at all levels and stages.

9. Environmental education must recover, recognize, respect, reflect, and utilize indigenous history and local cultures, as well as promote cultural, linguistic, and ecological diversity. This implies acknowledging the historical perspective of
native peoples as a way to change ethnocentric approaches, as well as the encouragement of bilingual education.

10. Environmental education should empower all peoples and promote opportunities for grassroots democratic change and participation. This means that communities must regain control of their own destiny.

11. Environmental education values all different forms of knowledge. Knowledge is diverse, cumulative, and socially produced and should not be patented or monopolized.

12. Environmental education must be designed to enable people to manage conflicts in just and humane ways.

13. Environmental education must stimulate dialogue and cooperation among individuals and institutions in order to create new lifestyles which are based on meeting everyone’s basic needs regardless of ethnic, gender, age, religion, class, physical or mental differences.

14. Environmental education requires a democratization of the mass media and its commitment to the interests of all sectors of society. Communication is an inalienable right and the mass media must be transformed into one of the main channels of education, not only by disseminating information on an egalitarian basis, but also through the exchange of means, values and experiences.

15. Environmental education must integrate knowledge, skills, values, attitudes and actions. It should convert every opportunity into an educational experience for sustainable societies.
16. Education must help develop an ethical awareness of all forms of life with which humans share this planet, respect all life cycles and impose limits on humans' exploitation of other life forms. (The NGO Alternative Treaties, 1992/2002)

Furthermore, the Tbilisi Declaration states:

Environmental education is a learning process that increases people's knowledge and awareness about the environment and associated challenges, develops the necessary skills and expertise to address the challenges, and fosters attitudes, motivations, and commitments to make informed decisions and take responsible action. (Environmental Protection Agency, 2004, p. 1)

**Continuity of Schoolyard Gardening**

In the past 10 years, there has been a growing body of literature that documents the school ground greening and schoolyard gardening initiatives around the world. This section examines the current status of research on the schoolyard gardening initiatives, it reviews: 1) student participation in schoolyard gardening; 2) academic learning through gardening; 3) social, behavioral, and moral development through gardening; 4) ecological literacy and environmental awareness through gardening; and 5) the design and maintenance issues of the schoolyard gardens.

**Student Participation in Schoolyard Gardening**

Stowell (2001) asserted that "Student leadership and initiative is the driving force behind any successful outdoor classroom project" (p. 16). She suggested that the components, structure, and goals should be defined by students from the very beginning, and the project should evolve from their vision how the schoolyard should be cultivated. She went on to suggest that one of the ways to encourage student participation is to invite
students to develop a vision for the future use of their schoolyard. Creativity should be promoted and no idea should be discounted. Students’ creativity could also be drawn upon for community outreach since it is hard to refuse a child who is passionate about a project, and student-designed flyers, posters, and newsletters would be helpful in seeking donations and volunteer assistance, as a result community involvement may grow.

During his year-long research of children’s special places through mapping and interviewing more than 100 adults and 200 children in three cultures (England, Carriacou, and USA), Sobel (1990, 1993/2002) found that making forts, dens, and bush houses in the landscape appeared to be a common experience for children of all cultures, and this experience became a significant middle-childhood development in the memories of many adults. His finding revealed that children of 9-11 years of age had the highest interest in dens and bush houses. This finding resonates with Joseph Chilton Pearce’s Earth Matrix that children of 7-14 years feel at home in the earth environment and the natural world. Sobel argued that it is crucial for children to participate in world-making or world-shaping activities because “If we allow children to shape their own small worlds in childhood, then they will grow up knowing and feeling they can participate in shaping the big world tomorrow” (1993/2002, p. 161).

In her book *Landscapes for Learning*, Stine (1997) illustrated 11 case studies (eight in California, one in New Mexico, one in Japan, and one in the UK), three of which are related to student participation in schoolyard naturalization or schoolyard gardening initiatives. Stine described that the Coton Community Primary School in Cambridgeshire, UK involved each student in the design of their school’s outdoor environment for the ‘spirit of adventure’ (p. 199). In the implementation of the project,
the school invited parents to participate. Each parent was assigned two Coton children to work with, and they set about digging holes, stripping bark, and treating the wood with preservatives. Now that the children had a new outdoor resource, with which they had been involved from the beginning brainstorming to the final building. Because of their intensive involvement with the project, they had a strong sense of pride and ownership.

Stine (1997) went on to describe that the second stage of the project was to develop the school’s courtyard. The school continuously encouraged the students to create design ideas, two of which were selected after evaluation based on the criteria of function, form, ease of construction, and cost. They transformed a bleak inner courtyard into a weather garden by making a solar powered fountain and a sun dial, and adding a wind vane, grapevine, plants, and sculptures. The sound of running water made the courtyard a special place. An old greenhouse was moved into the courtyard. The students used the theme of ‘gods and goddesses’ as inspiration for artifacts in the weather garden. They studied the phases of the moon, and from the student’s drawings, nine moons were chosen to use for sculpture patterns. The principal cut these out of aluminum, and the children beat their patterns using a sand tray. The forms were completed by painting them with translucent blue ink. Stine summarized that students, parents, teachers, and community members all worked together to create this weather garden that filled the interior of the Coton School with soft plants, soothing sounds, art, and nature, and it is a place for continuing creative educational activities.

Another case that Stine (1997) examined was the Rosemead High School in Rosemead, California, 30 miles east of Los Angeles. The school was built in 1949 and suffered severe deterioration in the 1970s. In the early 1980s, it underwent serious
restoration. However, the outside area, particularly the central courtyard, known as Panther Square, had experienced a loss of trees and an increase in the amount of asphalt. Realizing that attention needed to be directed to restoring the outside environment of the school, RHS sought help from the Landscape Architecture program at California State Polytechnic University in Pomona. Eight graduate students from both architecture and landscape architecture, along with their faculties, spent two quarters working with 40 RHS students (representing all 4 years), teachers, and staff, together they generated ideas and plans for future changes. The method they used was to make the 40 RHS students take an ‘awareness walk’ through a series of existing outside space and ask them to map out the things they liked and disliked and to suggest ideas for transforming their courtyard. To reach a wider range of student input, the graduate students designed and circulated a survey. RHS students were asked to describe how they currently used the outdoor space, to rate various existing elements in the courtyard, and to make prioritized suggestions for change. The graduate students then created new design elements based on the teenagers’ desire for an outdoor setting that contain meaning for this school.

The third case that Stine (1997) reported was the Walden School in Pasadena, California. The school began in 1970 with two parents who wanted a different learning environment for their children. It was initially located in a home and soon moved into a rented lower level of a nearby church, where they resided for 18 years, when all of a sudden in a September, they were notified to move out within 3 months. In order to complete the school year, they temporarily rented an abandoned school site. Fortunately, with the support of parents and community members, the school managed to obtain enough funding to purchase a building (originally a ceramics plant/art studio housed in an
industrial concrete block structure) and converted it into a school. However, the outdoor yards, known as the South and North Yards, were major areas that needed transformation. They began to work on the South Yard and each of the eight classes selected two students to be on a planning team. Sixteen children aged 5 to 12 met four times a month to discuss the outdoor space problems and what they liked about current play opportunities. They described a longing for natural things, the grass and trees. Each child and staff member was asked to write his or her wish list for the new yard, and for the school as a community.

Stine (1997) continually described that when it came to the redesign of the North Yard (which was used by the youngest children, from 3 to 5 years old), a landscape architect, a member of Walden School’s Advisory Board, suggested involving her college students currently studying community design issues. Ten college students began working at Walden School to fulfill their class project requirement. They planned a variety of activities to encourage the children to express their likes, both verbally and in art form. The children described a range of ‘liked’ activities, from computer games to sitting in quiet shady places, from hiding in the bushes to going to the Disneyland castle – they wanted more interesting options for physical activities. The children’s feelings, descriptions, and evaluations became the treasures that the school began to investigate. The college students learned about the importance of involving even the very young as valued and contributing members of a school’s community.

Doyle and Krasny (2003) reported that, through the Cornell University Garden Mosaics program in New York State, youth learned about ethnic gardening practices in six urban community gardens and one school garden in six American cities on seven sites
(Allentown, Baltimore, Buffalo, New York – Bronx, New York – Harlem, Philadelphia, and Rochester) using the Participatory Rural Appraisal (PRA) research method, which is a type of Participatory Action Research. An important principle underlying PRA is the emphasis on incorporating multiple perspectives and diverse participants into the actual implementation process. This non-curriculum Garden Mosaics program was envisioned as a ‘learning community’ to develop a multi-city database on urban community gardening practices that can be used by community garden activists and researchers. The program allowed non-formal educators, community gardeners, and teachers to engage young people aged 9-16 in investigations of local environments using aerial photos and topographic maps, and conduct a community action based on their research findings. A total of 31 educators and volunteers and 85 youth participated in the activities in cooperation with 26 gardeners at six community gardens and one school garden.

Doyle and Krasny (2003) conducted 20 interviews with 29 educators (two focus group interviews) from each of the six cities, and 30 interviews with 28 youth from the seven sites, and four interviews with four gardeners from two program sites, as well as participant observation and interaction with the group activities, such as gardening. Doyle and Krasny found that a seventh site engaged youth in gardening at a school garden developed long-term mentoring relationships with gardeners at their home gardens, and that garden history often became an opportunity for gardeners to recount their personal gardening stories in the past. They asserted that “Gardening catalyzed the interaction and understanding between youth and gardeners” (p. 104).

During Doyle and Krasny’s (2003) interviews, several educators noted that garden history was a good initial activity because it provided youth with a perspective on
the garden being studied; and numerous youth interviews and journal entries reflected the impact of hands-on gardening, including increased knowledge, enjoyment, and sense of responsibility. The PRA activities promoted positive interactions among educators, youth, and gardeners. It appeared to Doyle and Krasny that the youth learned about gardening and gained academic and communication skills through the Garden Mosaics program. This research results indicate the potential for using PRA in urban environmental education programs. However, one educator in Rochester commented that she would like to see more children’s participation in design and execution of the activities.

Moore (1995) believed that ‘hands in the dirt were a first step towards a sustainable future’ (p. 224). The book *Natural Learning* is a recollection of the life history of an Environmental Yard written by Robin C. Moore and Herb H. Wong (1997), in which they recounted their 10-year experience with children in Washington Elementary School in the San Francisco Bay Area of California, where gardening was part of a larger regenerative design project to re-naturalize a completely asphalted urban schoolyard, known as the Environmental Yard. From the school district archives, Moore (1995) discovered that schoolyard gardening was not a new idea in the San Francisco Bay Area of California, and that Washington School site had been under cultivation in the 1920s. Moore (1995) recalled his own childhood experience in schoolyard gardening in England in the 1940s, and noted that gardening went out of fashion after World War II; the schoolyard was replaced by asphalt – a neat and tidy engineering approach to school environments in the 1950s. The Washington School in the 1970s represented one of many
null
schools whose goal was to reintroduce the natural environment as an interactive educational resource on the schoolyard, with gardening as a leading strategy.

Moore and Wong (1997) recounted that the project stretched from the early 1970s to early 1980s; it was carried out as a cooperative effort between the University of California, Berkeley and the Berkeley School District. The success of the project was largely due to a close collaboration between Moore, landscape designer/researcher, and Dr. Herb Wong, principal of Washington School at the time, who had a passion for developing an interdisciplinary environmental pedagogy at the school. For Wong, this meant that all subject areas would be taught through the environment, and that all children had to explore their physical surroundings through play, to make their own discoveries, and to learn about the environment. For children, vegetable and flower gardening was an easy way to initiate this pedagogical approach and it provided motivation for putting hands in the dirt – the most direct link to the biological processes of planet earth. Some children experimented with a ‘Yard Blend’ of mint tea with comfrey, which led to a project called ‘Nature’s Medicine Chest.’ The children designed and planted a ‘Healing Herb Garden’ to include 15 species outside the enclosed garden. Higher grade classes catalogued the countries where foods come from and researched the processes of food production, which was a vivid demonstration of the interdependency of foreign markets. Children also explored methods of food preservation and processing: canning, bottling, jams, and jellies. Nuts and seeds were identified as nature’s way of preservation.

Moore (1995) further described that the school initiated a composting program to help the healthy growth of rows of lettuce, carrot, beet, and chard. To evaluate the
program, one class set up an experiment to demonstrate the effect of compost on garden productivity: “Beans were planted in three pots containing respectively dirt from the Yard, dirt from the landscaped strip in front of the school, and compost. The much faster growth rate of the beans in compost dramatically made the point” (p. 225). Moore concluded that, for children, “No other activity duplicated such an intimate combination of freedom of expression and discipline [as gardening]” (p. 230). For teachers, gardening provided opportunities to connect individual personality, aesthetic expression, culture, and geography more closely than any other areas of the curriculum. As a vehicle for interdisciplinary environmental education, gardens are unsurpassed, because they are constantly changing, highly attractive, interactive, motivational settings – a fertile source of imagination and for scientific investigation. Gardening was the leading-edge community participation in the development of the Yard; it was one of the most direct means through which people of all ages acquire an awareness of themselves as part of the earth’s ecosystem.

Thibault (1994) believed that schoolyard ‘vegetable gardens’ with different ethnic themes could help explore multiculturalism in Canada’s urban settings, since ‘we are what we eat’ and a big part of culture is food. What we eat and the way in which food is prepared and served varies greatly from culture to culture. Teachers helped students familiarize themselves with their culture of origin by asking them what kinds of fruits and vegetables they eat at home. Teachers asked students to research into how people of different cultures plan their gardens. For example, they found that there was a similarity among the Chinese, the Italian, and the Portuguese gardens in their intensive method of planting. Teachers let students design a garden using the techniques of different cultures.
In the meanwhile, students also researched the many festivals and celebrations focusing on the planting and harvesting of food around the world. By doing so, a sense of respect for cultures other than their own was built and spread.

A nutrition garden could teach students about the importance of a healthy diet, since “Research reveals that cancer, heart disease, diabetes, high-blood pressure, and obesity are linked to diet” (Marturano, 2000, p. 35). Morris, Briggs, and Zidenberg-Cherr (2000) believed that schoolyard gardening might be the key to successful nutrition education programs. To encourage first-graders to increase their consumption of fruits and vegetables, they developed and taught children a garden-enhanced nutrition education program. Morris et al. (2000) found that schoolyard gardening could teach children healthier eating habits. Morris et al. (2001) found that children who planted and harvested their own vegetables were more willing to taste than children who did not participate. They argued:

Fruits and vegetables are important in a child’s diet because they provide the body with vitamins, minerals, fiber and several phytochemicals necessary for growth and development and health maintenance. However, a recent study found that only 7% of children aged 2 to 11 consumed the recommended two servings of fruits and three servings of vegetables each day. (p. 40)

Morris et al.’s (2000, 2001) research touched on social cognitive theory and how it was applied to practice in California schoolyard gardens with amazing results. They further stated that gardening not only provided opportunities for students to expand their knowledge and skills related to healthy eating, but also significantly enhanced their awareness of the environment. Gardening provided the students with hands-on
experience through the growing, harvesting, and preparation of foods, which provided a wonderful opportunity for food-service staff, parents, and community members to become involved. Gardening activities could teach students about the agricultural value of land in their community.

Adams (1991) asserted that children learn through experience, and gardening could provide children with aesthetic experience that is crucial for them to develop the ability to use their sensuous connection to the world. She argued, “An important aspect of art education is the exploration of the nature of sensory experience and a reworking of that experience in order to understand it and to derive knowledge from our innumerable sensory encounters with the environment” (p. 21). She considered that certain kinds of art-based study, gardening for example, can encourage contemplative, reflective thought, which may well lead children to gain environmental understanding, consciousness, and awareness.

Adams (1991) described that the Learning through Landscapes program in the UK extended student’s learning environment outside the classroom, which they call the ‘sunshine classroom,’ the ‘outdoor laboratory,’ or the ‘pocket park’ (p. 25). The outdoor environment is an idea of hidden curriculum that acts as a powerful educator through the visual, spatial, and symbolic language it employs and the social relationships it encourages.

Adams (1991) noted that the educational philosophy at Coombes Infant School in southern England was to make no distinction between the learning environment indoors or outdoors. Sensory experience formed an important basis for much of the children’s work in the school. In their rich and diverse outdoor environment, children could explore
a wide range of sounds, sights, smells, tastes, and textures. The soft landscape provided a great variety of plant life and soil conditions that allowed children to observe and describe natural phenomena and to participate in planting and harvesting. She observed:

Growing, cropping, and using plants are an important part of the work of the school….When the produce is harvested, the children are involved in sorting, setting, counting, grading, weighing, and estimating as part of their work in mathematics. They are also engaged in cooking, eating, and sharing the food as part of social education activities….An awareness of history, of rooting oneself in time and place, is a constant concern. (p. 26)

The Edible Schoolyard garden is located on the campus of Martin Luther King Junior Middle School in Berkeley, California, looking over the San Francisco Bay and the Golden Gate Bridge. In the spring of 1995, the school hosted a design symposium, inviting landscape architects, chefs, gardeners, teachers, and other design professionals to share their visions of a future garden. The school’s intention was to restore one acre of abandoned land. In December 1995, the students, teachers, and community members began to remove asphalt, weeds, debris, and planted a cover crop. The garden was thus formed in a good shape in the summer of 1997 (its design was ultimately determined on-site by the students and a garden manager, David Hawkins). Garden classes taught students the principles of ecology, the origins of food, and respect for all living systems. Student participation in all aspects of the ‘Seed to Table’ experience occurred as they prepared beds, planted seeds and seedlings, tended crops, and harvested produce (Center for Ecoliteracy, 1999; The Edible Schoolyard, n.d.).
In the kitchen classroom, students prepared and ate delicious seasonal dishes from produce they had grown in the garden; vegetables, grains, and fruits, grown in soil rich with the compost of last year’s harvest, are elements of seasonal recipes prepared by students in the kitchen. Students and teachers gathered at the table to share food and conversation during each class. Cleanup was a collective action. They completed the ‘Seed to Table’ cycle by taking vegetable scraps back to the garden at the end of each kitchen class. This experience exposed children to food production, ecology, and nutrition, and fostered an appreciation of meaningful work, and of fresh and natural food (Center for Ecoliteracy, 1999; The Edible Schoolyard, n.d.). Martin Luther King Junior Middle School summarized 20 reasons for having a garden and a kitchen at their school:

1. The garden and kitchen provide a context for understanding seasonality and life cycles.
2. It is an opportunity to work cooperatively on real tasks.
3. Sensory experience becomes part of a child’s day at school.
4. The garden and kitchen offer opportunities to honour the cultures comprising the MLK school community.
5. They provide opportunities for informal one-on-one time for teachers and students to talk.
6. They create common experience to build on in multiple settings, from classroom to celebration.
7. Students understand the role of food in life; the kitchen and garden allow us to improve nutrition and highlight healthy foods.
8. Students learn about where food really comes from.

10. They provide opportunities for community involvement; the kitchen and garden provide a link with neighbours, volunteers, parents, and community businesses.

11. They offer opportunities to teach life skills such as gardening and cooking.

12. The kitchen and garden setting helps broaden the way teachers look at both curriculum and their students.

13. The garden and kitchen are beautiful spaces that connect students to their school.

14. They provide a context for rituals and celebrations.

15. A kitchen and garden promote risk taking, such as trying new things...foods, activities and making new friends.

16. Students value the garden; their sense of pride and ownership discourages vandalism.

17. The kitchen and garden offer opportunities for students to practice their observation skills.

18. In the kitchen and garden students build vocabulary, both small and large.

19. The garden and kitchen offer opportunities to integrate curriculum across subject areas.

20. In the kitchen and the garden, students can observe all of the Principles of Ecology in practice (The Edible Schoolyard, n.d., p. 6).

Canaris (1995) depicted how the Westminster Center School in Vermont integrated gardening and nutrition education into the total curriculum to improve nutrition and nutritional awareness for students, as well as to enhance the quality and meaningfulness of their learning. The school had a parent volunteer who was a local
organic truck farmer. He, along with other parents and teachers, helped the children grow their own produce for snacks. They planted cherry tomatoes, lettuce, corn, carrots, pumpkins, and potatoes in their ‘Snack Garden.’ Canaris discovered that, while gardening, the school gained community support and built an invaluable relationship with a retired community member whose backyard abutted their garden field. They recognized that the retired citizens had an important role to play in passing on community values of interdependence and responsibility to younger members. The children and parents participated in a fundraising project of selling their homemade pumpkin pies at an annual harvest festival, in which parents became involved with their children’s growth and development, and a sense of community partnership was promoted.

Canaris (1995) observed that one of the students correctly computed the number of times he would have to plant pumpkin seeds. In math class, they learned to multiply and add fractional amounts in recipes. They expanded their garden curriculum to include recipe and journal writings and community outreach letter writing for asking for donations; these helped them become articulate writers. They also learned about where to plant blueberry bushes after dividing their garden into quadrants, mapping them, and testing the PH level of the soil; this inquiry-based process taught children about science. On a warm September day, some students would take out their sketch pads and pastels, drawing the last yellow of the sunflowers, having a pleasant aesthetic experience while appreciating nature and getting to know from where their food comes.

*Common Roots* is a video program directed by Gittelsohn (1993), capturing the Barnet School in Vermont, and their exciting journey to explore meaningful hands-on learning experiences that nurture each child’s natural curiosity and ensure success for all.
students through cultivating a school garden in four seasons. The project was an innovative partnership involving the Kindergarten to Grade 8 students at Barnet School, its parents and community, the Vermont Department of Education, and a non-profit educational consulting firm called “Food Works.” They believed that children grew when exposed to experiences that had direct meaning to their lives. Their students’ learning experience was expressed in an old phrase, “When I hear I forget, when I see I remember, when I do I understand.” Through school gardening activities, the students explored their community’s past, investigated the present, and built a common future by using the themes of food, ecology, and community. By growing vegetables and historic theme gardens, building a nature trail, and involving their parents and community members, the traditional subject areas became integrated and meaningful.

Camp (1997) described a group of 60 gifted students from Grades 4 and 5 at Lake Park Elementary School in Naples, Florida who participated in a 3-year community/school partnership project: designing and planting a medicinal garden that offered a true learning environment for real-world educational experience. Teachers of the gifted believed that the walls of their classroom should not be the boundary for learning, and that knowledge should be acquired for a purpose and real-life audience. They taught the gifted how to research so that the students were prepared to investigate the topics that interested them. Teachers provided support to each student on the journey through the research process. At the end, each student had completed research on at least one of the plants, developed a detailed research portfolio and presentation on that plant, and participated in the design, development, planting, and maintenance of the garden.
Canadian researcher Anne C. Bell (2000, 2001a, 2003) examined the relationship between school-based habitat restoration and student’s “knowing through participation” (2003, p. 101). She conducted a 10-month case study at a school in southern Ontario that had restored a wetland at the rear of the school property as an outdoor classroom for environmental and nature education. Through a survey, interviewing with teachers, principals, parents, and students, as well as her 72-day site observations of students (in Grades 1, 5, 6, 7, and 8), Bell (2001a) discovered how the wetland provided tangible places and storied spaces for students to engage with fellow beings on an ‘intimate and embodied level’ (p. 209). This connection gave students the opportunity to learn to identify plants, animals, and changes in seasons as well as to deeply understand the interrelationships among the individual species. The opportunity for students to explore the more-than-human world helped them develop a ‘sense of place’ in which they felt a connection to the environment that surrounds them. Bell (2001a) affirmed that these experiences “added a depth of feeling and commitment not accessible through indoor, print-centered approaches to learning which so often cast relationships within the more-than-human world in terms of distance, detachment, abstraction, and control” (p. 223).

Canadian researcher Janet E. Dyment (2004) conducted a mixed method research on the process, impacts, and enabling and limiting factors of school grounds greening initiatives in the Toronto District School Board. In her quantitative study, she examined the motivation and involvement in the initial planning and ongoing maintenance of the greening process. Among the 45 schools out of 100 that returned her questionnaires, she found that the most often mentioned for providing the initial motivation were teachers (41.8% of responses), individual parents (22.6%), principals (18.5%), parent teacher
committee (8.2%), community members (2%), school board staff (2%), and students (1.4%). The individuals received the highest ranking for involvement in the initial phase including principals (M = 3.39), teachers (M = 3.37), students (M = 3.27), and individual parents (M = 3.20) (pp. 116-117).

With regard to the level of involvement of individuals during ongoing maintenance, Dyment (2004) found that the most involved were students (M = 3.04), teachers (M = 2.96), individual parents (M = 2.75), principals (M = 2.72), and custodial staff (M = 2.62). When Dyment compared levels of involvement between initial and ongoing phases, she found from her paired samples t-tests that all rankings for ongoing phases are significantly lower than initial phases. For the question of who were the three individuals that had donated the most volunteer time throughout the entire greening project, she found that the key volunteers were teachers (25.8% of responses), students (22.3%), and individual parents (21.8%). In reflecting on the effect of student involvement in school ground greening, some of Dyment’s interviewees observed that students who were involved took tremendous ownership for and empowerment from the projects, and that they learned about “the power of collective action” (p. 121).

Dyment (2004) further explored the main enabling and limiting factors for the greening projects in her questionnaires. She found that the three most commonly reported limiting factors were: 1) availability of funding (17% of responses); 2) demands on time (15%); and 3) difficulty with maintenance (15%). It showed that teacher involvement (11% of responses) limited the success of projects much more than community involvement (4%), student involvement (2%), or principal involvement (1%). Dyment also found that the involvement of teachers (21% of responses), parents (14%), principals
(14%), and students (9%) enabled the success of greening projects in the past, and their continuous involvement will facilitate success in the future (teachers 20%, parents 14%, principals 9%, and students 9%). Funding appeared to be an important factor for ensuring the success of greening projects for both past (19%) and future (21%). Funding also emerged as both an enabling and a limiting factor. For example, adequate funding is enabling and poor funding is limiting. Interestingly, school board involvement was not rated as an important enabler (pp. 199-200, 215-216).

During interviewing with principals, teachers, and parents in her five case study schools, Dyment (2004) discovered that a dedicated team comprised of teachers, parents, principals, and students was the most important factor in enabling or limiting the school ground greening projects. She received comments like “Teachers made our project happen....Parental involvement is the key to ongoing success....Without the principal’s endorsement, nothing can happen....Students serve as the catalyst for these projects...their enthusiasm is required to make the greening project succeed” (pp. 202-203). Dyment also discovered the importance of leadership during the greening process: “People are key...but until the ‘key organizer’ can be found, large scale greening projects will have to wait” (p. 203).

**Academic Learning through Gardening**

In a Canadian research study on the relationship between student academic achievement and schoolyard naturalization, Simone (2002) examined the province-wide standardized test results of 16 elementary schools in an urban school district in Ontario and found that the students in Grades 3 and 6 attending schools with naturalized schoolyards performed better than students who did not. When Simone controlled for
socioeconomic status, she found that the relationship between academic achievement and schoolyard naturalization persisted. Interestingly, the naturalized schoolyard had a stronger impact on achievement for students from poorer neighbourhoods as compared to wealthier neighbourhoods.

Phillips (1997) recounted her experience as a teacher for the gifted children and an environmental studies specialist at a Montessori school, where their mission was “Cosmic Education,” which emphasized the study of the universe through guided discovery and systematic approach to nurturing, appreciation, and respect for diversity, natural order, and interdependence of the world. She launched “Our Green Classroom” program, helped the school convert a courtyard into a garden, added flowers, herbs, vegetables, and soil amendments, and used it as an outdoor laboratory that enabled the students to learn about the world in a real, hands-on way. Through these practical learning experiences, the students enhanced their observation skills and recognized the need for living things; they were becoming the environmentalists of the future.

Gardening inspires children’s creative imagination. Krupa (1994) told a story of the Ossington/Old Orchard Public School in downtown Toronto, how their schoolyard garden provided an abundance of leaves with various shades of green that gave their students the opportunity to mix colours, which was otherwise discouraged because of its messiness and wastefulness. She explained, “A magical way to help children broaden their colour palette is by extracting colours from plant through natural dyes” (p. 16). Students also asked their pen pals to send exotic leaves, printed them on a map so that they could study habitat diversity. Krupa (1994) summarized:
Our schoolyard garden has proved art to be a powerful tool in increasing students’ self esteem and belief in their artistic expressions, building a sense of community, fostering creative responses to problems and as a catalyst for learning through exploring the unknown. (p. 17)

Malone and Tranter (2003) explored children’s perceptions of the role of school grounds as sites for learning through observing and interviewing five Australian primary schools in two cities: Melbourne and Canberra, over a 2-year period (spring/summer of 2000/2001). They conducted in-depth interviews with 10 students (aged 8-10) at each school (50 students in total). Each child was observed and mapped during lunch and recess times, then interviewed individually about their play on their schoolyard. Malone and Tranter found, among other things, that 70% of children at Orana School in Canberra identified places that supported cognitive activities (includes imaginative and creative play) are: garden, forest, sandpit, or cubby. These spaces provide access to real-life experiences, such as exploration of living and non-living things, interdependence, biodiversity, life-cycling, recycling, and food webs. Students felt that gardening is better than writing: they learned about worms and tools and that there is a lot more ‘fun’ when they get to do gardening. The area enjoyed and valued most by the students in Orana School was the forest, where they could ‘walk and get fresh air’ (p. 298).

horticulture, language arts, math, music, permaculture, physical education, science, social studies, and vermiculture. Venuti (1994) argued, “Whether they are brick or wood, emotional or psychological, walls enclose and separate, keeping some things in and other things out. Walls set limits” (p. 47). Gray (1994) remarked, “I believe that going back and forth between classroom and real world experiences develops true understanding, an understanding that cannot come from just reading, doing worksheets, and discussing them” (p. 31). Kutsunai (1994) also noted:

The garden became a living classroom; it offered opportunities that were unmatched in our students’ lives. Its potential went beyond books and basic science activities to enriching real experiences for all of us....abstract concepts were easily and clearly demonstrated in the garden setting....We are in the air cycle and so are the plants. The garden taught us that. (pp. 6-8)

Social, Behavioral, and Moral Development through Gardening

Cheskey (1996) estimated that many elementary school students spent about $1^{1/2}$ hours per day, or 20% to 25% of their total time, at schoolyard. By the end of their sixth grade, students would have spent 1800 hours or 257 school days in their schoolyard. For most children, this was their social time playing and establishing friendships, developing social and physical skills, and forming values. Their schoolyard environment had a profound influence on their behaviours, physiological changes, and mental functioning. Increasing vegetation complexity and structural diversity could reduce aggression and violence and promote positive human values. Natural features, such as trees, flowers, vegetable gardens, and water had a positive effect on people. Exposure to nature had been shown to alleviate stress and promote health (Hartig, Mang, & Evans, 1991; Kaplan &
Kaplan, 1989; Ulrich et al., 1991; as cited in Cheskey, 1996). Cheskey (1996) then summed up: “Sweeping vista, open water, secluded hiding places, mysterious passageways... these are the environmental features that appear to contribute most to our physical and mental well-being” (p. 14).

To evaluate the benefits of participating in the Bexar County Master Gardener Classroom Garden Project, Alexander, North, and Hendren (1995) did a survey on students, as well as interviews with teachers, students, parents, the principal, and the Master Gardener in an elementary school in San Antonio, Texas. Their results indicated that participation in the gardening project had many positive effects on the school children. Their interview data showed six emerging themes:

1. Moral development: respect for living things and cooperate with others;
2. Academic learning: lead to the intelligent contemplation of nature and an awareness of and appreciation for their environment;
3. Parent/child/community interaction: parents get involved with school matters and children have a sense of being part of a larger community;
4. Pleasant experiences: watch the beauty and variety of the growing plants, the tangible produces bring rewards, satisfaction, and sheer enjoyment;
5. The influence of the Master Gardener: Master Gardeners as role models provide guidance and support to enrich the teachers’ experiences;
6. Perceived problems: gardening is time-consuming and not all the kids in the school get to do it, anger and frustration occur when things of value are harmed out of vandalism, neglect, or violence (pp. 258-262).
To evaluate the integrated Environmental Studies Program (ESP) in an Ontario secondary school, Russell and Burton (2000) did a 3-year-longitudinal (1997-1999) case study of 73 students in Grey Highlands in northwest of Toronto. The program was taught during February and June semester in a portable building behind the school. The students who enrolled in the program could spend about 75% of the semester outside, in the schoolyard, in the community, and on field trips.

Russell and Burton (2000) noted that, from the teacher’s perspective, the students learned concepts of environmental science, outdoor recreation, and environmental education during such activities as water testing, winter and summer camping, rock-climbing, cross-country skiing, snowshoeing, hiking, and a 16-day wilderness canoe trip in Temagami; they also learned to identify dominant tree species and signs of animals; but most importantly, they learned about nature, environmental issues, and environmental advocacy.

Russell and Burton (2000) also found that, from the student perspectives, three key themes emerged as important to them: experiential learning, interpersonal skills, and personal growth. Building on the insights of the students in the Environmental Studies Program, Russell and Burton concluded that four interrelated characteristics of the program were particularly appealing: experiential learning (meeting the diverse range of learning styles of students), authenticity (doing real-life projects in the real world), connections to human and natural communities (enhancing their interpersonal skills), and holism (moral development and spiritual growth).

The Butterfly Peace Garden is located in the Batticaloa District of Sri Lanka, a region where many lives and communities have been profoundly affected by a long-
running civil war. For 7 years now the garden has provided a sanctuary where thousands of children from villages and towns throughout eastern Sri Lanka have come to play, cultivate the soil, care for animals, practice arts, and learn basic elements of yoga, qigong, and other body wisdom exercises. As with many other coastal communities throughout the Indian Ocean, Batticaloa, Sri Lanka, the home of the Butterfly Peace Garden suffered tremendous damage and loss of life with the tsunami of December 26, 2004. Along with the distribution of material aid, the Butterfly Peace Garden’s tsunami relief and reconstruction efforts are making notable contributions to the healing of the community’s heart, body, and mind through the help of its children (Butterfly Peace Garden Media Unit, 2004/2005).

Coffey (1996) asserted that the schoolyard gardens could also teach children important civic virtues, “the private care of public property, economy, honesty, application, concentration, self-discipline, civic pride, justice, the dignity of labour, and the love of nature” (p. 8). Dr. M. Latimer affirmed that, “those values connect with the educated person that we hope to see in our society” (personal communication, August 2, 2004). Coffey (1996) found that the enriching outdoor learning environment reduced student’s anti-social behaviour, such as violence, bullying, vandalism, and littering. In addition, children’s physical movement in playgrounds was slowed by garden elements, such as tress, plants, and benches, and “This child-calming effect has cut down the number of ‘knock and bump’ accidents in paved playgrounds by up to 80%” (p. 10).

Coffey (1996) noted that over the years decreases in juvenile delinquency had been reported during periods of schoolyard gardening. Teachers reported that social stresses in the classroom were diminished when young people were engaged in learning
through improving their surroundings. In Britain, research shows that both absenteeism and drop-out levels are in decline as school life grows more meaningful for older students; and teachers and students alike are discovering that hands-on activities in outdoor classrooms make learning more interesting. Coffey (1996) contended that “Creating an outdoor classroom may not actually lessen teachers’ workload, but it changes the nature of the work by taking the pain out and putting the joy and excitement of learning back in” (p. 8).

Coffey (1996) argued that the economic benefits of schoolyard gardening are less immediately obvious but become apparent over time. For example, organic waste, rather than going to the landfill, can be composted and used to restore nutrient-depleted soils. Not to be forgotten either are the less-quantifiable, long-term health benefits associated with outdoor physical activities. Moreover, the importance of planting trees in urban schoolyards cannot be underestimated. Coffey maintained that, “Planting shade trees reduces children’s risk of exposure to harmful ultraviolet radiation, and trees also help to filter dust and pollutants from vehicle exhaust” (p. 10).

The value of planting trees in urban areas is also noted by Houghton (2003), who stated:

Trees provide summer shade, buffer cold winter winds and reduce energy costs; they boost property values, reduce water runoff and soil erosion, filter dust, block noise and provide habitat and shelter for songbirds and other urban wildlife. In addition, they renew our oxygen and add moisture to the air through transpiration. Within our depleted ozone layer, they block close to 60 percent of the sun’s rays. Trees also filter air pollution, taking in such noxious gases as sulphur dioxide,
nitrogen dioxide, ground-level ozone, carbon monoxide and microscopic particles that contribute to smog.

Trees also absorb carbon dioxide, a principal greenhouse gas that contributes to climate change. A landmark study done in Chicago in 1994 revealed that larger city trees were able to absorb up to ninety times more carbon dioxide than those with smaller trunk diameters and canopies. The Chicago study concluded that it would require nine million dollars worth of pollution control equipment to match the work of the city’s urban forest in purifying the air! The results of this report so impressed the City of Toronto that it has commissioned a similar study. (pp. 106-108)

*Ecological Literacy and Environmental Awareness through Gardening*

Pivnick (1994) asserted that, “A garden is an ideal place for environmental education to take place” (p. 7). She considered that our environmental problems today were not due to our lack of knowledge, but a lack of intimate connection with nature. To create a long-lasting, deeply held environmental ethic, the schools must provide opportunities for young generations to develop a love for the land and a bond with nature, and gardening might help us do so. The beauty and aesthetics of the schoolyard gardens can create a ‘sense of place’ that invites teachers and students to work, study, and play. These landscaped places are so powerful that they may influence the performance and satisfaction of all who work and study in them (Novak & Purkey, 2001). Gardens also attract neighbourhood visitors to come to appreciate flowers and plants. Therefore, the bond between the community and the school can be strengthened.
In a survey, M. R. Harvey (1989a) examined the relationship between children’s experiences with vegetation on school grounds and their environmental attitudes. In October 1986, Harvey did 42 group interviews with 995 numbers of eight to 11 year old children in 21 junior schools of eight counties in the south of England. These 21 schools were drawn from 10 different locations, ranging from small villages to the inner city with diverse socio-economic status. Based on 845 (425 girls and 420 boys) completed questionnaires, Harvey found that students from schools with vegetated landscapes tended to have higher scores for botanical knowledge, pastoralism (which measures the enjoyment of the natural environment in an intellectual and aesthetic fashion), and lower scores for human dominance over nature. When Harvey (1989a) compared these scores with those obtained by Bunting and Cousins (1985) in a study of Canadian children in Grades 4-10, Harvey found a remarkable consistency in a cross-cultural application. This confirmed the role of the school landscape as a teaching resource for enhancing botanical knowledge and fostering environmental ethics.

In the same study, Harvey (1989b) investigated the gender, age, and socioeconomic differences towards vegetation. Harvey found that boys experienced vegetation as frequently as girls, their experiences were as varied, and they enjoyed their contact just as much. However, Harvey also found that boys had significantly more contact with vegetation as an object of play and adventure, while girls encountered it significantly more as food and ornament and somewhat more as a task (i.e., cutting, watering, and weeding). In general, girls’ attitude to vegetation was consistently more positive than that of boys. Harvey (1989b) noted that this result echoed Moore’s (1986) observations that boys tended to use plant parts to pretend games of violence, while girls
engaged more in small-scale play with plant parts. Harvey (1989b) also found that children's general attitude to vegetation changed with age: the older the children, the fewer positive responses to vegetation. With regard to socioeconomic status of children and their attitude to vegetation, Harvey found that the higher the status group, the more varied were the children's experiences, the more frequent were their contacts with vegetation, and the more they indicated that they appreciated this contact; and children's contacts with vegetation as a play object, as food, as a task, and as an adventure were significantly higher; only vegetation as an ornament was not associated with socioeconomic status. Harvey (1989b) then concluded that there should be as much variety as possible in designing children's outdoor environments and family gardens so that some vegetation can be used for play and adventure, while others for food production and task fulfillment. Involving children in routine tasks within their garden might be fruitful for the development of their positive environmental attitudes.

Stimpson and Wong (2001) noted that in Guangzhou, China, environmental education is integrated with the existing subjects in the mandatory school curriculum, but it is better developed in the primary schools than in the secondary schools. In the former, it is mainly taught through geography and nature studies; in the latter, through infusion into biology and geography. There are also informal, extra-curricular activities that emphasize the application of environmental cognition through industrial visits and school greening programs.

Stimpson and Wong (2001) critically analyzed and evaluated the environmental education program implemented in Guangzhou through a qualitative research using grounded theory. They conducted interviews with 20 government officials, eight
principals and vice-principals, 30 school teachers and 10 tertiary teachers over a 4-year period. They found six emerging themes that help explain the particular form that environmental education has taken place in Guangzhou:

1. A response to environmental degradation and the practical needs of society;
2. A knowledge-focused area of scientific learning in the national interest;
3. A field of study with Chinese characteristics (considering the context of China);
4. A political tool and an element in national propaganda;
5. An administratively led and centrally controlled innovation;
6. A field of study in conflict with mainstream education. (p. 400)

Mock (1994) found that, in Japan, gardens were an important means of teaching young people traditions and developing cultural identity. She noted that, in Japan, the child's education about gardens began practically at infancy, and learning about gardens and nature continued as a lifelong process. Formal schooling concerning gardens and nature were overlaid on a foundation constructed by the culture and the socialization process. This can be attributed to the Shinto religion that worships natural phenomena. In Japan, Mock discovered that fathers, on an average, spend 18 hours a month with their children. And during these hours, children were often taken to parks and famous gardens by their parents. Thus, gardens are often associated with the happiest childhood memories. Through these early visits to gardens, children learn aesthetic appreciation and religious significance of garden elements from their parents and grandparents. It is in this way that the artistic, religious, and historical elements of the culture are handed down from generation to generation. To the Japanese, gardening is a way of focusing on the heart. So gardening teaches the culture, or education of the sentiments, particularly in the
elementary years. The Japanese consider school gardens to be important educational tools, and in almost every elementary school, a portion of the grounds is given over to a small garden. The children plant the gardens, with help from teachers and interested parents. Each child is able to plant at least one plant and from that gains a sense of ownership in the garden. The Garden Club has primary responsibility for taking care of the garden after school, and the Garden Club is the most prestigious among all the clubs—it is hard to get in even though it is a requirement that they come to look after the garden during school holidays. Damage in the garden is controlled by each child’s having a ‘stake’ in it and any offenders are punished by peers, not by the teachers. Students are taken regularly outside their school to famous gardens and natural areas throughout their school years. The school trips, like gardening, form an important element of the child’s education and have long-lasting benefits into their adulthood. This close contact with nature and national culture has a unifying effect on the country and establishes a true sense of homeland.

Dunne (2000) described that JFK High School in the Bronx, New York built ‘The Enchanted Garden’ in 1995 by their school’s Environmental Club to preserve the diversity of wildlife in this area. Their campus was located in the middle of a small, dried-up river valley where it used to be a creek in the early 1900s. In recent years, the land was flat, neglected, and choked with weeds. The wetland garden was a reminder to everyone of what this land might have looked like a century ago; it hosted birds, insects, frogs, fish, snakes, squirrels, and even skunks and raccoons. It was a living classroom where the students learned about ecological literacy, global environmental issues, biodiversity, and the importance of habitat preservation. They also learned about
themselves, the value of teamwork, and their community. The Enchanted Garden has had a huge impact on the school and the students.

Besides the positive impacts of school ground greening on student academic achievement, social and behavioral development, play, environmental awareness, health, and safety, Dyment (2004) also found several additional impacts through follow-up interviews. The school ground greening projects were venues for community outreach, political activism, and values transfer (pp. 159, 190-191). One of the parents Dyment interviewed noted that environmental awareness was one of the most important results that the students gained through school ground greening activities. However, one of the teachers asserted that environmental awareness and stewardship might increase only for the students who were actively involved in the greening project (p. 176).

**Design and Maintenance Issues of the Schoolyard Gardens**

The schoolyard gardens evidently have many remarkable educational values. But why do some schools not have a garden? To answer this question, Gardner and Go (1999) did a survey to all the public and private schools in Sonoma County of California. Their findings showed that the reasons for those schools not having a garden are: lack of space or adequate sites (59%), lack of leadership or garden coordinator (26%), lack of resources (24%), and lack of summer care/watering (24%). Their findings indicated that science (92%) is the most common curricular subject taught in the gardens, followed by math (51%), English language arts (41%), and health (37%). The least use is physical education (8%). Their research results also showed that the schools that had successful gardens were mostly because of a supportive school principal (92%), a supportive maintenance staff (69%), and parental involvement (62%). The existence of a Garden
Club has minimal effect (9%). However, they did not reveal the percentage difference between the successful and unsuccessful schools.

Ongoing maintenance is vital to the survival of a schoolyard garden, and “Watering is a key element in the success of a garden” (Kutsunai, 1994, p. 5). The life of plants and flowers depends very much on the long-term commitment of the school, the parents, and the community who provide continuous personal, institutional, and organizational support. Without these supports, a schoolyard garden may have negative effect on the neighbourhood. Many schools built their gardens but lacked the knowledge on how to maintain them. A few years later, their gardens were filled with weeds and some even became their neighbourhood eyesore (C. English, personal communication, June 11, 2004).

Coffey (1996) asserted that maintenance was the lasting hurdle of schoolyard gardening. Maintenance for the first 2 or 3 years was more intensive than later years when the plants would have established themselves. Weeding and watering their schoolyard garden through the summer was done by their parent volunteers. Mock (1994) also observed that in Japanese elementary schools, parents with gardening knowledge were called upon for help. The fundraising falls on the Parent Teacher Association to find resources for gardening activities. Twice a year, the parents all come to school on a Saturday to help with the big cleaning days. Every inch of the school and the schoolyard garden is cleaned. This reinforces school cohesion and unity.

Hanscom and Leipzig (1994) described that the garden at their school was a place where all of the school children and community learned not only science, but also responsibility for the environment. Their school had developed a detailed ‘Gardening
Timeline’ from September to the following September to guide their gardening activities for different grade levels. Their school organized a 4-H (Head, Heart, Hands, and Health) Club to deal with the summer maintenance issue of the garden. The 4-H members included boys and girls from their own as well as other schools. They also sought help from parent volunteers, sometimes a paid coordinator if a grant was available, and raised funds by “selling produce from the garden, flower arrangements and T-shirts” (p. 13).

Russell and Burton (2000) noted that fundraising represented a significant amount of work in the Environmental Studies Program, and that funding is a perpetual problem. They asserted that “Given the cutbacks to education in Ontario, financial independence may be essential to the survival of these programs” (p. 299).

A lack of continual involvement has negatively affected some of the schools in Dyment’s (2004) study. Through interviews with the school administrators, teachers, and parents, Dyment summarized four maintenance strategies that had been proved successful by one of the five schools she investigated:

1. The design of the schoolyard garden is sustaining so that when the original committee moves on, it will need very little maintenance;
2. An elected position on school council that is responsible for the schoolyard garden;
3. The environmental focus is explicit in the school’s mission statement; and
4. Community support from neighbours has been actively sought.

These efforts may help to manage and sustain the schoolyard gardens once the original group of teachers, parents, students, and principal is no longer involved (p. 142).

Dyment (2004) investigated the design issue and found that design plays an important role in enabling and limiting the success of schoolyard gardens. If the greening
project is too large, then it will be hard to sustain it because no one would know where to begin. And if the design requires too much maintenance, what often happens is that the schoolyard gets neglected and the invasive weeds make it look awful. Therefore, long-term planning approach such as ‘designing for neglect’ and ‘designing for sustainability,’ were employed. With such an approach, maintenance and continuity issues decreased significantly (pp. 206-208).

Heffernan (1994) from the American Horticultural Society along with two other professional landscape designers initiated a Children’s Garden Project at George Washington’s River Farm, Alexandria, Virginia. Working together with elementary school students, they created 12 children’s garden designs for both recreational and educational purposes at schoolyard, backyard, and community sites. The students designed: ‘Persian Carpet Garden,’ ‘Butterfly Garden,’ ‘Wildlife Discovery Pond,’ and ‘Dinosaur Garden’. The professional landscape designers designed: ‘an Alphabet Garden,’ ‘Little House on the Prairie,’ ‘Colonial Wind, Weather, and Sundial Garden,’ ‘Secret Grove Garden,’ ‘a Ditch Garden,’ ‘Imagination Garden,’ ‘a Child’s Fantasy Garden,’ and ‘a Sunflower House Garden.’ They found that the ‘Wildlife Discovery Pond Garden’ was the most popular of all, and the second best was the ‘Imagination Garden’ (pp. 224, 226, 229). These gardens contained secret hiding places and puzzle maze of grass that naturally attracted children’s curiosity to explore and to discover the unknown.

On the other hand, Marturano (2000) proposed four types of gardens that were suitable for middle school students: ‘Social Studies Garden,’ ‘Bird and Butterfly Gardens,’ ‘Nutrition Gardens,’ and ‘Ethnic Food Gardens.’ In the Social Studies Garden, students learned that, during World War II, the U.S. Government encouraged families to
grow their own food in ‘Victory Gardens’ to increase food supplies and to create a spirit of hope and triumph. This brought history to life for students. The Bird and Butterfly Garden allowed students to observe bird migration and to find true south (Denman, 1996; Marturano, 2000). Teachers encouraged students to participate in Feeder Watch (a long-term project surveying winter bird populations) and Monarch Watch (a research program monitoring the behaviour of migrating monarchs through netting, tagging, and releasing of butterflies). In the Ethnic Food Gardens, students were provided with opportunities to grow plants associated with their ethnic origins, which enabled them to study their own cultural heritage and to celebrate cultural diversity.

**Chapter Summary**

This chapter reviewed the literature related to schoolyard gardening. It started by analyzing how schoolyard gardening is grounded in the holistic philosophy of education, along with the Multiple Intelligence theory. Then, it traced the history of children gardening. Later, it examined the current situation of student participation in schoolyard gardening, as well as the subsequent learning outcomes. In the next chapter, I will discuss my research design, data collection procedures, and data analysis methods.
CHAPTER THREE: METHODOLOGY AND PROCEDURES

To see a World in a Grain of Sand
And a Heaven in a Wild Flower,
Hold Infinity in the palm of your hand
And Eternity in an hour.

— William Blake, “Auguries of Innocence”

The purpose of this research is to investigate through adult perceptions what factors have enabled and limited student participation in schoolyard gardening, and how to support student involvement in schoolyard gardening. It is a follow-up study of the Canadian researcher Janet E. Dyment’s (2004) Ph.D. dissertation Greening School Grounds in the Toronto District School Board: An Investigation of Potential.

So far, there have been three Canadian research studies in this area, each with its particular emphasis: Bell (2000) on ‘school-based habitat restoration;’ Simone (2002) on ‘schoolyard naturalization;’ and Dyment (2004) on ‘greening school grounds.’ There has been no detailed Canadian research study on adult perceptions of student involvement in ‘schoolyard gardening.’ As Dyment (2004) pointed out, there are still many gaps in the existing literature of the impacts of school ground greening programs, as well as the factors that enable and limit student participation (pp. 5, 47, 49, 126, 212, 225). This research has explored the findings by Dyment in greater depth and detail. My choice of studying the age-old activity of gardening is supported by many environmentalists, for example, Orr (1992), who argued:

On the minority side are those seeking “old and solid knowledge,” which used to be called wisdom. It has less to do with specialized learning and the cleverness of
means than with broad, integrative understanding and the careful selection of ends. (p.13)

...No one, of course, is against wisdom. But while we mass-produce technological cleverness in research universities, we assume that wisdom can take care of itself. The results of technical research are evident and most often profitable. Wisdom is not so easy – what passes for wisdom may be only eloquent foolishness. Real wisdom may not be particularly useful. The search for integrative knowledge would probably not contribute much to the gross national product, or to the list of our technological achievements, and certainly not to our capacity to destroy. As often as not, it might lead us to stop doing a lot of things that we are now doing, and to reflect more on what we ought to do. (p.14)

...In this category, I would include research into energy efficiency and solar technologies, materials efficiency, the restoration of damaged ecosystems, the knowledge of how to build healthy cities and to revitalize rural areas, how to grow food in an environmentally sound manner, and research on the conditions of peace. These are things on which our survival, health, peace, and peace of mind depend. (p.14)

**My Identities and Background**

Many scholars have noted that a researcher’s identities and background influence his/her research topic, analysis, and findings of their research (Creswell, 1998; Deshler & Selener, 1991; Dyment, 2004; Stanley & Wise, 1993). For example, Deshler and Selener (1991) asserted that, “What we decide to research and the way we conduct our research is a political statement about who and what is important to us” (p. 9).
My personal and professional identities (e.g., Chinese family background with parents practicing holistic medicine, educated in China, England, and Canada, educational and professional background in architecture, art history lecturer, Daoist advocate, environmentalist, able, Canadian citizen, and resident of Ontario) influence all aspects of this research. For example, they have influenced the topic I have chosen to study (e.g., schoolyard gardening); the range of the literatures I have selected for review (e.g., worldwide schoolyard gardening initiatives vs. just Canadian schoolyard gardening initiatives), the location of my research (e.g., Toronto, Ontario, Canada), and the participants in my study (e.g., principals, teachers, parents, the TDSB/Evergreen representatives, and the Ontario Ministry of Education officer). These ultimately influenced my data analysis, interpretations of the findings, and dissemination of the research results. Being aware of my identities (and also my limitations), I then strived to obtain an objective view while conducting this research.

Throughout my career, environmental issues have always been my primary concern. In my architectural design, I paid special attention to incorporate daylight penetration and natural ventilation so as to minimize energy consumption. I am particularly interested in studying how the natural and built environments affect human development from childhood to adulthood, and how to design sustainable settlements to maximize the positive impacts of the environments on human development. I believe that these schoolyard gardening research findings will not only make contributions to the schoolyard gardening movement in the Toronto District School Board, but also to school communities, school boards, and provincial ministries of education across Canada and around the world.
Research Design: Transformative Research

This research used a collective case study approach to qualitative research (Creswell, 1998; Stake, 1995) to investigate the topic in depth and detail. It included interviews, audio-recordings, drawings, photographs, and field notes. I used purposeful sampling to select interviewees that provided me with different perspectives on the issue that I was investigating.

This research design was guided by the principles of transformative research (Deshler & Selener, 1991), whose findings aim to make a direct contribution to a social transformation and environmental sustainability. My research design is connected to the work of Deshler and Selener in these ways:

1. Ethical – paying special attention to the preservation of environmental sustainability;
2. Empowering – promoting the conservation and proliferation of different forms of life;
3. Holistic – emphasizing, identifying, and revealing relationships and interconnectedness between the part and the whole, the micro and the macro, and the local and the global (pp. 10-11).

These three tenets formed the basis for the design, development, and implementation of this research. This research is potentially transformative because through the participation of the schoolyard gardening activity, the students may become more self-reliant, more ethical, and more responsible citizens in the society when they grow up.

Interview Question Selections

It has been quite a journey for me to come up with these research questions and the interview questions. I tried a variety of approaches and finally embarked on this one:
adult perceptions of the enabling and limiting factors of student involvement in schoolyard gardening. My research questions are:

1. From the perceptions of adults, what is the amount of student participation in schoolyard gardening and at what stage are students mostly involved?

2. From the perceptions of adults, what are the factors that have enabled and limited student participation in schoolyard gardening?

3. From the perceptions of adults, how can schools maximize the enabling factors and minimize the limiting factors for student involvement in schoolyard gardening?

Based on the above research questions, I developed seven semi-structured and exploratory interview questions as follows, to invite the participants to tell their stories:

Q1. From your observation, what is the amount or percentage of student participation in the schoolyard gardening project? At what stage does this figure apply?

Q2. What factors have enabled student participation in the schoolyard gardening project? How has the teaching staff attempted to enable these factors?

Q3. What factors have limited student participation in the schoolyard gardening project? How has the teaching staff attempted to limit these factors?

Q4. How do the teachers provide opportunities to ensure true and lasting student involvement in schoolyard gardening?

Q5. How do the parents create a family culture that supports their child’s/children’s true and lasting involvement in schoolyard gardening?

Q6. How does the school principal create a school-wide culture that supports true and lasting student involvement in schoolyard gardening?
Q7. How does the school board create a board-wide culture that supports true and lasting student involvement in schoolyard gardening?

_Snowball sampling_ occurred while I was interviewing some of the participants. For example, one participant suggested to me to also interview the Head of Curriculum at the Ontario Ministry of Education. Although this was not part of my initial research design, I thought that this interview could strengthen my research findings. I further developed two research questions for the education officer at the Curriculum and Assessment Policy Branch of the Ontario Ministry of Education:

1. Why does the Ontario Curriculum not support Environmental Education elements?
2. How could the Ministry of Education incorporate Environmental Education elements in the curriculum in future?

Then, I set up another separate interview questionnaire for the education officer at the Ontario Ministry of Education:

Q1. Why does the Ontario curriculum not explicitly support Environmental Education elements (e.g., schoolyard gardening) or Ecological Literacy (Ecoliteracy)?

Q2. How could the Ontario Ministry of Education officially recognize, at the policy level, the importance of Environmental Education and Ecoliteracy and provide the school boards with funding for such initiatives as schoolyard gardening?

Q3. How could the Ontario Ministry of Education help link Environmental Education (e.g., schoolyard gardening) with existing curriculum?

Q4. How could the Ontario Ministry of Education promote teachers to use schoolyard gardens as an outdoor classroom and provide teacher training for it?
Site and Participant Selections

The collective case study involved three schools in the Toronto District School Board (TDSB) that currently run a schoolyard gardening project. The rationale for choosing this particular school board is that TDSB is Canada’s largest and first to have a dedicated Department of Environmental Education, and that it has 227 schools that have been involved in gardening, schoolyard naturalization, or other school ground greening activities (Houghton, 2003). Furthermore, the schoolyard naturalization issue is far more acute in an urban setting such as Toronto because a lot of children live in apartment buildings in the downtown areas, whereas children living in the suburb in houses with backyards may get in touch with nature much more easily.

The reason for choosing only three schools is my desire to investigate each case in depth and detail. As Creswell (1998) advised, “Typically, however, the researcher chooses no more than four cases...the more cases an individual studies, the greater the lack of depth in any single case” (p. 63). Creswell continually argued that what motivated the researcher to consider a large number of cases was the idea of generalizability, a term that holds little meaning for most qualitative researchers.

The total number of interview participants was 16 individuals: two principals, three most involved teachers, two less involved teachers, three involved parents that are associated with the three case study schools, and one additional parent at a fourth school that is starting to renovate their Courtyard Garden but is not part of the case studies; Richard Christie¹, District-wide Coordinator of Environmental Education for the TDSB; Heidi Campbell, TDSB/Evergreen School Ground Design Consultant; Bruce Day, District-wide Grounds Team Leader for TDSB; Cam Collyer, National Learning Grounds

¹ Using real names with permission was noted as part of the ethical review at Brock and with the TDSB.
Manager at Evergreen; and Denis McGowan, Education Officer at the Curriculum and Assessment Policy Branch of the Ontario Ministry of Education.

The school participants were selected by their school principal. My assumptions were that the power and decision-making rest very much in the hands of the principals in the elementary schools, and that the principal would be able to assess the teachers’ and parents’ level of involvement by measuring the amount of time (and even money) that the person had donated in the schoolyard gardening project comparing with others.

Having the principal select participants might make the participants feel coerced into participating. Instead, the principal reduced the sense of coercion by asking among the school staff and parents who would like to participate in the interviews, and then selected one that he/she felt was most involved and less involved. For instance, a teacher described the procedure of how her principal passed on my interview request to her:

She [the Principal] forwards all information so that when it comes in, she goes through it, that’s how she sends your application when she got it. She doesn’t say, “You have to do it.” She will give you the choice, and then when I spoke to her about it, she needs to know that I put thoughts into it and why I would do it, and then she’s supporting it. She’s going to be interviewed and she will be a part of it.

(Teacher, School B)

An alternative method of recruiting could have been that I asked each school administrator if they had anyone in charge of their schoolyard gardening project or the Gardening Club. If they did, I could then ask for the name and contact information of that person. However, this method could not be used because the privacy and confidentiality of personal information should be protected by individual schools and the Board.
Ethics Approvals

Since this research involved human participants, ethics reviews through the Brock University Research Ethics Board (REB), as well as the Toronto District School Board External Research Review Committee were preceded prior to conducting the research.

The two applications for ethics reviews were filed after the approval of my thesis proposal by the Thesis Committee. Upon ethics clearance from the REB, I filed a copy of the clearance form with my supervisor and the Faculty of Education at Brock University. TDSB required a prior approval of an ethics review by the Brock University Research Ethics Board before submitting an ethics review application to the TDSB. It was required that no participant selection or data collection could commence until clearance had been received from the Thesis Committee, the REB, and the TDSB (Brock University, Master of Education Program Guide, 2004, pp. 14, 18, 28, 54, 106).

Ethics clearance by REB was received on April 1, 2005. Then, I personally delivered a different set of ethics application (seven copies) to the TDSB External Research Review Committee on April 4, 2005. I received their ethics approval on April 25, 2005 (see Appendix C) and started contacting the potential schools. I first emailed the 13 EcoSchools, and then I emailed all the 227 TDSB schools that were involved in some kind of school ground greening activity and that are listed at the back of the book A Breath of Fresh Air: Celebrating Nature and School Gardens (Houghton, 2003) published by the TDSB. I found each principal’s name on the TDSB website and deduced their email address based on their first and last name. Between April 25 and May 7, I sent out around 230 emails to school principals. Roughly 30 emails bounced back. About 40
schools replied, of which two schools indicated that they would definitely participate in the research; we set up an interview schedule soon after that.

The third school surprisingly faxed me their four handwritten interview questionnaire responses and consent forms on May 27. I called that school principal, wishing to set up an interview date, but she replied that she did not have time to set up interviews because it was a very busy time of the year. However, in the end, I did manage to interview their most involved teacher and a dedicated parent volunteer after all of my efforts in trying to find the third school had failed. The highly involved teacher at School C said to me at the end of her interview that the reason she agreed to participate in my interview was that she wanted me to complete my thesis in time, which was very kind of her.

**Data Collection**

The interviews were conducted during May 13 – June 10, 2005. First, I emailed all the 230 principals my “Letter of Invitation,” “Consent Form,” and “Interview Questionnaire” for them to pass on to their potential participants. After receiving two positive email replies from two principals, I called and emailed them my “Interview Schedule” form to set up an interview date. At the bottom of the schedule form, I informed each principal that photos of their school garden would be taken. In the cases of the TDSB/Evergreen representatives and the education officer of the Ontario Ministry of Education, I emailed them directly the above documents.

I spent one day at each school to undertake the interviews and take the school garden photos (with the permission from the school administrator). I collected the “Consent Form” from each interviewee on the day of the interview. In the beginning of
the interview, I verbally informed the interviewee that he/she could discontinue participation at any time without penalty or loss of benefits, to which they are otherwise entitled. The interviews, upon permission of the participants, were audio-taped and later transcribed by the researcher. Of all the 16 interviews, the longest one took 56 minutes, and the shortest one took 9 minutes. On an average, each interview took 25 minutes. At the end of the interview, I gave each participant a CD as a “Thank you” gift for their contribution to the research. It contained six PowerPoint slide shows of my curriculum unit design “Education Through Gardens.”

After I arrived home, I emailed each participant a “Letter of Appreciation,” in which I readdressed the purpose of the research, the timeline and the method for sending them the summary report of the research findings. In between the interview days, I transcribed the 16 interview audio-tapes (using a Panasonic RR-830 Standard Cassette Transcriber) into word documents (using Microsoft Word). I finished transcribing the last audio-tape (June 11, 2005) right after my last interview (June 10, 2005). The 16 transcriptions added up to 125 pages (single spacing), averaging eight pages per interviewee.

Data Analysis

The data analysis was carried out during June 13 – July 29, 2005. It consisted of ‘taking the data apart’ to determine individual responses, and then ‘putting it together’ to summarize it (Creswell, 2002, p. 12). First, I made a within-case analysis (Creswell, 1998, p. 63) by considering different perspectives from each interviewee at the same school and put them together. Secondly, I made a cross-case analysis (Creswell, 1998, p. 63) using three descriptive tables to compare and contrast the perspectives at the three
different schools. Thirdly, I made a holistic analysis of the perspectives from the TDSB/Evergreen representatives, as well as the education officer at the Curriculum and Assessment Policy Branch of the Ontario Ministry of Education and combined them together. Three descriptive tables were used to summarize my research findings in Chapter Five, which is followed by my reflections, implications, and recommendations.

Within each analysis, the data were further organized under four subsections based on my research questions: 1) amount of student participation; 2) enabling factors for student participation; 3) limiting factors for student participation; and 4) ways to support student involvement.

In regard to the procedure of my data analysis, I first read the four transcriptions from each case study school, and then making sense of the comments made by each interviewee, selecting, underlining specific sentences and paragraphs, identifying themes, and summarizing each paragraph before bringing it to my thesis. I used my field notes that highlighted the key points during the interview and combined them together to create the ‘summary list’ at the beginning of each subsection. I also redrafted the summary list a few times to accommodate new information emerging from the data, which I did not include in my interview notes.

During the data analysis, I tried not to put my personal stance, inferences, or evaluations of what I think they said or meant. Instead, I presented as much as possible the original words and phrases of the interviewees. Therefore, the knowledge claims are grounded in data. However, I did a fair amount of editing of all the data and eliminated certain words that are frequently used in the spoken language, such as “you know,” “right?” “And so,” “or whatever,” “OK,” “like,” “kind-sort of,” “things/stuff like that,”
“that kind/sort of thing,” “yeah,” “well,” “but,” “I mean,” to make the thesis more formal and readable.

Data Validation

In order to obtain more reflective answers from the interviewees, I emailed my interview questionnaire to the school principals and asked him/her to pass it along to the other potential interviewees. I also emailed the interview questionnaire to each of the four TDSB/Evergreen representatives, and a separate interview questionnaire to the education officer at the Ontario Ministry of Education.

Since this is a qualitative study, my procedure of data validation included triangulation (e.g., principal, teachers, and parents), thick description (presenting the original data input from the interviewees themselves), member-checking (emailing the draft of Chapter Four to the five participants whose real names are identified to check the accuracy of their account, which was requested by the participants themselves), and external auditing (the external examiner wrote an evaluation report of the study).

I did not conduct member-checking for the 11 interviewees at the three schools because the Brock University Research Ethics Board does not require it, and also because the process would be very time-consuming. However, four of the five interviewees whose real names are identified in the thesis did complete their member-checking within 3 weeks.

Ethical Considerations

Environmental education researchers are environmental activists, we are engaging in a political act, and are in essence generating knowledge to advance a social movement (Malone, 1999, p. 175). When perceived in this light, the participants in this study might
be in jeopardy if their names were to be revealed to anti-environmentalists, or to people whose political stance is against environmental conservation.

To protect the privacy and confidentiality of the schools and their participants, their names are not identified in my thesis or the final report. For the tape recording, transcriptions, and data analysis, I created a coding system that assisted me in tracing the interviewees. Both the researcher and the supervisor have access to the data. We try to maintain the confidentiality of the data as much as possible. However, due to the small number of participants and the principal’s awareness of the participants, the confidentiality issue may still arise. I obtained individual permission from each of the five participants (Richard Christie, Heidi Campbell, Bruce Day, Cam Collyer, and Denis McGowan) to use their real names because they referred to each other in their comments.

On Section E “Confidentiality and Anonymity” of the REB application form, Question 22 asked “Are the data anonymous?” I chose “No,” and it was approved. Also, according to the TDSB’s Research Review Committee Policy Guidelines, “The research must ensure that the confidentiality of information about TDSB schools, teachers, and students is protected and that no TDSB school, teacher, or student is identified in any report” (Toronto District School Board, 2005, Clause 8, p. 3). Therefore, in this thesis, no TDSB school, teacher, or student is identified. However, this clause does not cover the TDSB consultants who are not TDSB teachers.

**Methodological Assumptions and Limitations**

My first methodological assumption is that by employing transformative research as the philosophical framework for this research design it is possible that a social transformation and environmental sustainability will eventually be achieved. I have
chosen to frame much of this research within the transformative research because it best reflects my ideological perspective.

The second methodological assumption is that a collective case study using interview design is the most appropriate approach for this research because: 1) it allows me to develop an in-depth analysis within a case and across cases; 2) it provides me the opportunity to collect information through interviews, field notes, drawings, and photographs; and 3) it gives me the opportunity to hear diverse voices of different perspectives.

The third methodological assumption is that studying adult perceptions of student involvement is a good way to tackle this issue since the power and decision-making rest very much in the hands of adults. Moreover, interviewing students would require additional parental consents and audio transcriptions, which could be difficult to accomplish within the timeframe for a Masters thesis.

The methodological limitations of the collective case study are that generalization is almost impossible even after generating the results of this study because of the nature of qualitative research, and that it is almost impossible to draw conclusions based on only three school cases within one school board (TDSB) and 16 interviewees. Another methodological limitation is that there was no student interviewed in this research and that, if the students were interviewed, it might generate different answers.

**Dissemination**

I submitted a research report to Brock University Research Ethics Board (REB) and my supervisor on July 7, 2005. I also emailed a summary report to the participating schools, the TDSB, Evergreen, and the Ontario Ministry of Education on October 19,
right after my thesis defense (October 18, 2005). The school report included a more complete description of the purpose of the research, summary of findings, and recommendations.

I hope these research findings will make a direct contribution to the Toronto District School Board and the Ontario Ministry of Education in making sound policies on effectively incorporating schoolyard gardening into the curriculum, especially at the moment when the Ontario Ministry of Education is starting to review their Science Curriculum for Grades 1-8 (1998) in September 2005.

Benefits to the Participating Schools

The report from the data analysis will be beneficial for the participating schools to have a deeper understanding about the factors that have enabled and limited their student participation in schoolyard gardening, and thus be able to minimize the limiting factors and maximize the enabling factors in future practices. The final thesis and the report may offer suggestions for educators who are searching for ways to motivate students’ enthusiasm on schoolyard gardening so as to fully realize its many educational values.

Chapter Summary

This chapter focused on my research methodology and procedures. It explained why the transformative research is the most suitable philosophical framework for the design of this research. The key steps in conducting the research were outlined. In the next chapter, I will present the research findings.
CHAPTER FOUR: PRESENTATION OF FINDINGS

See the world as your self.
Have faith in the way things are.
Love the world as your self;
Then you can care for all things.

– Laozi, 600 B.C., Dao De Jing, Verse 13

This chapter presents in-depth and detailed findings of the research on adult perceptions of student involvement in schoolyard gardening. The purpose of the research is to investigate through adult perceptions what factors have enabled and limited student participation in schoolyard gardening, and how to support authentic student involvement in schoolyard gardening. It is a collective case study of three schools in the Toronto District School Board that are currently running a schoolyard gardening project. It involved multiple sources of information, rich in context that included interviews, audio tapes, drawings, photographs, and field notes.

The total number of interview participants was 16 individuals: two principals, three most involved teachers, two less involved teachers, and three parents associated with the three schoolyard gardening projects profiled in the case studies. I also interviewed four TDSB/Evergreen representatives, one educational officer at the Curriculum and Assessment Policy Branch of the Ontario Ministry of Education, and one additional parent at a fourth school that is starting to renovate their courtyard garden but is not part of the case studies.

The chapter is organized in three sections: within-case analysis, cross-case analysis, and holistic analysis. Based on my research questions, each section is further
divided into four subsections: 1) amount of student participation; 2) enabling factors for student participation; 3) limiting factors for student participation; and 4) ways to support student involvement.

**Within-Case Analysis**

This section analyzes the data within each of the three schools. It aims to find themes from the data at each school. To protect the privacy and confidentiality of the schools and their participants, their names are not identified in this thesis; generic names are used, such as “School A,” “School B,” “School C,” “Principal,” “Teacher,” and “Parent.”

**Case Study: School A**

School A was built in 1960. It is located in a small family-oriented community in southwest Toronto. Their schoolyard abuts a community park. Their gardening project was initiated in 1999 by an enthusiastic teacher, who worked in the Parks and Naturalization Department of the Toronto and Region Conservation Authority before coming into teaching. He led the school to plant trees and shrubs on the schoolyard at the back. In 2001, when the present principal assumed her role, she started a Gardening Club, but the club is not running right now. They have a parent council that supports the schoolyard gardening initiative. To make the school aesthetically appealing, the parent council suggested building a front garden. In 2004, the front Garden was created, with some consulting from a local garden store, White Rose (now closed down), and with some native plants recommended and donated by another local garden store, Canadian Native Plants.
The school has a well-established composting program. In September 2004, they won a Silver Certification by the Toronto District School Board for their EcoSchools program. This year, they have also started a recycling program. There are 17 teachers and 18 support staff. The school serves about 280 students (Junior Kindergarten - Grade 5), representing different cultural backgrounds. Approximately 25% of the students speak a primary language other than English.

**Amount of student participation.** It seems that it is a school-wide schoolyard gardening initiative in School A. All (100%) of the students participated in the planting. But when it comes to the maintenance stage, student participation dramatically dropped to 37.5%. There is no student participation in the planning or design of the project. For example, the highly involved teacher observed:

> When we actually plant, it's 100%. I basically coordinated it and organized the whole school...there are a couple of different projects at the school, but the first one we started out in the actual schoolyard, which is the naturalized groupings of logs and shrubs. The whole school goes out in stages. I spend the whole day out there, and in 40-minute or 30-minute increments each class comes out and they get a lesson on how to plant....And we get lots of parents as well. We have a great planting day. (Teacher, School A)

The parent volunteer also noted that all the children in the class participated on the planting day because the school made it compulsory; she said, “From what I’ve seen, I think all the school is involved in it, from Kindergarten up to Grade 5...the teachers signed up every class and they were made to participate.” Whereas the less involved teacher reported 90% student participation in the planting stage:
It was a school-wide approach to gardening that we had at least 90s in terms of percentage, and most people were involved....My class was not involved in any design, but certainly the planting, and later on the maintenance...I do have my children check to make sure that other kids have not ruined the shrubs, we need to take care of what we planted. That’s the type of maintenance we’ve done in our classroom. (Teacher, School A)

The principal felt that it was about 3/8 classes (37.5%) that were actively involved in the front garden, and all the classes except kindergarten participated in the back garden:

They sometimes go out and work in the front gardens, especially the last year...about three classes out of the eight that did a lot in the front garden; whereas with the trees and the shrub planting [at the back], all the Grades 1 to 5 classes get involved in that, not usually the Kindergartens will participate.

(Principal, School A)

**Enabling factors for student participation.** At School A, the factors that have enabled student participation in schoolyard gardening are teacher’s leadership; teacher’s interest; curriculum integration; teamwork; principal’s support; the EcoSchools program; teachers making students understand about the importance of the project; students seeing their accomplishments; school making it compulsory; parent council’s support; good relationships with the school’s custodial staff; and supports from White Rose and Canadian Native Plants. For example, the principal commented:

He’s [the leading teacher’s] been really the driving force behind it...and the teacher has to be interested in order to take class out to do it. If the teacher is not interested, they’re not going to do it....The parent council has supported it over
the years by giving the money....Of course, I’m supportive of it, so there is a support from the administration. And we also get board support as well...that EcoSchools program, people are there to give advice; they put on workshops about schoolyard naturalization. (Principal, School A)

The EcoSchools program as an enabling factor is shared by the leading teacher (highly involved teacher), who said, “The EcoSchools program...has created a more formal network, which is great. So that’s been a help to me...” In the view of this highly involved teacher, other factors that have enabled student participation are curriculum integration, teamwork, and a supportive principal:

Teachers integrating the naturalization project in their curriculum, in some cases it fits very easily in the curriculum, like Grade 4 Science: “Habitats and Communities.” And other cases you can modify things and connect things to the curriculum. So getting that really is a factor of me connecting with other teachers and bringing them on board for a number of things.

...Having a supportive principal, that’s really important, who’s going to provide either time, or money, as well as provide support for the staff, and resources for teachers that are interested...that really makes a difference...because most teachers are pretty busy just for their class, never mind add in [schoolyard gardening]...teachers have more and more things layered on top, every year there are some new things that is usually downloaded to teachers. (Teacher, School A)

The less involved teacher felt that making the students understand the importance of the schoolyard gardening project is an enabling factor:
I think the factors that have enabled students are the facts that the teachers getting
the children to understand why it's important to do this for our school, and why
it's important to garden at home, and that letting them know not only are we
helping the environment, but it's also a therapeutic activity as well.

...I can only speak for my class, they've got excited about it, they felt they
were really making a difference, and they were working together. Also just
getting them to be involved in team work, they really enjoyed it. (Teacher, School
A)

In the view of the parent, the factors that have enabled student participation are that the
school made it compulsory and that the students saw their accomplishments:

They [the students] were made to do it...the teachers signed up every class and
they were made to participate, which is good because you can see some of the
areas are building. Actually we were one family that lived in a condo at one
time...we didn't have hands-on with the gardening stuff. So it was a good thing.
And I also think that children like seeing what they're accomplishing out there,
when they saw the actual plants and the trucks with the soil things like that, I
think they enjoy that part of it. And that was a lot to talk about. (Parent, School A)

The principal felt that the parent council's support was an enabling factor in the past:

I think that the school council most every year they give us $500 towards buying
the shrubs. But this year they didn't give us anything, I don't think they did last
year because they didn't have very much money, they haven't been as active a
group as they have been in the past. They haven't had the money to give to us.
(Principal, School A)
The highly involved teacher revealed that a good relationship with the custodial staff is crucial to the success of the schoolyard gardening project:

Good-related connection with head caretaker is also [essential]...and head caretaker is my fishing buddy, we work really well together, he helps me, I help him. You teachers will have to have that for the naturalization project...that’s critical, as you don’t want to be filling the school full of mud, for example, when you’re out planting, they’ll help to facilitate stuff, hooking up the watering holes and helping you with tools, all kinds of things. So that needs to be there. (Teacher, School A)

The principal acknowledged that supports from White Rose and Canadian Native Plants were an enabling factor for the school to create their front garden:

As far as the front garden goes, we actually got the Head of Consulting come from White Rose, which is now closed down, but they did come out and we even had another, there is a place called Canadian Native Plants...that’s at Downsview Park...recommended native plants to grow in there, so we had a bit of planting from them. (Principal, School A)

**Limiting factors for student participation.** At School A, the factors that have limited student participation in schoolyard gardening are scheduling, time, and money; politics and negotiations ("work-to-rule"); EQAO; students not willing to participate; parents not wanting their child to get dirty; teachers not getting together to talk about it; teachers worrying about kids getting skin cancer; no Gardening Club; and not an ongoing thing.

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1 Educational Quality and Accountability Office conducted province-wide assessments in reading, writing, and mathematics in Grades 3 & 6. All students in Ontario in these two grades participated in an integrated unit of work for 2.5 hours for each of 5 days in May/June 2004.
The highly involved teacher considered that scheduling, time, money, as well as politics and negotiation are the limiting factors:

But scheduling, I have to do something with my class. Some of them are kept with me as a Green Team, helping out all the other classes. I had to put together a rotary schedule and farm them out all over the school, 30 kids you’ve got to put them somewhere, and there was no money allocated for a supply teacher, for example, a supply teacher would have been easier. But you’ve got to have the money to do that, or be willing to allocate the money for that purpose. (Teacher, School A)

The principal also felt that money and the difficulty in obtaining funding due to politics has been a limiting factor:

Of course it’s all money because trees are so expensive, at least the big ones, because the small ones if you put them in, they get vandalized and break....I don’t know how many but quite a number of trees we’ve planted here have been vandalized and have to be taken out. That cost a lot of money...I think Earth Angels that was called. He [the highly involved teacher] put in an application and got replied back, ‘No Toronto District School Board School could get trees.’ Because there was some sort of conflict going on between the TDSB and this foundation. To me, that seems a little ridiculous; whatever it is, figure it out because we need the trees....I don’t really know what the problem was, but that kind of thing is annoying. They should be able to figure that out because I understand that money is tight, but what’s our priority? You have to do whatever we can to help the kids connect to nature. (Principal, School A)
The principal went on to explain how politics and negotiations have been a limiting factor, “We’ve had so many ‘work-to-rule’ things in the last few years that really tend to interfere with that [gardening].” The highly involved teacher further explained the political barrier brought by the CUPE’s recent ‘work-to-rule’:

So ‘work-to-rule’ can have quite a big impact because basically...you’re dropping a lot of these administration items, and focusing just on your classroom teaching. That may mean not doing other things such as the naturalization project....So the political situations always had an impact on schools. (Teacher, School A)

The principal also noted that the EQAO has been a limiting factor for the Grade 3 teachers to implement the gardening project:

They’re [the teachers are] more worried about getting the curriculum done, or if they’re Grade 3 teachers, they have EQAO to worry about, all these other factors limit their ability or desire to take the kids outside to do anything with them....The curriculum as it currently stands is quite heavy, and most teachers worry about that. They worry about teaching, getting all those things across to the kids, even though I tell them not to worry. And the other thing is they don’t really realize you can teach kids outside in this, you can do a unit on the environment in it that covers all the things, but they just aren’t there yet. (Principal, School A)

The principal also revealed that the school is worried about the kids getting skin cancer because of the lack of shady areas in the schoolyard:

I was out in the portable for a lot of years, I really like that because it was so close, you just open the door and you’re outside. We would go outside all the time, do reading and stuff. But it’s hard now, especially in this hot weather; you
have to go miles across the field to the little one row of trees you can sit under, because it was just too hot out there...Especially in the summer when it’s so sunny, we’re worried now about taking kids out because of the sun, getting skin cancer. It would be nice if we have a bigger shady area with more trees....The shrubs are great, but we really need more shade trees to make a difference first as far as the sun goes. (Principal, School A)

The principal observed that sometimes the students themselves are not willing to get involved in gardening because of their lack of contact with nature:

Sometimes the students themselves are reluctant to get involved. When I was a teacher, I used to take my kids out and do stuff with them outside. And some of them wouldn’t even want to sit down on the grass because they would get dirty, would there be bugs or something there. But you really have to take them out or to get them acclimatized, especially kids that live in an apartment...the community that I worked in before, the majority of the kids lived in an apartment building. So they would never go outside, and just to get them to sit down on the grass is a big achievement, to get them to do gardening is a whole other thing. I would say that that would be a big thing for limiting student participation.

(Principal, School A)

This observation is supported by the less involved teacher, who told me a similar story:

One of the factors that limited one of my students for participating is the child’s parents did not want her to participate in the activity because they didn’t want her to be out in the sun and they didn’t want her to get dirty....And I did call them in and I did tell them the benefits of this and how it was a school-wide approach, and
they did not want her to get dirty, and they had written a note. So I did try and limit that from happening and I wanted her to participate but you certainly can’t make the parents want something that they don’t want. (Teacher, School A)

The less involved teacher also felt that another limiting factor is that teachers did not get together as a staff to talk about the gardening project:

We could have got together and decided on how we were going to continue with the maintenance. Maybe the fact that we didn’t really sit down and do that, maybe that limited some classes from continuing on with maintenance. (Teacher, School A)

The highly involved teacher felt that a lack of storage for tools is also a limiting factor, “There is storage, which is another big issue in schools; schools have no storage, that’s one of the limiting factors, storage for tools, and money for tools” (Teacher, School A).

The parent volunteer considered that access was a limiting factor. She suggested that the school should start a Gardening Club and that schoolyard gardening should become a year-round continuous activity rather than a ‘one day event’:

...they [the students] didn’t have access to a lot of it; I don’t think the school has a Gardening Club. If they have something like that, where the kids could get participating a little bit more. I think then they would have more access to it. I think they’re limited on the access. They were only given that half an hour time they went out there to do their little section. I think it would have been better if they had something that was an ongoing thing...it was just one day thing and they just forgot about it. (Parent, School A)
Ways to support student involvement. Based on my interview questions and responses from the participants at School A, this section is further divided into four subsections: teachers, parents, principal, and the TDSB, to describe the ways that each role may contribute to sustainable student involvement in schoolyard gardening.

**Teachers:** make gardening as an ongoing activity all year round; try doing it with other teachers; have multi-grade involvements; do presentations on issues; make visits to farms; continue to let the students know about the benefits. For example, the highly involved teacher considered:

Ongoing initiatives every year...ongoing conversations with other teachers are the networks that I would build in my school, and have other teachers do stuff for me, have their classes do announcements, posters, presentations, and assemblies.

Multi-grade involvements, not just having, say the Grade 5s do it, because when the Grade 5s leave, then you have no one with the experience the next year. I think it’s really great there are a lot of kids who planted shrubs when they were literally the first year when I did it here, which would have been 6 years ago, they were in Grade 1 or kindergarten, and they can point out their shrub, “I planted that and it was this big, and now it’s this big!”

I’ve also had teams of students go around and do little presentations in the school, a couple of kids will go around and do a little question and answer presentation or whatever the issue happens to be related to the naturalization project. We also did a visioning activity a couple of years ago where teachers in their classes had used the video, I think it’s called “Digging in the Dirt”....The teachers showed the video, we did it the school-wide...and then the kids brain-
stormed a wish list of all the things they like to see in their naturalization project.

(Teacher, School A)

I managed to obtain the student wish list from the highly involved teacher. It shows 48 items that the students would like to have in their school. The following is the top 10 on the Student Wish List (2003/04):

1. Gardens – vegetables, wild flowers, flowers, fruit (plums, peaches, raspberries, cherries, apples), no weeds (40 students);
2. Pond with fence and bridge – fish, algae, frogs, turtles, starfish, lobsters, ducks, bugs (40);
3. Forest (or 1/2 forest) (25);
4. Adventure playground for older students – swings (tires, ropes), seesaws, tube slides (20);
5. Benches and picnic tables for lunch (15);
6. Vending machines – gumballs, pizza, ice cream, slushies, candy, coke (12);
7. Field games (11);
8. River, stream, creek, waterfall, fountain (10);
9. Garbage cans and less litter outside (10);
10. Greenhouse (8).

Note the first wish on the list is Gardens. The less involved teacher felt that continuing to let the students know the benefits of gardening can promote more student involvement:

I think by that way what I have done and what we have talked about as a staff is just continuing to let them know what the benefits are and taking them outside to look at what we’ve planted...if you look at them in comparison to how they were
when they were just planted, the children are able to see how they’ve grown. It’s nice to see that and because they were here for that planting, they remember they planted that first time, and how the shrubs grow. I’m just educating them on the environment and what the benefits are, that’s very important….I think that it not only educates them, but it also may provide for some of them deeper understanding of what they are missing. (Teacher, School A)

The less involved teacher further expressed that it is important for all the schools to participate in schoolyard gardening:

I really think that it’s important for all the schools to be involved in this because it’s something that unfortunately because of the way our society is…we’re so rushed, we live in the city, we don’t really get a chance to appreciate these simple things, like gardening and how therapeutic it really can be…about 75% of my students live in an apartment building, and they don’t have the opportunity really to get their hands dirty, touch the earth, and put their feet in the grass. So it’s really nice for them to be actively involved in something like this because I don’t really think that they have a lot of opportunity to appreciate it. (Teacher, School A)

Parents: reinforce and discuss more about the gardening project at home; support teachers; communicate with teachers; donate money or trees to the school. For example, the parent volunteer felt that the school should ask parents to donate trees because that would create a ‘sense of ownership’ in the school community; parents would also like to be involved in the whole process of the schoolyard gardening project:
It’s like anything, if it’s yours, you take care of it, if it’s not yours, people would step all over it...you can make a difference by donating a tree, something like that, I think that would really accent the schoolyard quite a bit, and that would save the school the money from buying it. All they would have to do is to plant it, and the children would get excited, “That’s the tree we donated!”

...I know myself as a parent, it’s nice to be asked for something like that [trees]...because once you’ve donated something and that’s come out of your pocket, I think you’re going to be more up to want to know what’s happening, want to be more involved in it. I think honestly not just ask for parents to come and volunteer to help the classes do it, but help in the whole process of it. (Parent, School A)

The parent volunteer also observed that students love gardening. However, she advised that the school should spend money on the right type of trees that are more durable for the school, as well as for the neighbourhood community:

All I can say is the kids even take care; they love the idea of enhancing the schoolyard; they love when it’s a gardening day, some kids even bring their gloves and things like that for the planting. My only suggestion is [to watch over] what they are doing out there; the kids are planting twigs, but that’s a play area. The twigs are getting broken; the money should be spent better.

I think they should get nice hardier trees because you’ve got to realize it’s not only used by the kids in the school, it’s used by the community because of the park....The people are using it in the summer for baseball, soccer; it’s always busy out there, weekends and nighttime. When I started doing it [gardening], I
was part of the school council; I supported it fully because I think it’s a great program for the kids, especially in this area where a lot of them live in an apartment building, they probably never go home and plant a seed. (Parent, School A)

In terms of parental support, the highly involved teacher felt that the parents should talk more about the gardening project at home with their children, and that the parents should communicate with the class teacher:

Reinforcing and discussing with their kids the concepts that we talk about at the school, and supporting and working with the teacher...the ongoing communication that needs to happen...you have to reach out parents to get them to do that. Like in my case, I might have it as a homework question for little children to talk to their parents about whatever the issue is, whether it’s a naturalization project or something else. And I had to track it and follow up on it when they get back to classes. (Teacher, School A)

Principal: ‘lead by example’; support teachers; cover classes; provide money, budget, networking, and resources; encourage teachers to take students outside; start a Gardening Club. The principal’s support in funding, time, and resources has been recognized as a vital factor to enable student involvement in schoolyard gardening, as the principal herself admitted:

First of all, I had to support with money, that’s a bottom-line thing. I have given money from our budget as we got $2000 donation from a new Wal-Mart store. We use some of that money towards the schoolyard. I do encourage teachers to take the kids outside, to get them involved in the gardening. I’m a member of the
EcoTeam here in the school. So I tend to ‘lead by example,’ rather than try and dictate the people because obviously you can’t, they’re going to do what they want to do.

I had a Gardening Club...that was probably my first year here that would have been 2001/2002...and a couple of the support staff helped me with that, we thought Gardening Clubs are good for kids, there were a group about 30 kids that we used to take out once a week, and working in the garden throughout the year. That’s what I mean by ‘leading by example,’ I got that Gardening Club going, and then one of the other support staff took it over the next year....It’s not going now because [the highly involved teacher] didn’t want to work out there with last year.

(Principal, School A)

**Board:** establish EcoSchools program; provide professional development during the day-time; establish more partnerships; provide funding and incentives. With regard to the TDSB’s EcoSchools program and professional development, the highly involved teacher shared his view and provided his recommendations:

EcoSchools program is a good start, and it really has made a difference...the school board is really signed on board with that....A core part of EcoSchools is energy conservation. They’re looking at all the energy efficiency initiative, to cut down on heating and cooling bills. That’s where the money comes in...the school board could provide some time during the instructional day for PD for teachers...some PD during instructional time during the school day, in another words you get half day or something. And they get supply teacher in, you go for PD, instead of always after school and in the evenings. (Teacher, School A)
The TDSB should provide more funding for the schools to run the schoolyard gardening project, according to the parent volunteer:

It would be nice to see funding from the school board. I think every school should have a little bit of funding that comes through that set specifically aside for that. I know this principal has tried really hard to get the front gardens cleaned up over the years because with all the cutbacks they don’t have that in their budget.

(Parent, School A)

The TDSB should also reward schools that have a well-established composting and recycling program because they can reduce the number of lifts of garbage bins thus save the TDSB maintenance budget, according to the highly involved teacher:

With the [Grades] 4s and 5s, they’re quite independent; they rotate through the job list in the whole class. One of the jobs is the ‘Clever Composters.’ The three of them everyday have buckets and collect all the compost, they make up the posters, and they supervise the kids doing the composting and recycling. We’ve got a new ‘litterless lunches’ that was one of our new initiatives this year. So there is no garbage, and again that’s ongoing work on my part to try and encourage litterless lunches and deal with all the issues that come out of that.

...We cut down on our garbage so much here...and the budget for the garbage disposal is centralized through the central maintenance budget. So we could do with one less lift, we could easily do one a week...because we have less garbage, we could have less pickups, which would equal a monetary savings. This school budgets should benefit directly from that savings....As a staff, we should decide on how to allocate it. Right now, we’re not benefiting from it...we’re helping out
the environment, and we’re helping out the school board, but the school is not benefitting directly. (Teacher, School A)

At the end of the interview, the principal demonstrated the positive effects of student involvement in schoolyard gardening at their school:

What I have noticed is that when we had that Multi-cultural Day, one of the activities that the kids were to do was to write out a wish, and they’re on the wall out there….I was impressed with the number of kids from his [the highly involved teacher’s] class who talked about environmental issues as their wish. That’s a good comparison right there. It’s not just the academics. They talked about having cleaner air, no pollution, and not wasting energy...they are obviously where those issues are, right? So that’s good. (Principal, School A)

Photos of the schoolyard gardens at School A are presented as follows (see Figures 3, 4, and 5):
Figure 3. School A front garden, May 2005.
Figure 4. School A schoolyard garden at the back, 2000. Source: Teacher at School A.
Figure 5. School A schoolyard garden at the back, May 2005.
Case Study: School B

School B was built in 1991. It is located in a multi-cultural community in northeast Toronto. They have a “Butterfly Garden” on the schoolyard at the back. The gardening project was initiated in 1998 by two teachers. Since then they have been fortunate enough to receive funding from the Friends of the Rouge Watershed, TD Friends of the Environment for the project. In 2004, the school planted a “Rose Garden” on the front yard in honour of a teacher who initiated the gardening project and who died. One of the school’s goals is to continue their environmental focus by improving and maintaining their “Butterfly Garden” with the support of community funding.

There are 24 full-time teachers, one part-time teacher, and seven support staff. The school has about 520 students (Junior Kindergarten - Grade 8), representing different cultural backgrounds. Although most of the students are first generation Canadians, around 80% of the families have at least one parent from outside Canada. Currently, there is no Gardening Club or Environmental Club running at the school, although the less involved teacher expressed that she would like to start one in 2006.

Amount of student participation. It seems that School B has a very high percentage (100%) of student participation at the initial planting stage of the “Butterfly Garden,” and also at special events, such as the ‘Cleanup Day,’ that occurs twice a year. But when it comes to the ongoing maintenance, the number has drastically dropped to less than 15 (3%) involved. For example, the highly involved teacher, who is one of the initiators of the “Butterfly Garden” observed:

There was no student involved in the design of the “Butterfly Garden.” It was designed by the Friends of the Rouge Watershed....Special events we have 100%
involvement. Those again would be the 20 minutes cleanup that the TDSB and City encourage. When we planted the “Butterfly Garden,” all children from Kindergarten to Grade 8 planted. That was enabled by the fact that the older kids helped the younger ones. (Teacher, School B)

The involved parent, who has been with the school for 6 years, shared a similar view:

At the initial stage, when they first put in their “Butterfly Garden,” participation was 100%. Every student in the school planted at least one plant....Later on, now, probably it would be less than that. However, I do know that classes go out there, and do observations or collecting...now it’s maybe less than 50%. (Parent, School B)

The less involved teacher shared her similar observation about the amount of student participation in schoolyard gardening:

From just what I’ve seen this year, [the student participation is] quite low. There was one gardening initiative in the fall, and there were few students, handful, I say less than 15 involved. And in terms of the organization of that event, I don’t think there was any student involved, I think it was teachers organizing and initiating with the help of maybe a parent or two in the community.

I do know, however, recently there have been a few Grade 5 students who take it upon themselves to organize other students to go out and do some things in the Garden that we have here. That’s just in the last month since it’s got nicer outside. We’ve got a “Butterfly Garden” in the back that started to be implemented 6 or 7 years ago. At the time, students from the whole school involved. But this year from what I’ve seen it’s quite low. (Teacher, School B)
About the cleanups twice per year, the principal commented, "I think every class takes part in it for at least 40 minutes in the spring of the year..." (Principal, School B).

*Enabling factors for student participation.* At School B, the factors that have enabled student participation in schoolyard gardening are funding and support from Friends of the Rouge Watershed, TD Friends of the Environment; adult initiatives; ownership of teachers and students who initially involved in the "Butterfly Garden"; "Penny Drive" fundraising initiative; special activities such as "Wind Break"; competition with other schools; and City's or TDSB's challenges. For example, the highly involved teacher stated:

> We had major events here at the school. We have been very fortunate because we had Friends of the Rouge Watershed...the leader...has helped with materials, he has helped teach. The other thing is [TD] Canada Trust Friends of the Environment; they have afforded us a lot of money over the years, which have enabled us to take the kids out. Basically what the teachers have used is supports from these groups, Canada Trust Friends of the Environment give us money for books, and they established in our library about $6000 worth of books, which the teachers have used in educating the students about what we are trying to do outside.

> ...We probably did some of it [the Butterfly Garden] 6 or 7 years ago, we did the first stage. Over the time, maybe in the last 6 or 7 years, we haven’t received any money even though we’ve applied for money in the last 2 years. They’ve given us over $25,000 in trips, books, and all the materials. It’s only when you get that kind of funding, can you involve the whole school because even when you
were to just buy a tiny little plant, all that cost. Unfortunately, one of the obstacles is money, but fortunately we have more and more people that are willing to help fund. (Teacher, School B)

The less involved teacher considered that adult initiatives are an enabling factor:

I think it's probably the teacher involvement, the teacher organization more than anything. The activity that took place in the fall was run by two or three teachers and a couple of parents...in the neighbourhood who have taken it upon themselves....Some of the teachers probably grab some of the students to come out and help.

And parent involvement seems also to be a factor that enables student involvement because...if they don’t have the example set at home, or examples set at home, they don’t participate. We did a community cleanup...it was teachers setting up for time and taking their whole class out. It wasn’t necessarily a voluntary thing. There are few students took it upon themselves to go out with garbage bags at recess and clean. But in terms of gardening, I think they do wait for adult initiative. (Teacher, School B)

The involved parent felt that the ownership of teachers and students who initially were involved in the “Butterfly Garden” is an enabling factor:

I think that the teachers that were here at the initial building of the “Butterfly Garden” and the planting of the plant definitely had a lot of ownership in it, as well as the students that were involved in that. New students coming in probably don’t feel as involved because they weren’t here for the initial planting although they do stage two while they build an outdoor classroom area besides the
"Butterfly Garden." I think if they were actively involved in the actual building or maintenance that they definitely buy in and would want to use it a lot more. That would also be true for the teachers. New teachers coming in, probably would not use it so much, or even are aware of it as much as those teachers that had been here at the initial onset of it. (Parent, School B)

The highly involved teacher initiated a school-wide “Penny Drive” fundraising activity that helps with the schoolyard gardening project, along with other things:

What I do here is that every year I run “Penny Drive”....The kids bring in pennies, they can bring in coins. But it was started as a “Penny Drive” because I teach in a portable, I would walk out across the pavement and notice the kids throw pennies on the ground because you really can’t buy much with the penny. So I thought OK, I started picking them up. I started a box of “Penny Drive.” We made usually between $1200 and $1500 dollars...that bought us hose and shovels and all these wheelbarrows and plants.

Unfortunately someone broke in and stole most of our stuff about a couple of months ago. We’re down to no shovels again, it’s a never-ending battle. But the “Penny Drive” has afforded us a lot of things here at the school. The parents really supported it. This year we did the “Penny Drive” for the environment that was hit by the Tsunami. Rather than keep the money here, we donated it to the environment over in Indonesia and the rest of the countries there. The parents were very appreciative of the fact that we had done that as there are families from there. It ended up that we raised over $3000 dollars with that “Penny Drive.” We will do another “Penny Drive” next year for the little things. (Teacher, School B)
The highly involved teacher further revealed that special activities such as “Wind Break,” competition with other schools, and the City or board challenges are enabling factors:

The special activities that we’ve done at the school, we have planted a “Wind Break,” which is the trees all along the fence. We planted two phases of the “Butterfly Garden.” We attempted to plant a garden at the front of the school in memory of the teacher that initiated the environment project here...but she died 2 years ago....Now the things that really get the kids involved are the Friends of the Rouge Watershed competitions in the area of the schools. We have been in competition in the last month with two of the schools....City or board initiatives...when the City does the 20 minutes cleanup or challenges communities to clean; we get involved in all those things. (Teacher, School B)

**Limiting factors for student participation.** At School B, the factors that have limited student participation in schoolyard gardening are time and money; upkeep in the summer; unions’ “work-to-rule” issue; curriculum; weather; soil and ground conditions; materials/tools got stolen; cost of flowers; allergies; teachers’ lack of interest; leading teacher’s lack of time for other teachers; leading teacher’s lack of time for students in other classes; and lack of ‘publicity’ within the school. The principal felt that a lack of time and money is a major limiting factor:

One factor is lack of time. You only have so much time in the day and you want to cover the curriculum. Another is money, money to buy tools and money to buy plants. We’re not given any extra money by the TDSB, so it comes out of our budget. We did some fundraising last year; we had a “Penny Drive” while we bought plants and things.
I guess sometimes it's hard for the kids to take pride in the "Butterfly Garden" because they see dandelions and weeds all around the schoolyard. The TDSB has cut back in terms of taking care of weeds and cleaning that area. Just getting teachers to buy into it, some people are not as environmentally conscious as others...also the upkeep in the summer because everyone is away for two months. (Principal, School B)

The money issue expressed by the principal is also shared by the less involved teacher:

The budget seems quite tight. I know for certain things like if the class was to be planting, part of the plants in the class can be taken home, and she [the principal] would probably cover things like the potting soil and the seeds....She's going to have to make room in the budget to replace our gardening tools that were stolen....I think a lot of that extra that we do to the school is through fundraising or through parent donation and teacher donation. (Teacher, School B)

The highly involved teacher expressed that the unions' "work-to-rule" is a limiting factor:

The first thing that we've had this year that's really limited has been the "work-to-rule," which has involved the support staff and teachers. That obviously put down everything and shut down all the extras...he [the caretaker] will help me when it comes time for pruning some of the shrubs. But he hasn't been able to do it because they were on this "work-to-rule," and that was only lifted this week [May 30]. (Teacher, School B)

The principal also commented about the "work-to-rule" as a limiting factor:

This year there have been a lot of "work-to-rule" situations with the unions; it's really hampered that [gardening]...just because of the work environment and
"work-to-rule" we already had this year; we may have it again starting tomorrow [June 1], there has been a lot of things that we want to do that we haven’t been able to. (Principal, School B)

The less involved teacher shared the same view about the ‘work-to-rule’ as a limiting factor:

The “work-to-rule” I think this year has definitely been a [limiting] factor, partly because the students can’t go out and do the gardening and do the yard work without the teacher. And the teachers have been asked to support the “work-to-rule” by not going out and doing those things. The caretakers “work-to-rule,” that’s one factor for sure. (Teacher, School B)

The highly involved teacher, who teaches Grade 5, felt that the Ontario curriculum has been a limiting factor:

Part of the restrictive thing would be the curriculum itself. Let’s say in the Grade 5 science program, it does have the environment as far as you’re talking weather...But you don’t talk about planting and types of tree, like my curriculum this year does not support the time that I would give, I can change it so that the expectations are met, but that would be another problem. (Teacher, School B)

The involved parent, who teaches at another school in Ontario, shared a similar view about the Ontario curriculum as a limiting factor:

I just think the curriculum is so intense now in the school that it’s really hard for teachers to find the time, and they would have to actively pursue how they could fit it into the curriculum to meet an expectation. Whereas years ago, you would put it in as an extra activity, or extension of some activity, but now it’s really hard
to get through all the curriculum in the year, so that definitely teachers are very well aware of that and may not have the time to incorporate it into their program, or just go out for one period or one class to use that and walk around and talk about it. (Parent, School B)

The highly involved teacher felt that the weather has been a limiting factor too this year:

>The other thing has to do with the weather...this spring has not been great for getting the kids outside. This past winter I think we’ve lost a lot of our plants....We have a culture garden at the front which is roses when most of those have been killed, which you can see they’re just not coming. The side where the “Butterfly Garden” is it’s all wild flower. The thing that you might consider as a weed, but it grows and it’s native to this area. And the Garden we hoed last week a couple of times is slow in coming back this year. That does have to do with the weather. (Teacher, School B)

The soil and ground condition in this area is a limiting factor, according to the highly involved teacher:

>The other thing is the soil in this area, anytime that the school is built obviously they’re not going to spend a lot of money in getting good soil back for lawns and gardens. And the ground here is so hard that at times we had to get equipment that can go through the hard soil. Secondly, it limits the students to being older bigger kids that can dig. That definitely has been its limitations there. (Teacher, School B)

The loss of materials in this spring and the cost of buying flowers are limiting factors, as the highly involved teacher expressed:
We lost a lot of our materials...So you have the kids bringing them from home, but then it can’t be spontaneous...it really limits what you can get done. And the cost of flowers, there’s always a cost factor. (Teacher, School B)

The less involved teacher shared a similar view with regard to their loss of materials:

Another one I guess would be when we had our gardening equipment stolen...a month or two ago, we haven’t been able to do as much as in the spring as I was hoping. In the fall, there was one event organized, I just don’t know if the students realize that they can take it upon themselves to organize something like that. So it’s quite unique that the three girls in Grade 5 have done so. (Teacher, School B)

The highly involved teacher considered that allergy has played a part in limiting student participation in schoolyard gardening:

One thing that’s raising problems is allergies. I have really bad allergies for grass and the budding of trees. I believe when I take the kids out, I have to check and make certain that we don’t have any serious problems....So that is a factor with the kids today because allergies do play quite a part. (Teacher, School B)

The highly involved teacher also observed that teachers’ lack of interest in nature has been a limiting factor:

It depends again on the teaching staff. If the teacher is not interested, he won’t get them to do it....If the teacher believes in the program, and believes in trying to keep the yard clean, sees lessons (they all have lessons out in the yard), then you have ‘by class only,’ not by school, not the whole school. The fact is for some are that the project you have to get dirty, and it’s a very hands-on program. If the
teacher is not a hands-on teacher, he or she won’t be interested in going out.

(Teacher, School B)

The involved parent shared her similar insight about some teachers’ lack of interest in nature has been a limiting factor:

Or if they [the teachers] don’t have an interest in nature themselves or maybe they don’t know what would we look for out there, they don’t have the expertise in the area…what can I offer to the students out there? They’re not comfortable without having a background…maybe there should be plaques by them identifying the different plants. If teachers weren’t comfortable with that or a curriculum that was set out, how can you incorporate it into your class? I just feel a lot of it is that it just isn’t time with the expectations nowadays from the Ministry. (Parent, School B)

The leading teacher felt that her lack of time for preparing the plan for other teachers has been a limiting factor:

It’s been just a couple of us…probably at one point we’re four of us….We have many other teachers that are interested as long as you prepare it. You give the directive, and then they will do it. But you have to do all of it for them. That is a limit because I teach full-time, this almost becomes a second job, that’s limiting, they’ll support it providing it’s all planned…when it comes to time for the cleanup, we have all the support from the staff….The students have also been involved in writing contest about what they have done, what they have seen and how it affects. Again it’s basically the same percentage of students that have to go to certain teachers… (Teacher, School B)
The leading teacher felt that her lack of time for supervising students in other classes has been a limiting factor:

Because of the society that we live in, students even if they’re working outside the window...one of the things you need to provide is...to be out there. The only time that we have altered from that is when we were doing the Garden at the front...the principal then...was in a wheelchair. He said it was fine for him, he went over to the window and he supervised with the windows open and talked to the kids the whole time. So I could go back to class. Otherwise we would have to stop at that point because I had my own class to look after. So that would be a supervision part as well. (Teacher, School B)

The less involved teacher, who is going to take over the whole schoolyard gardening initiative after the present leading teacher retires next year, commented that a lack of ‘publicity’ of the materials available in the school has been a limiting factor:

I think part of the problem in this school is maybe a lack of attention to those things [gardening materials], or lack of publicity. Unless you go hunting, you don’t learn certain things, or unless somebody...who has been the lead in that area for years comes to you and says, “Go to this, this is available.” No one ever knows. I don’t know where it should start. It’s surprising that there isn’t an Environmental Club; there isn’t any kind of committee who does this throughout the year. It’s just a couple of teachers and a couple of parents who get together and organize an event. All these things that I want to do, I don’t even know it might be available to me already. (Teacher, School B)
Ways to support student involvement. Based on my interview questions and responses from the participants at School B, this section is further divided into four subsections: teachers, parents, principal, and the TDSB, to describe the ways that each role may contribute to sustainable student involvement in schoolyard gardening.

**Teachers:** integrate the “Butterfly Garden” into the curriculum; take ‘Nature Walks’ in the “Butterfly Garden”; use the “Butterfly Garden” as reading area; make efforts to maintain the “Butterfly Garden” throughout the year; build a “Rose Garden” in front of the school; get involved in community cleanups twice a year; plant plants in classrooms; model respects for greenery; make a new banner for the foyer with a garden as its theme; start an Environmental Club that includes gardening; and start composting and recycling programs. For example, the highly involved teacher observed:

They [the teachers] do use it as part of their curriculum. Some of the classes have raised butterflies, they’ve gone through the whole process, when they have actually hatched and they’re ready to fly, they take them outside to the “Butterfly Garden.” That has been like a whole cycle and the students say when they get older, they still remember that aspect.

They do take them out for ‘Nature Walks,’ and part of the “Butterfly Garden” has the tree trunks cut, so that they can be little stools for the students, it’s a reading area. I noticed a lot with the primaries that they are out doing their ‘Nature Walk,’ investigating the scenes, and library has...many resources for the teachers to use so that when they’re reading to the kids, they’ll read a lot of non-fiction as well, so that the kids can see. I would say that they do try particularly in the primary [level] to have this as part of their curriculum. (Teacher, School B)
The involved parent described that the school built a “Rose Garden” in front of the school which helps to create a sense of pride and a sense of ownership among the students:

So what have also done here beside the “Butterfly Garden” is we’ve also done flower beds on the front, and every spring and fall for the past years and years, parents and children and teachers have come after school planted bulbs in the fall, cleaned up the gardens in the spring, done weeding, trim back stuff. And just last year, put it in another garden, a “Rose Garden” here, a teacher had passed away and they put a bench out there, so that built a “Rose Garden” for that, and that was initiated by a group of teachers here.

This year, unfortunately, it didn’t take place, because those teachers didn’t initiate it and nobody else took over that position. But it has been fabulous that the kids out there planting bulbs and doing gardening. What I think is really important about that is it gives them a sense of pride and a sense of ownership. The kids are more likely not pull the tulips out when they look pretty and pick the flowers not till later, to say something to somebody else if they were littering our schoolyard, just a whole sense of ownership for the school, beautifying the grounds. (Parent, School B)

The less involved teacher expressed that to involve students in the cleanups, plant plants in classrooms, and model respect for greenery are ways to support student involvement:

I know the “Butterfly Garden” as the example...just having that there and having the kids able to see it whenever they go outside or look out the window, I think inspires involvement on some kids’ part. The facts that so many teachers are willing to sign up for the cleanups, the teachers do volunteer to do the gardening.
There are some teachers I know who do little [mini] planting activities in class and encourage the kids to take them home. I keep pots and plants in my room, and talk about them as members of the classroom, and occasionally we’re picking on them how they’re doing, there is new leaves, just to model and make excitement for growth because I don’t think they [the students] really think that or respect all the time.

Actually there is something else that we’re about to do for our front foyer, we’re making a large banner. The theme is a ‘garden of mind,’ all will be floral, I think just having that in the front hall will connect the idea of gardening and nature and whatever everything else will be... (Teacher, School B)

The less involved teacher further expressed that, next year, she is going to start an Environmental Club that includes gardening, as well as composting and recycling programs to teach students about self-sufficiency:

I think keeping things beautiful includes keeping them clean and gardening. I hope next year to take more steps in that direction....What I’d like to do is to start an Environmental Club that includes gardening, and I’d like to even consider starting some kind of compost because the kids have so much food waste and if we have real compost, that will save us money in purchasing things like fertilizer for the garden because we have it here...but even just to teach the kids those are ways to be self-sufficient and to take care of things....We don’t have recycling in the staff room. My goal next year is to get things started while I will sort out this garbage more. (Teacher, School B)
Parents: be a role model by doing gardening at home; participate in community cleanups twice a year; and fundraise for the "Butterfly Garden." For example, the involved parent shared her experience:

I mean the main way is always just as being a 'role model' for your little kid....They know for a really enjoying day for me is just in my garden, weeding, looking after the plants, planting new plants, and making environment that encourages birds (we have a bird feeder), forever looking at the birds, just really as a 'role model' for your children.

My daughter, the one in Grade 6, has her own part of the garden that's her area. She chooses the plants to be planted there and looks after that. They have an appreciation of the effort you put in and the enjoyment you get out of it. I think that's important just as a 'role model,' they see you and know the importance of it. (Parent, School B)

However, the principal observed that there are only five parents and their children who come to help clean the front Garden at the school:

We've done it twice where they cleaned up the Garden out front here while we had parents and their kids come out. But we get five parents and kids; we don't get a lot of support. Maybe part of the problem is that if the kids aren't taking pride in their area, it's hard for them to tend to the Garden. (Principal, School B)

An interesting discovery contrary to my expectation is that all the participants at school B revealed that, in this multi-cultural community, it is the children educating the parents rather than the parents educating the children, as the highly involved teacher observed:
This area is very multi-cultural, when we first started, the parents themselves would come to pick some of the flowers to take them to plant in their own house [garden], not realizing that that was not something that they should do. They did not have an idea about the flowers, about gardening here in Canada. I feel that it's not the parents helping the kids; it's the kids helping the parents; the kids are educating the parents today on what to do or what not to do whether we're into planting or whether we're doing research on limiting energy wasting, electricity....I think that’s great because we know then the newer generation coming up will have a greater respect or greater understanding of what is going on.

...We do a community cleanup twice a year. It’s not supported well by the parents. But we feel for every few parents, 10 or 20 that you’re going to get out...will have a respect for what’s going on. They do support the fundraising....It’s the same thing with the parents; some of them will come if you plan the cleanup, but they all will support the money to help. That in itself is very good. We’ve been after a few of the parents to take initiatives into planning cleanups, but in the most part that doesn’t happen. We have a couple that has tried doing it twice a year, but again they do most of it by themselves.

Friends of the Rouge Watershed...do special events and hillside was our outdoor school....Very few of the families here support it because you will see it advertised maybe one Saturday every 2 months. When I talk to the kids, very few of them would go; very few of them would be interested in that. I think in that
case that’s difference in culture. I think that’s something, some area that we have to work at. (Teacher, School B)

The involved parental supported this observation about other parents at the school:

When the “Butterfly Garden” was first established, parents were definitely encouraged all over the summer to come in and walk through the Garden, bring their children and look there. They [the students] do a lot of that at the school in terms of growing plants from seeds, studying that and then bringing it home and encouraging them to put it in their garden and start their own garden….The students learned that and wanted to provide an environment at home that is inviting for a wild life, butterflies, and the birds...the kids come home and say, “Today we leaned at school that...” getting parents involved. That’s important...a lot of the parents are really good that way, a lot of them just don’t know. (Parent, School B)

The less involved teacher noted a similar phenomenon that there are not many family gardens in this neighbourhood community:

If you drive along this main street from the school, there is not a lot of gardening happening at home from what I can see. Some of the homes do in the neighbourhood, but a lot of them don’t. If they’re not getting it at home, they’re probably not instilling the value for it in their children. The other thing to it is that it’s a very diverse community, you move to Canada, there is certain type of plant that will grow here that may not grow in other places, it’s just a matter of what to choose to grow because even they don’t have a beautiful garden, they probably have a ‘Herb Garden’ or Shrubbery or something. From what I can see at face
value, there is not a lot of push for that from home. But there were some parents involved in the gardening, I think they're the parents who are taking the primary responsibility organizing the gardening every fall. (Teacher, School B)

**Principal:** take the lead; provide funding; provide moral support to both teachers and students; make announcements and reinforce behavior on gardening events. As the principal expressed:

I have to take the lead from the staff. When I got here, there were a lot more pressing issues than the Garden, and that's what we really tackled. I can be really excited about it [the Garden] and want to do something, but unless I have the support from the staff, it's not going to fly. I'm getting the feeling that staff aren't as interested in it now, that's why I let it slide. But anything that staff bring up to me like they want to do a “Penny Drive” for shovels or for plants, that's great. (Principal, School B)

The involved parent also noted that the principal helps to fund the gardening project and encourage more student participation:

[The principal is] allowing programs to run and encouraging those programs, helping to fund those programs so the purchasing of all the bulbs for the school to be planted. When those plantings are going on, the principal is out there, pops out, where there is treats for the kids, juice boxes, and supporting programs that people want to do. They support the classes in the spring after the snow is gone; there is a lot of schoolyard cleanup. The students go out, “let's be proud of our school and out cleaning up the stuff at the end of the winter, all the garbage is blowing”...they have the play days, “let's get outside and appreciate the grass area
and the Garden area.” If a teacher wants to take their students out to the Garden, they will absolutely be encouraged to do so. (Parent, School B)

The highly involved teacher commented that the principal provides moral support to both teachers and students in participating in the gardening project:

The principal I have right now is supportive, she supports a lot of my adventures providing that she sees that I put effort into it, it’s not disorganized...she needs to know that I put thoughts into it and why I would do it, and then she’s supporting it....I would say that right now she is still the liaison between the parents and myself....Last year, when the students were on Breakfast Television, or Environment Week, she got up and she was down there at 6:45 in the morning, helping the kids. She’s supportive of the kids when it came to that. We’re hosting a celebration with all different schools next week, and when I asked, she has decided that she would have it here. Students have to write essays with regard to the environment, and I think it is open from Grades 7 to 9. (Teacher, School B)

The less involved teacher also commented that the principal is very supportive, especially on the gardening or cleanup days:

When there are [gardening or cleanup] events taking place, she acknowledges it and rewards it...she will make announcements or give out rewards saying, “Thank you for your effort to do this.” She also reinforces the behaviour when it happens. I think she had some involvement in the gardening in the fall...

(Teacher, School B)

**Board:** establish the EcoSchools program; give building permission; encourage schools to initiate gardening projects; provide funding; provide awards or incentives; and hire
more grounds crew personnel. For instance, with regard to the EcoSchools program, the less involved teacher shared her thought:

We’ve got an EcoSchools program, and that is TDSB-based. The focus there I believe is more for clean grounds and for recycling....I haven’t really seen any support for gardening initiatives, like beautifying. When there is dandelion out, we’re told to mow them, and then we have more dandelions. I don’t know how much the TDSB is really being stepping out, unfortunately. (Teacher, School B)

The involved parent appreciated the fact that the TDSB support and encourage the schoolyard gardening initiatives by giving building permission, she observed that “the school board is supportive in giving permission: ‘Yes, on the property, you may do this or that.’ That would be the main thing, they’re encouraging it” (Parent, School B). The highly involved teacher commented that the TDSB’s effort in encouraging the schoolyard gardening initiative is only felt in the last 5 years, but it is not enough, they should provide funding and more grounds personnel:

Their actual effect of what’s going on has only been felt in the last 5 or 6 years. I know when we did the Gardens here, it was not through the school board, it was through our own initiative....Basically they hired a person, Heidi Campbell, at one point that would come and speak to the different schools and teachers, and now I think it’s Mushia Motto that is doing a lot of this work for the TDSB. But when you think of the number of schools and you think of the amount of work that really needs to get done, the actual fact it’s just like a little spray, it’s not very much.
...For instance, I have been working with this Board since 1988. The TDSB used to have gardeners, and lots of times they hire kids in the summer. They planted flowers in your garden, and they trimmed your trees. They don’t do that anymore. As a result, all of our things at the front, we had even learned to pull them out. They don’t plant flowers, we’re not allowed to spray or do anything for dandelion. Right now, the only way that we get rid of the yellow is cutting them with the lawn mower and, of course, that’s spreading the seeds, it’s just making it totaling up. The parents are complaining because of the way our grounds are kept.

...So the TDSB in some respect is going backwards because they don’t put the money there as they used to. They do support the city-wide cleanup, they have hired personnel as I’ve mentioned, but I don’t think they fully comprehend how big a job it is, and how much time it takes. I know for myself to have done the gardens, I had to come and work in the summer, I had to work at nights, and that’s a bit much. (Teacher, School B)

The highly involved teacher went on to suggest that the TDSB hire more personnel and provide incentives:

I would say that the TDSB has to put money behind what they are hoping. I know that they’re hoping that the communities support it more because the schools are in the communities, and that the parents should take pride in their own school. I do agree with that. But I do feel if you’re going to hire people to come out and try and teach everyone about what to do, you’re going to have to put more than just a person.
...You have to have money available, and you have to have incentives...when we’ve gone to [TD] Canada Trust and got all these money, what if the TDSB has some kind of matching program: if you can fundraise $5000 and show me $5000, we might give you $1000, something like that. All this is very expensive and it limits what we can do. I would say that there have to be progress of more than just hiring someone, but you have to get more people back doing the work. (Teacher, School B)

The principal shared the same view that the TDSB should provide funding and more human resources:

They’re cutting back on funding, they’re not cutting the grass, they’re not weeding, and they’re not doing anything. If the front of the school has no pride, it doesn’t look good, how can we expect the community to take pride in that? They don’t put extra money in the budget for it. They could say, “Here is an extra couple of thousand dollars to do something for gardening”...everything involves money, even hiring grounds crews to take care of the schools. When I first started teaching, we always had grounds crews doing that, weeding and cutting the lawn and planting flowers even. (Principal, School B)

The less involved teacher also felt that the TDSB should provide money or offer guidance; obviously she is unaware that the TDSB is offering guidance:

At the least provide money...or maybe even have somebody at the board level who can act as a lead and go into schools and say, “OK, this money is available to you, let’s form a committee, what do we want to do to the garden at the school with this money, and how could be best to use it to make the grounds more
pleasant.” Even just the “Butterfly Garden,” it’s beautiful but we could add on to it, we could maintain it a little better. But as it is now, there isn’t money coming in to help us do that. It’s like, “OK, when if you can find time and get consulting there, go.” So more board money and may be somebody to offer some guidance.

(Teacher, School B)

The involved parent as well suggested that, like the TD Friends of the Environment, the TDSB should also provide funding and awards for the schoolyard gardening project:

I don’t think that there is a funding set up for it, I think they would definitely sign off, absolutely sign an application for some kind of fund....I know the school itself has been given...environmental awards for the work that they have done here. That this school has been very active in creating the Gardens, the “Butterfly Garden” in particular that has been put in an outdoor classroom area out there.

The school board…verbally support it, but what’s important is the money....I don’t know if they allocate funds...I think that a lot of the money for the bulbs is through fundraising. I don’t think they donate money specifically for the Garden...we’ve planted a lot of trees along the side, but a lot of the money often comes to the “Butterfly Garden” through the *TD Friends of the Environment* funds. (Parent, School B)

Photos of the “Butterfly Garden” at School B are presented as follows (see Figures 6, 7, 8, and 9):
Figure 6. School B butterfly garden, May 2005.
Figure 7. School B butterfly garden, May 2005.
Figure 8. School B butterfly garden, May 2005.
Figure 9. School B butterfly garden, May 2005.
Case Study: School C

School C was built in 1955. It is located in northwest Toronto, a community that has a widespread tradition in family gardening. The school began building their “Peace Garden” a number of years ago, and it was planted by all of the students at the school as part of the Remembrance Day Service. A dedicated parent volunteer comes to the school regularly to help with the maintenance of the Garden all year round. She also organizes an active Gardening Club that assists in maintaining the Garden. The Garden features plant and tree growth indigenous to the area.

In 2002, a “Kindergarden” was planted in honour of a kindergarten teacher who retired. And the kindergarten classes took on planting a “Rainbow Garden” in their yard in the spring and fall of 2004. This year, another kindergarten teacher, who has a background in horticulture, is planning to build an “Alphabet Garden,” using letters A-Z to identify different plants to help the kindergarten students learn. The school also has an Environmental Club and a Green Club run by this kindergarten teacher. The school’s mission is to “develop confident, environmentally responsible, lifelong learners by ensuring a balance of quality learning experiences.”

In the spring of 2004, they participated in the Schools in Bloom project; while they did not win, they did well for their first time. The school serves approximately 325 students (Junior Kindergarten - Grade 5). It has 13 full-time teachers, one part-time teacher, and seven support staff. They have a very supportive School Council. The school has well-established recycling and composting programs. During my visit, I noticed that there is a big paper recycle bin at the front entrance of the school, a number of smaller recycle bins in the staff kitchen, and a few composters outside the school building. In the
Teachers Room, there is a plaque hanging on the wall, on the top part is an image of the globe, at the bottom it reads, "I am myself and what is around me. If I do not save it, it shall not save me" (Gassett). To me, it appears that the school has created a strong sense of environmental awareness.

**Amount of student participation.** At School C, the schoolyard gardening activity is not a 'one day event,' it occurs throughout the whole year because of the Gardening Club run by a dedicated parent volunteer. The Gardening Club has 40~50 student members (12%~15%) from fall to the following spring: Grades 2-5 from September to December, Grade 1 is invited to join in January; they have continuous enrollment and a good turnout, no child is turned away. The students not only participate in planting the "Peace Garden," but also participate in maintaining it throughout the year. However, the principal and the chairperson estimated that student participation in the "Peace Garden" is 7% and 5% respectively. It may be that *not all* the student members in the Gardening Club actively participate in maintaining the Garden at all times. As the parent volunteer described:

> We have 50 students in our Club, and it is 300 students in the school. They have probably about 40 in the fall and then we add the Grade 1s after January. We just have a large turnout....There are enough kids in the Club; there are always hands to do the job. For example, one comes and says, "We have a performance to do for French Club." And she wants to meet this morning to practice...they're allowed to go to their practice. The Gardening Club is very open, sometimes you have some of them don’t show for 2 weeks. That's OK, I always say, "Don’t worry about it, and come whenever you can." Because I don’t want them to feel
that they have to be there if they don’t want to be because you know what, they’re not going to work as well if they do not want to be there, but we have really good turnout. (Parent, School C)

The highly involved kindergarten teacher commented that the parent volunteer’s flexibility has made the students participate in the Gardening Club all year round:

She is fabulous as a parent volunteer that her Gardening Club is open to anybody that wants to come, and if they have conflicts, she will say, “Don’t worry about it, come the next time.” She does a ton of stuff with them in all different areas and all throughout the whole year. In the winter time, they will make something to do with birds or bird feeders or something instead...because you can’t plant in the winter, she has the Gardening Club going all through the year and that keeps the students involved in their composting and in their weeding, but they’re Grade 1 to 5, so it’s a lot easier than with kindergarten. She’s really fabulous with keeping it going and keeping the kids involved. (Teacher, School C)

With regard to the “Kindergarden,” all the junior and senior kindergarten children (100%) participated in planting seeds, plant watering, and mulching. For instance, the highly involved kindergarten teacher described:

We started the garden planting bulbs in the fall, and since then we’ve planted annuals and perennials whenever we’ve been able to, so it’s only fall and spring, a couple of times a year, and we do a lot of planting inside and then transfer the plants outside or send them home. (Teacher, School C)
**Enabling factors for student participation.** At School C, the factors that have enabled student participation in schoolyard gardening are parent volunteers and donations; having a Gardening Club; fundraising through selling seeds/plants to the community; principal’s support; teacher’s initiative in using classroom budget; and the City’s or TDSB’s supports. The highly involved parent stated:

The Gardening Club is not part of the school council, it’s part of the school. It was initiated because we donated a garden to one of the teachers that retired. The principal supports it, as far as the students participating; we just make announcements when the Gardening Club is. We don’t have a meeting every Friday or whatever because I work, so that when I’m available, the children do announcements to say what we’re doing.

And the principal is very positive and helps to provide the finance so that we can run it. We have a lot parents that help to run it in the spring, we sell spring bulbs…to the community…as fundraiser, and the parents helped to provide stuff for the gardens too. (Parent, School C)

The highly involved teacher considered that teachers’ initiative, principal’s and parental support are enabling factors:

It was our idea, the other kindergarten teacher and I wanted to make a garden, so we talked to the principal. Because I have done it so much at my previous school, I called the Maintenance Department and talked to the head man there. He came out and we talked about it and had a look, and then he sent his men to do the work, but, of course, I had to have approval from the principal because the school has to pay for it, it has to come out of the school budget to have it dug up.
So we had it dug up and the other teacher suggested asking the parents to donate the bulbs. Because we're in such a friendly community, parents donated the bulbs. We started this in the fall 2 years ago, and we just built on it from there. The principal was supportive, she gave money to do it because it was all grass in the first place, and the other teacher and I just discussed and bounced ideas off each other. (Teacher, School C)

The highly involved teacher further described that having teachers' and parents' donations, using her classroom budget, as well as getting free mulch from the TDSB and the City are enabling factors:

The tulips that we donated, the annuals I got out of my budget last year...and the perennials either came from donations or from a school fundraiser that I purchased them from, and from my garden or other people’s gardens. This year now I’ve spent $150 on the perennials for the A-Z Garden....That $150 came from my classroom budget, which means fortunately I’ve got enough pens and papers. My budget allows for petty cash items as well as just classroom materials, so I put that in under petty cash, but it’s still actually part of my classroom budget I could have bought a toy for $150 or something instead. Because these are perennials...I wouldn’t have spent that money had they not been perennials because they will come back again.

The mulch is free; the City gives the TDSB mulch, and if we request it, then the TDSB brings the mulch here. Today, they just delivered it to the “Peace Garden,” which is one of the other gardens that were established before I got here...the kids are all excited because we went yesterday on a trip and we planted
plants at High Park in the Black Oak Savannah, it was butterfly plants too. The
kids were talking a lot about that today. So it’s good. (Teacher, School C)

**Limiting factors for student participation.** At School C, the factors that have
limited student participation in schoolyard gardening are money and time; unavailability
of the other leading teacher; unavailability of the parent volunteer; age of the
kindergarten students; lack of gardening tools; lack of storage space; and lack of
information. The highly involved teacher observed:

The only factors would be money and time. Unfortunately, the demands on our
time are much more extensive now than they were 10 years ago. I don’t know
how I did it 10 years ago, I started two or three different gardens at my previous
school....I had the entire school planted, every single class planted, shrubs,
flowers, trees or something in these gardens. But [now]...we have to have a plan
before we can apply for a grant, and the school budgets don’t allow for an
extensive amount of money. (Teacher, School C)

The highly involved teacher went on to explain that budget cutback and another teacher’s
unavailability are limiting factors:

Their [TDSB’s] budget has been cut so much. When I was in my last school, they
dug the gardens for nothing. This was going back 10 years before everything got
amalgamated and the budget got cut so much. They dig the garden for you; they
just send the maintenance man over and do it. It was no problem at all, but now
this school has to pay for it or you can apply for grant, like [TD] Canada Trust
Friends of the Environment.
I got a grant at my last school, there is another Evergreen Learning Foundation has grant money that you can apply for. I haven’t done it yet because the other teacher took a different job this year. Now she’s coming back next year, so we have ideas to do more things. But she took a year to change jobs, it’s kind of upsetting....I don’t want to be the only one doing it, too much work for one person. (Teacher, School C)

The highly involved teacher considered that the age of the kindergarten students is also a limiting factor:

After the school board delivered the mulch last year, we had all the kids take buckets and distribute the mulch all over to keep it moist throughout the summer. The kids did a lot of the work. They can’t do the weeding; I did the weeding because it’s a lot of dandelion in the middle of the lawn, dandelions and thistles, and the thistles are way too sharp, both plants have deep roots, the kids couldn’t get them out. I did the weeding on Victoria Day. (Teacher, School C)

The highly involved parent volunteer felt that her work schedule and the lack of other parental involvement are limiting factors:

The only thing is me working. I think it would be better if I could [come and run] this Gardening Club...every Friday for morning recess, but I can’t with my job...I think if we had lunch hour every Friday in the garden it would be better. I just can’t do it...as far as being out with the kids, it’s me and one other parent...and we do it all. I’d like to get more parents’ help because in 4 years when my son moves up, I won’t be here anymore.
So next year my biggest challenge is to recruit another parent to help, to take the initiative to be a leader in it, not just hang out and do whatever I’m doing, but to have ideas. We’ve had one woman 2 years ago worked with me, it was a lot better when you had two parents that take the initiative. By having more parents’ initiatives in it would make it for a better club definitely. (Parent, School C)

The lack of gardening tools and storage space are observed as a limiting factor by the parent volunteer, too:

You know one problem with having that many students is not enough gardening tools, and if somehow the TDSB could figure out a way of supplying that to the schools that have programs...the other thing is you can’t store 50 shovels, 50 spades, but even you have 10 of everything would be nice. (Parent, School C)

The highly involved parent volunteer commented that a lack of information or communication about what is available from the TDSB has been a limiting factor:

For example, doing “Peace Garden” pruning, the caretaker came yesterday and said, “The TDSB can do that.” Well, I don’t know what the TDSB can do or what they can’t do. I phoned her [the principal] as this concerns me. If I mulched them and 2 days after they told me “You can get mulch.” If I’m doing something I always get this after the fact. I said, “We need to do a list of everything that the TDSB offers” that she has it or someone has it because I’m not going to be here in 4 years. If we trim that garden every 4 years, to do a good trim, by the time I go, the next person is not going to know....I think there needs to be a protocol on information about the way of dealing this. I’m sure they have a lot of information....But I don’t know what’s available. (Parent, School C)
Ways to support student involvement. Based on my interview questions and responses from the participants at School C, this section is further divided into four subsections: teachers, parents, principal, and the TDSB, to describe the ways that each role may contribute to sustainable student involvement in schoolyard gardening.

Teachers: create an “Alphabet Garden” and a “Rainbow Garden”; let students grow plants and take them home; create indoor winter gardening activities; and emphasize the composting and recycling programs. For example, the highly involved teacher described:

This week I’ve just purchased perennials to make an “Alphabet Garden,” I purchased the perennials for all letters A-Z, they’re native species plants, and they’re to attract birds and butterflies. I spent a lot of time doing the research and collecting all the plants…we’re going to plant the perennials this week and they’re going to have name tags that say, “A for…” whatever the plant is. Last year we planted a “Rainbow Garden,” we planted annuals because otherwise they would all be in bloom at the same time. Both the senior kindergarten and the junior kindergarten classes planted in rows, like all red, and then all orange, and then all yellow so it looked like a rainbow effect when it was finished. (Teacher, School C)

The highly involved teacher went on to describe that she let students take home the plants that they grow at school so that the students can have a continuous observation of growth:

We planted bean seeds for the kids to observe the growth; we planted them in clear plastic cups just covered with wet paper towels so the kids could see the roots grow and the shoots, the stems, the leaves, and all the parts. And then we
planted them into soil and the kids took them home. The kids are still telling me (this is weeks ago) how much their bean plant has grown.

We planted the pumpkin seeds from the pumpkin that we carved in the fall. We dried seeds and saved them, and then we planted the pumpkin seeds in tea pots so that the kids could take those home. They took those home last week or the week before, and they’re telling me today how much their pumpkin plant is growing. (Teacher, School C)

The highly involved parent volunteer described that she tries to grasp every opportunity to get the students involved in smelling, feeling, and tasting the plants from the gardens:

The Grade 3s, when they do the unit on seeds and flowers, they come out and they plant what they planted in the class in our garden. Last year down the sidewalk when you come in, all the kindergartens and the Grade 1s and the Grade 2s helped plant some flower seeds all the way down, some of it worked, some of it didn’t. There was not enough sun there. But yeah, if there is an opportunity, we use the opportunity.

The “Peace Garden” in the back, we’re trimming that this week...we did the garden in front of the Principal’s Office last year, we had stuff they could eat, stuff they could smell, stuff they could feel, stuff they could taste....I’m just very open with it if the teachers want to do something, I make it available...now I’ll come three times a week in the fall and in the spring, in the winter, maybe once every other week. (Parent, School C)

The highly involved parent volunteer also described that she created indoor gardening activity suitable for students to do at winter time:
We do garden crafts in the winter. When you came in, did you see the water balls hanging in the tree, all painted like the wind chimes?... There is a tree there; you’ll see all these things hanging from it, they’re quite pretty, the kids did those over the winter. One of the crafts we’re going to do is to plant a seed in soil in a balloon and watch it grow in the balloon and then break the balloon when it’s ready.

We’ve also made out of newspaper pots, we planted seeds in small pots, and then out of newspaper we made larger pots where they do the seedlings, put them in there to grow a bit, then they took them home to plant in their garden. They go home and show their mom and dad what they did, and also the water balls here they’ve taken some home too. I think we did that for 3 days a week for about 3 weeks to get all the water balls enough for the number of kids. (Parent, School C)

The parent volunteer also noted that the school put a lot of emphasis on the composting and recycling programs to teach students about environmental consciousness:

All over, we have kids that come and pick up all the recycling, that’s part of the Environment Club; they’re very big on recycling...they’ve got bins in the gym, we have composting just outside the office in the corner...[But] they don’t do with their lunch, lunch goes in the garbage. (Parent, School C).

Parents: donate plants, bulbs, seeds, literature, and time; support their children’s plant growth at home; give children opportunities to do gardening at home; and take children for ‘Nature Walks’ in Community Park. Both the highly involved teacher and the parent volunteer observed that parents are very supportive in this school community, and there
are lots of family gardens in this neighbourhood. For instance, the highly involved teacher told such a story:

In this community, we’re very fortunate, the parents are very, very supportive and very involved in the school. A lot of the parents that live right around here have gardens....And the parents support it...some live in apartments, it’s more difficult, but a couple of kids told me they put them [plants] in a pot, a bigger pot, so that they could keep the plant growing even if they can’t get a pumpkin out of it.

One mom has a balcony, she bought a tomato cage, and she put the bean plant in (it’s a scarlet runner bean, which is a vine), and [the student] was telling me today how the plant is climbing up the tomato cage because it needs a troweller or something to support it. He was all excited, “it was swaying,” he said.

The parents are very supportive for the most part. (Teacher, School C)

The highly involved teacher went on to tell another story to show parental support in their children’s gardening activity:

The parents are very supportive; a lot of them have gardens. One of the moms, one of the parents is moving over this summer, and I just sent her extra pumpkin seeds in case the pumpkin plant doesn’t make survive the move. She was on the trip yesterday and was telling me, she can plant some extra ones at their new house. They’re moving in another week or two. So, they’re very good, they’re really involved in it, and their kids. (Teacher, School C)

The parent volunteer said that she supports her children’s gardening activity at home by giving them the opportunity to make mistakes and letting them learn from that:
They help with the garden; they can do whatever...they’re allowed to plant seeds.

Some people are very picky about how their garden is. I’m not picky...I bought the plants from Veseys [a company], and I let them plant the bulbs. Some of them might be a little bit too deep, I would say, “This should be planted downwards.” But I don’t go and break the sites and do it. I give them the opportunity to do it, they watch to see if it’s coming up, and they learn from that. If it doesn’t come up, let’s gently look under and see what’s happening, maybe planted a little too deep, let’s move it up.

...They go to the store to buy seeds, they help pick the plants...and they’re very involved in everything at home. They always see the front garden they plant, things like pumpkins and pumpkin seeds, and sunflower seeds. My son wants to put tomato plants in the front garden. Oh, it’s fine; I have no problem [with that].

(Parent, School C)

The highly involved teacher also revealed that the parents support their children’s involvement with nature by taking them to ‘Nature Walks’ in the Community Park:

A lot of them live close enough that they can go to the Humber Valley Park, it’s just down there, and they can walk miles alongside the River, a lot of parents take their kids down there and they have lots of opportunities to be involved with nature. While in my last school, all the kids lived in apartments, no exceptions...so the community involvement wasn’t at all the same. (Teacher, School C)

Principal: provide support with funds and fundraising initiatives; be positive with feedback and suggestions; encourage newsletter and announcements; encourage student
participation; and pay speakers to come and talk to students about environmental issues.

The highly involved teacher commented:

She [the principal] leaves it up to us, but she supports whatever we come up with. She’s very supportive in that respect. If [the parent volunteer] has to go to her to ask something, [the principal] is great, she’s just very supportive. In other years if I needed money for plants or something, she would give me extra money... when we asked her about the garden in the first place, she said, “Get an estimate.” We got an estimate and she said, “OK”... as long as she has enough money... she’s very supportive. (Teacher, School C)

The parent volunteer also commented on the principal’s support, she said “if I need shovels, if I need anything, she’s [the principal is] always supportive.... She’s positive when the kids are out there, she’ll come out and see what they’re doing, and that’s a really important thing” (Parent, School C). The parent volunteer went on to say that the principal also paid a speaker to come and talk to the students about environmental issues:

The other thing the principal does she pays for people to come in and talk to the kids about environmental issues too. They had a gentleman came in, I think 2 weeks ago, and he talked about not using a car, using the TTC or riding a bike, and how Switzerland has the cleanest air in the world... (Parent, School C)

**Board:** send flyers; promote workshops; promote Ecokids.ca (website by Earth Day Canada); provide awards; and provide more gardening programs and tools. As the highly involved teacher noted:

They [the TDSB] are very involved in EcoKids, and they have a website: ecokids.ca. The school board supports EcoKids a lot.... We did this huge energy
conservation thing, the 20-20: The Way to Clean Air Health Plan and we have all
the posters in the hallway, the school board supports all kinds of things like that.
The school board sends out posters, I just saw them today, all kinds of
environmental things, not just schoolyard gardening, but...waste reduction...all
kinds of things like that...they have many, many flyers come. As I’m the
Environmental Rep in my school, I get all the flyers and then I post them, and I
pass them on... (Teacher, School C)

The highly involved teacher also appreciated that the TDSB is offering workshops to help
teachers and parents learn skills:

They [the TDSB] support the gardening...there are workshops held at least
monthly, different kinds of workshops, for gardening, for school naturalization,
for getting parents involved, for fundraising, all kinds of things that they get
different people in to speak to those issues, and you can go to any workshops you
want, either as a teacher or as a parent volunteer. (Teacher, School C)

The highly involved teacher went on to explain that she could not go to many of the
workshops because of the location and her prior knowledge in horticulture:

The only problem I found is the majority of them [workshops] are in the east end.
I can’t drive from here to the east end for a workshop at 4 o’clock...because I
have been doing this for 10 or 12 years, I’ve been to almost every workshop
already. I also have a degree in horticulture...so I already have a lot of prior
knowledge, which is an advantage for me...the school board does tremendous
supports. (Teacher, School C)
The highly involved teacher further suggested that the TDSB should provide funding and awards to encourage schoolyard gardening initiatives:

If they [the TDSB] could provide more money, at my last school they used to, I don’t know if they do this anymore or not, actually they used to give out Environmental Awards. The gardens that we made at that school won $500 Environmental Awards. That was neat; it gave us more money to work with.

(Teacher, School C)

However, the highly involved teacher was also aware that there has been a budget cutback at the TDSB, and that she hopes the workshops are closer to where she lives:

Yeah, the awards were nice, but their budget has been cut so drastically that I don’t know if they have money to do that or not anymore. I think they provide a lot of support with the workshops that they offer. I just wish the workshops aren’t all so far away. I live in the northwest end, it’s difficult to [go to those workshops]...occasionally there have been a couple in the west end, but they happened to be the ones that I don’t [need to go]...like the last one I think it was on Community Involvement. I can get all the community involvement I need, so I didn’t choose to go to that one even though Runnymede was close enough.

(Teacher, School C)

The parent volunteer complained about the TDSB’s construction crew that ruined their garden recently:

Everything I do here is what I can do, what I can get people in the community to provide, what I can get the children to do, like most of those plants that we have out here were donated. When the kindergarten teacher retired, she didn’t know,
we asked kids to bring a plant from home; they planted plant in the garden. Now that garden would look a lot nicer, but in the spring, they [the TDSB’s construction crew] were fixing the bricks, they threw a lot of it in the garden. So it’s not as full and luscious as it would have been, we lost a lot of lilies because they just dragged the composters and threw out in the garden. So it’s not at its prime. (Parent, School C)

At the end, the parent volunteer described that students have learned environmental stewardship through the gardening activity:

But it’s [the garden is] coming, the kids are wonderful because we just finished cleaning it up and weeding it and cutting back the old stuff from the fall....So I let the kids decide, and every single one of them went to fix it. Isn’t that amazing? They already have it in them to say, “No, we’ve got to fix it, Mrs. [XX] comes she’ll want to see it nice. We work hard, we will make it better.” I was so proud of them; I thought that was all amazing. (Parent, School C)

Photos of the “Peace Garden” and the “Kindergarden” at School C are presented as follows (see Figures 10, 11, 12, 13, 14, 15, 16, and 17):
Figure 10. School C front entrance with plant decorations, June 2005.
Figure 11. School C front lobby with paper recycle bin, June 2005.
Figure 12. School C staff kitchen with recycle bins, June 2005.
Figure 13. School C peace garden and children, June 2005.
Figure 14. School C peace garden with new mulch from the TDSB, June 2005.
Figure 15. School C peace garden, June 2005.
Figure 16. School C kindergarten, June 2005.
Figure 17. School C hanging tree with waterballs (which students created during winter), June 2005.
Cross-Case Analysis

This section compares and contrasts the data from the three TDSB schools. It aims to find common themes and contrary evidence among the interview participants. In doing so, descriptive tables are used to display the findings in a clear and efficient manner.

Amount of Student Participation

With regard to the amount of student participation in schoolyard gardening, both School A and School B have a high percentage (100%) of student participation during the planting stage, but it is typically a ‘one day event’ that happens once or twice per year, when it comes to the maintenance stage of the project, the percentage dramatically drops. Whereas School C has a Gardening Club, which has 40–50 student members (12%–15%) who continually maintain the schoolyard garden all year round. A detailed comparison of the amount of student participation at the three schools is made (see Table 1).

Enabling and Limiting Factors for Student Participation

With regard to the factors that have enabled and limited student participation in schoolyard gardening, the three schools shared some common elements and some contrary evidence. The common enabling factors are teacher’s initiative and commitment, principal’s leadership and support, parental involvement and donations, and the TDSB’s EcoSchools program and workshops. The common limiting factors are time, money, and unions’ “work-to-rule” issue. My research findings are consistent with Dyment’s (2004) findings that ‘teacher involvement, parental involvement, and principal involvement’ (p. 216) were the top enabling factors, and that ‘money and time’ (pp. 199, 215) were the top two limiting factors for school ground greening.
<table>
<thead>
<tr>
<th>School</th>
<th>Amount of Student Participation</th>
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<tbody>
<tr>
<td><strong>School A</strong></td>
<td></td>
</tr>
<tr>
<td>Planning &amp; Design</td>
<td>No student participation</td>
</tr>
<tr>
<td>Planting</td>
<td>All (100%) of the Grades 1-5 students participated</td>
</tr>
<tr>
<td>Maintenance</td>
<td>Three classes out of eight (37.5%) participated</td>
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<tr>
<td><strong>School B</strong></td>
<td></td>
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<tr>
<td>Planning &amp; Design</td>
<td>No student participation</td>
</tr>
<tr>
<td>Planting</td>
<td>All (100%) of the Kindergarten – Grade 8 students participated</td>
</tr>
<tr>
<td>Maintenance</td>
<td>Less than 15 (3%) student participation</td>
</tr>
<tr>
<td><strong>School C</strong></td>
<td></td>
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<tr>
<td>Planning &amp; Design</td>
<td>All students participated</td>
</tr>
<tr>
<td>Planting</td>
<td>All (100%) of the Kindergarten – Grade 5 students participated</td>
</tr>
<tr>
<td>Maintenance</td>
<td>40–50 (12%–15%) student participation at the club level</td>
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</table>
My findings show that the curriculum is a dual factor that may either limit or enable student participation depending on the grade level. For example, at School B, the highly involved teacher considered that the Ontario curriculum is a *limiting* factor:

Part of the restrictive thing would be the curriculum itself. Let’s say in the Grade 5 science program, it does have the environment as far as you’re talking weather...But you don’t talk about planting and types of tree, like my curriculum this year does not support the time that I would give, I can change it so that the expectations are met, but that would be another problem. (Teacher, School B)

Whereas at School A, the less involved teacher argued that the curriculum is *not a* limiting factor:

I don’t think so because the curriculum is there and we need to obviously cover all of the expectations, but I think it’s really up to the teachers....I speak just for myself, it’s up to me to go that extra mile to do something like this to have your children involved in this. For me, Grade 4, I was able to link this to the curriculum “Habitats and Communities.” I don’t think that the curriculum causes a barrier because really if a teacher didn’t want to be involved in gardening, certainly they don’t have to be....You need to be able to put forth that effort as a teacher. And then that’s really what we should be doing, and that’s our responsibility. I don’t think it’s a barrier at all. (Teacher, School A)

Furthermore, at School A, the highly involved teacher considered that the curriculum is an *enabling* factor:

Teachers integrating the naturalization project in their curriculum, in some cases it fits very easily in the curriculum, like Grade 4 Science: “Habitats and
Communities.” And other cases you can modify things and connect things to the curriculum. So getting that really is a factor of me connecting with other teachers and bringing them on board for a number of things. (Teacher, School A)

Another dual factor I find that is both enabling and limiting is the community gardening culture. For example, at School C, there is a strong family gardening tradition in the neighbourhood, so it is very easy for the school to get community support or donations, whereas at School B, the situation is reversed.

An important enabling factor I find is the Gardening Club. For example, the involved parent volunteer at School C felt that having a Gardening Club is an enabling factor because students can participate in various indoor gardening activities through the Club even at winter time. Whereas the parent volunteer at School A felt that not having a Gardening Club at the school is a limiting factor because gardening is a ‘one day event,’ and as such students cannot get access to participate in the gardening all year round (see Table 2 for a detailed comparison of the three schools).

Ways to Support Student Involvement

With regard to ways of supporting student involvement in schoolyard gardening, the three TDSB schools shared their experiences and made recommendations. Among all three schools, some common themes are as follows:

**Teachers:** integrate gardening into classroom teaching and curriculum;

**Parents:** make donations to school and create a family gardening culture;

**Principal:** take the lead or ‘lead by example’, support in money/budget and networking;

**Board:** provide funding, awards, incentives, resources, and maintenance (see Table 3).
### Table 2

**Comparison of Enabling and Limiting Factors for Student Participation at the Three Schools**

<table>
<thead>
<tr>
<th>School</th>
<th>Enabling Factors</th>
<th>Limiting Factors</th>
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<tbody>
<tr>
<td>School A</td>
<td>teacher’s leadership; teachers’ interest; curriculum integration; teamwork; principal’s support; TDSB’s EcoSchools program; teachers making students understand about the importance of the project; students seeing their accomplishments; school making it compulsory; parent council’s support; good relationships with custodial staff; supports from White Rose and Canadian Native Plants</td>
<td>scheduling, time, and money; unions’ “work-to-rule” issue; EQAO; student not willing to participate; parent not wanting their child to get dirty; teachers not getting together to talk; teachers worrying about kids getting skin cancer; not having a Gardening Club; not an ongoing thing</td>
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<tr>
<td>School B</td>
<td>funding and support from the Friends of the Rouge Watershed, and TD Friends of the Environment; adult initiatives; ownership of teachers and students who initially involved in the “Butterfly Garden”; “Penny Drive” fundraising initiative; special activities such as “Wind Break”; competition with other schools; and City’s or TDSB’s challenges</td>
<td>time and money; upkeep in the summer; unions’ “work-to-rule” issue; not linked to the curriculum; weather; soil and ground conditions; materials/tools got stolen; cost of flowers; allergies; teachers’ lack of interest; leading teacher lack of time for teachers; leading teacher lack of time for students; lack of ‘publicity’ within the school</td>
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<tr>
<td>School C</td>
<td>parent volunteers and donations; having a Gardening Club; fundraising through selling seeds/plants to the Community; principal’s support; teacher initiative in using class budget; City’s or TDSB’s support</td>
<td>money and time; unavailability of other leading teacher; unavailability of the parent volunteer; age of the kindergarten students; lack of gardening tools &amp; storage space; lack of information/communication</td>
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Table 3

Comparison of Ways to Support Student Involvement at the Three Schools

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<tr>
<th>School</th>
<th>Ways to Support Student Involvement</th>
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<td><strong>School A</strong></td>
<td><strong>Teachers</strong></td>
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<td></td>
<td><strong>Parents</strong></td>
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<td></td>
<td><strong>Principal</strong></td>
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<td></td>
<td><strong>Board</strong></td>
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<tr>
<td><strong>School B</strong></td>
<td><strong>Teachers</strong></td>
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<td></td>
<td><strong>Parents</strong></td>
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<td></td>
<td><strong>Principal</strong></td>
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<td></td>
<td><strong>Board</strong></td>
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<tr>
<td><strong>School C</strong></td>
<td><strong>Teachers</strong></td>
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<tr>
<td></td>
<td><strong>Parents</strong></td>
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<tr>
<td></td>
<td><strong>Principal</strong></td>
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<td><strong>Board</strong></td>
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Holistic Analysis

This section analyzes the data from the four TDSB/Evergreen representatives and one educational officer at the Curriculum and Assessment Policy Branch of the Ontario Ministry of Education, so as to obtain an overview of the schoolyard gardening initiative in the TDSB. Real names of these individuals are identified with their kind permission; this was noted as part of the ethical review at Brock and with the TDSB.

Amount of Student Participation

With regard to the amount of student participation in schoolyard gardening, the TDSB/Evergreen representatives provided an overall picture of 80 schools that have participated in the school gardening movement in the Toronto District School Board. They noted that the trend is that there are many more schoolyard gardening projects than previous 20 years, and that the interest in gardening widely varies from school to school, and from community to community.

For instance, at high school, student participation is normally at the club level, whereas at elementary school, student participation is determined by the adult community of teachers and principal. In general, student participation is around 40%~50% in the planting stage, and 80% on special events, such as a ‘Cleanup Day.’ Students are typically involved in mulching, cleanups, watering, and weeding. The TDSB and Evergreen hope to get more students involved in the initial planning and design stage of the project. As Richard Christie, District-wide Coordinator of Environmental Education for TDSB, observed:

Let’s say there are 80 active projects every year, I would say probably half, probably 40%~50% have a high percentage of student involvement...and probably
half don’t, half probably have very forged, very token-like. The half that don’t, students probably be involved in the planting stage...that’s where typically students are involved....I guess there would be students involved in watering, some weeding, it depends on the project. I think students will be fairly involved in the maintenance....Ideally we want students to get involved right from the very beginning with the design. (Richard Christie)

Heidi Campbell, TDSB/Evergreen School Ground Design Consultant, observed that there is about 80% student participation, but this number depends on communities, teacher’s commitment, parent involvement, and principal’s support:

Student participation is required in all of the gardening projects that I helped support. When we meet with schools’ greening committees, the student component is always very much a part of the discussion: how will they be involved, how many will be involved, what grades, we try to extract that information from the committees when we meet with them.

And of course, all of the Evergreen and TDSB resources are aimed at student participation; it’s within the culture of the way we work with schools, which is highly participatory. We really want that participatory approach; it’s not one parent or one teacher, we encourage that community approach. I would say probably a very high percentage around the 80% mark, there is student involvement. Now with each project, it would vary, with each school community, it would vary, because sometimes the Grades 3/4 class, that’s about 60 kids roughly out of a population of 300 [20%]. (Heidi Campbell)
Bruce Day, District-wide Grounds Team Leader for TDSB, observed that there are more and more schools participating in the gardening project in the last 2 decades:

I have been with the TDSB for 21 years...the trend that I'm seeing is that over those 21 years, there are many more gardening projects underway now than there have ever been....This interest in gardening varies from school to school, it is not consistent, there are some schools that are way ahead of others and are actually pushing and leading us. And there are others that don't even know how to plant a tree in the school ground. There is a huge range of gardening projects at the schools. (Bruce Day)

Cam Collyer, National Learning Grounds Manager at Evergreen, observed that student participation in schoolyard gardening differs between high school and elementary school:

The schoolyard greening projects have unique qualities that allow a significant amount of student participation in their development and they obviously have a significant amount of opportunity for student participation in the implementation....There is a very strong broad split between the elementary and high schools, and high school opportunities for...planning and designing one of these projects is typically done at the club level. You have a lot of students along with one or two teachers, it's a typical setup and it's quite intensive for the students that are involved. While at the same time, they often involve a broader number of students at specific moments, may be the implementation, big planting day, or a big site preparation day. It may be a large single event related to the planning process, such as a survey to every student. That's when each class has involvement in some mapping process.
While at the elementary level, it’s typically a little more dominated by the adult community of parents and teachers and the principal. Although at its best students are engaged significantly, it’s a matter of working with something that’s developmentally appropriate for them. It can be simple, I’ve seen this works extremely well at some schools, but there are skills to doing this that the adult community needs to bring in order to do well....We know that there is a wide range of how students can be engaged at a variety of meaningful levels. I’ve read just enough of Roger Hart’s material about meaningful participation of children that he articulated a lot of different levels of child involvement. We take that work seriously in our work of trying to communicate to schools to do meaningful involvement, engaging meaningful involvement with students. (Cameron Collyer)

**Enabling Factors for Student Participation**

In the perspectives of the TDSB/Evergreen representatives, the factors that have enabled student participation in schoolyard gardening are: helping teachers understand the project; letting students and teachers make choices; strength and leadership of the school principal; parent involvement; teacher involvement; printed resources by Evergreen and TDSB; student outreach to community; philosophy and workshops that meets the needs of teachers; and using surveys to involve students in the design of the schoolyard garden. For example, Richard Christie considered that helping teachers understand the project and letting students and teachers make choices of what they want are enabling factors:

Heidi has done a lot of work on helping teachers understand how you can involve students designing one garden. It’s bit of puzzle I think to know how do you get
the input of a whole bunch of students so that they are involved, so that not only one class of students, but many classes of students go through the design process, and somehow decisions are made about making choices, how do you take all the kids’ ideas and make some choices about what to do. I think it’s really just how can the teachers understand what some of the techniques are, what some of the strategies are, writing about them, and talking about them in the workshops.

(Richard Christie)

Heidi Campbell said, “I think teacher commitment to the project, parent involvement, and principal support. Those are the three big ones.” Bruce Day shared the view that the strength and leadership of the school principal is key to the success of the schoolyard gardening project, and that sometimes it is parent involvement or teacher involvement that have made the gardening project happen:

This I believe stems from the strength and the leadership of the principals at the schools, principals who are really involved and interested in greening and the environment. In some cases it may not be the principal, it may be the parents that are pushing, and the teachers are pushing the principals at that school. So the interest comes from different areas....I think you’re going to find that the schools that are leading the way are schools that are involved in other environmental issues as well such as waste reduction and energy conservation. (Bruce Day)

Heidi Campbell considered that printed resources by Evergreen and TDSB, student outreach to community, and workshops that meet the needs of teachers are enabling factors:
I think initially the resources from Evergreen have always instilled that the student or child's needs be considered at the early stages of the project; all of the resources are based on student participation. The resources talk about community involvement and getting the parents and neighbours on board so it becomes a community project, not just school-based...I think the written material has really underscored the whole commitment to student participation. Other factors are we now have ways of enabling teachers, our workshop series is a huge factor. We're constantly trying to meet the needs of teachers whether it is the timings of the workshop, work around their schedules, try and bring the workshops to the schools, community, or library. We try and stagger the workshops so that they regionally meet the needs of the teachers. (Heidi Campbell)

Heidi Campbell went on to explain the contents of the workshops and how they meet the needs of a variety of audiences:

They're usually skills-based workshops, building skills and knowledge needed to successfully start and sustain a school ground greening project. We have core series, which is how to get your garden started, how to recruit volunteers, how to involve the students, different ways of holding planting events, and ways of enabling the children to become empowered to plan, design, and maintain the project – measure the site, do a site analysis where they go out and determine environmental factors. We're trying to get them in tune with the outdoor environment so that they can place their garden in a safe and protected spot where it's going to survive the rigors of the school ground, get sun, where there is going to be some shade for relief for the people who are working in the garden, etc. We
try and tailor our workshops and resources to meet the needs of a broad age group. (Heidi Campbell)

Heidi Campbell continued to explain how they do survey to involve students in the design of the schoolyard garden:

When we do surveys with them, kids want trees, they want shade and places to sit....We ask them first how they use the school grounds and then how they feel about their school grounds. We’ll ask questions like, “What do you like to do in your school grounds? Where do you play? Where don’t you play? What do you like about your school grounds? What do you not like about the school ground?” They’ll say, “It’s hot, it’s noisy, there is no place to sit.” Then we’ll say, “What do you like to do in the school grounds? And, what would you like to be able to do in your school grounds that you can’t do now?...Then we ask what would make your school grounds more interesting? And then we get them to draw or write their ideas, there are always trees and flowers on the drawings, and they want butterflies, insects and lots of colour. It’s interesting to be with them and facilitate their ideas, talk to them how they feel about their play space. When we look at children’s play patterns we often find that some kids are going right to the perimeters of the fence because they find the active play area really noisy and too busy; some of them want a break from the rigors of play, they go to the quiet areas of the school ground. (Heidi Campbell)

Heidi Campbell further noted that gardening taught students to be sensitive about their environment, collaborative decision-making, and stewardship; it also taught them math, literacy, and ecoliteracy:
They learn about their environment, they’re part of it, and that they become sensitized to nature. In a lot of the activities with older children, they’re determining how the garden will be designed, how will it be used. I’ll take them outside to the proposed site and say, “Now we’re out here, you see this space, what are some elements that you think we need to shape the garden, for you to be able to use it?” And of course they say, “Well, we’d like somewhere to sit, we’d like somewhere to play chess or checkers, we love flowers and we like colour.” They start to determine the design based on their needs. What will the space become and then, of course, it’s also the parents’ input, the teachers have a lot of input, and then the principal. You start to create a Master Plan for the site based on everybody’s needs.

...The children start to realize there is this collaborative environment that they’re not the only ones making the decisions, and that they need to consult with other students and they need to consult with their parents...it’s a big collaborative effort. Through this collaborative process they learn stewardship and about caring for the space, these plants are living things, they’re growing all the time, they need to be nurtured to thrive and they can work cooperatively with others to make that happen.

I think they learn a lot of things that would involve math or literature; they have to write letters to the neighbours to say this is what their plan is and they measure the site. Often they’re out there with graph paper and measuring the area, figuring out scales, they’re working with that. And then they start to investigate what if they want a food garden, what types of food can they grow and why,
according to the *Canada Food Guide* or their cultural wants and needs. If it’s a habitat garden, they’re researching all about birds and types of insects that would visit and they do comparative studies. Here is the space before the garden, what type of diversity do you have? Now here we have the garden, what type of diversity are you seeing now? I think it’s really rich, and it’s cross-curricular, there is integration with all kinds of different subjects. (Heidi Campbell)

Cam Collyer explained that, in the elementary setting, survey and visual materials helped students to draw out ideas; whereas in the high school setting, written surveys, site walks, model-making, and 3D mapping have enabled students to be involved in planning and design of the schoolyard garden:

I think there are a number of things that can be done for different age groups. In the elementary setting, we’ve seen that a different number of surveys can be useful to draw out ideas...written surveys...visual materials to stimulate whether it would be voting processes, or ways of both identifying ideas, as well as identifying priorities, can be used. We’ve seen use of highly visual materials, such as themed visuals, can be very productive...it gives them stimulus so that they can provide input about the things that they might like to do and the way that landscape both natural and built landscape can have in helping them realize some things that they would like to do.

We know that site walks can be very helpful, things like literally walking the site with students, to have them lead adults who are taking notes on this process or coordinating the process to understand usage, their ideas, places that might be feared, problems that might be able to be identified, as well as favourite
spots, desire lines, routes that children travel. We know that model building can be highly effective, particularly in elementary. At any age group, 3-dimensional mapping...can be a significant aid in the planning and design process.

Of course, there is whole set of engagement possibilities around implementation and long-term stewardship, and these things need to be divided out because I think strong coordination on planting day can make a huge difference and there is a lot to be said in the approach. Many of our strategies for the building of things are designed around efficiency, and that’s often the wrong approach for engagement with students.

A simple example is that if you had to get a load of soil to fill up your new raised beds that have been just built; a dump truck and a small loader could put all that soil right into those raised beds. However, that would be a missed opportunity for student engagement. You could ask everyone to bring from home a cup or an ice cream container and get piles of kids out there moving all of that dirt so that they find a role in it and they find meaningful relationships to the project, and feelings of ownership are developed.

There are a number of tricks and tips around implementation. I think there are a number of things around stewardship of the site as well, a lot of these are in the hands of the teachers, how they can both work the formal end of their teaching, as well as the informal. It’s all part of the school’s approach to getting students out, identifying recreational opportunities, identifying opportunities for intellectual development, and identifying social opportunities... (Cameron Collyer)
Limiting Factors for Student Participation

In the perspectives of the TDSB/Evergreen representatives, the factors that have limited student participation in schoolyard gardening are as follows: lack of funding to start the project; lack of time; teacher’s inexperience with undertaking these projects; parent-driven projects and their lack of knowledge; parents’ impatience with the process; parent’s varied goals, values, and motivation; poor design and poor planning; lack of short-term and long-term plans; too big a scale; caretaker left out; not linked to the classroom teaching or curriculum; union issues; health and safety issues; and parents moving on.

Bruce Day revealed that a lack of funding from the TDSB is a limiting factor for many schools to initiate the schoolyard gardening project:

There is always a capital cost to start these projects. The TDSB is not going to pay for a gardening project or planting five or 10 trees at the school to provide shade or provide rocks for seating or anything like that. The capital project needs to be funded by the school. There is an upfront cost, where some schools have the ability to raise money very quickly and other schools may only be able to sell hotdogs or baked goods. From the money perspective, the TDSB is providing very little financial support. However, we do help out with maintenance issues such as pruning of the larger trees, or supplying mulch and soil amendments.

(Bruce Day)

Cam Collyer also revealed that there is a cutback in funding in recent years that limits Evergreen’s support for schoolyard gardening initiatives:
We serve schools across the whole country. We’re not a governmental organization, we’re non-governmental organization. We’re not governmental charitable organization. All of our funding comes through fundraising, and like many of the charitable sector, our percentage of funding that comes from government sources has dramatically declined in the last 5 years because of a lot of cutbacks in many areas of government funding. We have some government funding, but it’s never consistent, never in any kind of systematic way, always through particular programs. (Cameron Collyer)

However, with regard to the cutback in funding in recent years, Denis McGowan, an Education Officer at the Curriculum and Assessment Policy Branch of the Ontario Ministry of Education argued that, in fact, there is an increase in educational funding from the provincial government:

But there has been an increase in funding to schools, I don’t know how that would work out for things like schoolyard gardening...boards are being provided with more money right now to reduce class size, for textbooks, I don’t know how much more money if any they’re getting for maintenance or school buildings and so on.

...I don’t think the Ministry provides funds to boards for a specific gardening project; they provide funds to boards for facilities or for books, then it’s up to the Board to decide how to spend the money. I don’t think the Ministry would dictate to the Board, “Here is x number of dollars you have to spend on gardens...you use this to build a garden for students”...I don’t think that will get on too well with the school boards...because they like to decide on their own priorities....But the boards do get money for professional development of teachers. (Denis McGowan)
Richard Christie noted that teacher’s lack of experience in doing these projects, and parent’s lack of knowledge and their urgency to produce results are limiting factors:

I think teacher’s inexperience with undertaking these projects; I think also the other limiting factor is a lot of projects are parent-driven. I’m not sure parents really have very much understanding or knowledge about how do they engage students in a meaningful way, they would know even less than teachers....I think people also tend to be a little bit impatient with process...“OK, let’s decide what and where we’re going to plant.” They’re impatient about getting a lot of ideas because this is really very time-consuming.

I think ironically you would think that schools were the places where there will be strong emphasis on involving students. It’s surprising that we see not only school ground greening projects, but also the schools that have an EcoTeam if they’re an EcoSchool; they are not as good at involving students as you think they would be. I think it’s just more work, it’s more skill involved, and slower to develop those things. I think it’s partly because the schools are squeezing this in around all of their regular duties, this is something they’re taking on above and beyond all the work they’re typically doing. There is probably a sense that they don’t have a lot of time, they don’t have endless streams of time. (Richard Christie)

Heidi Campbell shared a similar view that sometimes these projects are parent-driven and that their impatience with the process, along with the teachers’ lack of knowledge on how to teach students in an outdoor classroom are limiting factors:
I think sometimes there is a strong parent component, and parent component can sometimes override, they’re not necessarily doing this intentionally, they’re really well-intentioned. They want to improve the school ground, but I think they like the process to happen in a very quick fashion. So we have to help them see that the timeline for student involvement is really important and that the result at the end of the journey, which I’m defining it as the installations, continues after that. It is much richer and much better because the success rate climbs when you’ve got all that involvement, and that takes time, we’re saying minimum a year, and most projects that have been really successful are 3-year planning process.

There is also whole faction of projects that are really small and they start with even just planting of annuals, just getting the kids digging in the dirt, just having the right space for them to do that. I think parents as well as teachers need to learn more about the effect children can have on the design, and the success that can happen because of that process. I think we just have to keep reminding them, here are some tools, give them the tools to involve students. I think some of the other factors might be teachers not knowing exactly how to work with kids outside. Just take them [teachers] outside, empowering them, giving them some tools to work with the kids outdoors, and making them feel comfortable. Then there is another level where you would say, there is a teacher who will take their kids outside, but they might not see the advantages that are there with an outdoor classroom. (Heidi Campbell)
Cam Collyer shared the same view that sometimes adults’ own desires to produce expedited results and a lack of skills inside the teaching community can be limiting factors for student participation:

There are a number of things that can limit student participation. Adults’ own desires to produce results for their kids. This expediency can often be a reason to avoid student participation, ‘let’s get it done quickly...the kids are just going to slow down the process’... the individual factor is quite simply the adults that limit students’ participation nine times out of 10, and their lack of skills and sometimes their honest sense of urgency to produce something quickly for students. It can often fall out of quite simply what the goal is of the given project or the value of these projects. (Cameron Collyer)

Cam Collyer also felt that parent’s varied goals, values, and motivation can sometimes overshadow a key guiding principle of these projects, which is meaningful student participation:

From the teachers, principals, and parents that we talked to, we know that their motivations for working on these kinds of projects are quite varied, everything from improving kid’s health to reducing aggressive behaviour, to connecting their kid’s with nature, to improving the way their kid’s learn, to wanting to see a greater diversity of play activities. In any given individual parent or individual member of a committee or group, some of those interest areas may take priority. For example, the priority of new opportunities for student engagement may fall higher or lower on the list and often the lower priorities are eclipsed by the higher priorities as opposed to integrates it with.
Children's participation, meaningful participation in projects like these is something that needs to be a guiding principle throughout in order to be implemented well. If there is a principle, you've got a good start, but then you need all the skills to be able to pull it off along the way....For example, there is a difference between asking young children what they would like to do on the site as opposed to what they want on the site, it can be an important difference in getting answers that are productive to a design process...that are more true to the child's interests and reflective of their developmental stage. (Cameron Collyer)

Richard Christie noted that maintenance can be a limiting factor if schools do not have the knowledge about invasive weeds:

Maintenance is one of the tricky things with these projects...because if the project is not designed with maintenance in mind, it can easily overwhelm a school, it's a lot more work than they thought. We're really trying to do two things...to get some of those [designers] to design projects that will have manageable amount of maintenance. Bruce and Heidi are trying to impart the skills....That's another thing; they [schools] don't know what to do or what not to do. For example, projects have problems with invaders of plant species that you don't want....But they typically won't know what's invasive and what's not invasive. So they won't know what to pull off, what not to pull. There are all those issues. (Richard Christie)

Bruce Day suggested that poor design, poor planning, and a lack of short-term and long-term plans can be limiting factors:
Over the years, we have had some poor designs and poor planning. What we’re trying to do is to organize things at the beginning. In some cases, you will get calls from a school and they will say, “We have a load of shrubs coming in the weekend, we have a few trees we want to plant on the weekend and can you come and show us the way?” Obviously this project may not succeed because they haven’t organized their thought process. They don’t have a short-term plan, they don’t have a long-term plan, and they put all kinds of energy into doing something on the weekend, and have not done the proper homework on the project. This is what we say over and over, “If you don’t build the foundation properly, you can’t put the roof on the house.” They need to have a good design, a good team, and a good long-range maintenance plan. Those are three things that are very important: a good design, a good team, and a good long-range maintenance plan. (Bruce Day)

Bruce Day went on to say that, if the schoolyard garden is designed too big in scale, it may become a limiting factor:

My observation over the past 20 years is that there are certainly many more [schoolyard gardens] now than there have ever been, and we’re much more busy now trying to set the vision and focus people on what is practical and sustainable. Because quite often, these groups have ideas of what they would like or what they want, but we have to put the brakes on these projects because my history with the TDSB here has shown that some of these projects are not going to be successful and we have to refocus some of these people on simpler things such as trees, rocks, mulch, or take a very complex project but make it very small. So we’re
saying, “Keep it simple, start small, and organize a strong team. In the course of a number of years if you show that you can sustain your vision, then we’re here to support you with further phases to make it a bigger project.” (Bruce Day)

Bruce Day also noted that leaving the caretaker out is a limiting factor:

The other thing here is that in some cases schools have organized the team to include teachers and the principals, but they didn’t include the caretaker. And the caretaker then feels like he/she has been left out, and has not been included in the project, but this is the person that has the water keys, and this is the person that can arrange to have a plumber come in to fix the water if it is broken. This person also has hoses, wheelbarrows, and other garden source tools. In some case the school has bypassed a very important part of the team, and in some cases the caretaker doesn’t want to be involved in the planning, but he/she just wants to be included in the process, “this is what we’re planning on doing,” and just include the caretaker in that, so that’s an important thing. (Bruce Day)

Bruce Day mentioned that, because the schoolyard gardening projects are not always tied to the curriculum, they may not be sustainable, and they may become a limiting factor for student participation:

The other thing is links to the curriculum, if these projects are not linked to the curriculum, in a lot of cases they are just not sustainable because the children need to be involved in these outdoor learning areas on a daily basis to see how the trees are changing, to see how the flowers are developing, and to see the bugs and the insects….In some cases at the schools you’ll find that it will be a parent who is very strong in this, but there is no teacher or principal who’s really keen on this.
If you don’t make that connection or that link with the curriculum, quite often these projects don’t succeed....If it’s tied to the curriculum, if it is a mandatory part of their curriculum, that they come out and learn about the insects, the bugs, birds, seasons, flowers, and seeds...then I think these projects have much better chances of survival. (Bruce Day)

The curriculum issue is shared by Richard Christie, who observed that teachers not integrating gardening in their classroom program or the curriculum is a limiting factor:

I think it’s to integrate more into the classroom program itself as opposed to handling it as an ‘add-on.’ Then again it’s parent-driven and that’s where real problem is...it’s harder for them [parents] to engage teachers who maybe aren’t as enthusiastic as they are. I think it’s hard enough for parents just to get teachers involved. And then it’s harder for them to get the teachers to integrate it in a meaningful way in their classroom program, that’s a whole other issue because even the teachers are willing or want to do the project; I think many of them will treat it as an ‘add-on.’ They’ll do it after school or at lunch with a small group of students and other adults, they won’t think it as part of their regular process.

...The problem is the province; the province sets the curriculum. The TDSB doesn’t have any jurisdiction over the Ontario curriculum. It had to be the province that changes in policy, but it’s highly unlikely the province is going to make changes. (Richard Christie)

Richard Christie went on to explain that the Ontario curriculum that emphasizes on literacy and numeracy has been a limiting factor because it makes some schools down play the importance of the schoolyard gardening initiative:
I think that traditionally school boards and Ministry have not paid very much attention to school ground greening. Still, I think that even people here in our board and the Ministry don’t really realize how after schools Heidi and Bruce do...she’s doing about 60 or 70 design consultations a year...especially an error had been where there is huge emphasis on testing, on the priority areas which are considered, literacy and numeracy. I think it’s even for people here it’s very surprising to find out how many schools do this work.

If the schools do this work, what’s interesting is that a school will have a project like this, a lot of work, a lot of time, a lot of effort, but they don’t consider it as their main work, they consider it just as the thing they’re doing over here....I think that the people who are doing this, they downplay its importance, like, “At our school, literacy is really important, oh by the way, we also have this greening project.” Even they’ll say, “No, our focus is on literacy.” But they do put all the time and effort in the greening project. (Richard Christie)

Richard Christie felt that there is a distance between what people think is important and what the educational system says is important, and that the Ministry of Education does not support the schoolyard gardening initiative in the Ontario curriculum:

I think because there is nobody saying to them that there is any value, that’s important, that’s good for kids. They’re doing these projects often because parents want them done, and parents were driving them, or they were just innate belief that the teachers have that this is good for kids, getting kids involved in a tangible project on their school ground, where they can see what they’ve done, that it’s contributing towards the environment in their neighbourhood, and in some
positive way to contribute to dealing with much bigger environmental problems globally.

I think this is the kind of inherent belief that it’s valuable, but it doesn’t fit in anywhere in terms of what the education system says is important. There is nobody at the Ministry ever talks about this, they don’t support it in any way. The Toronto District School Board is probably the only school jurisdiction in Canada at least that actually pushes this. This is what we consider as one of our environmental priorities.

...There is no board like us, we have it on our website, it’s in our annual Environment Report, we have these materials, we have staff support, and nobody does that. I think there is real dissonance between what people in local communities, teachers, parents, and principals believe is important, and what the system says. There is a distance there. (Richard Christie)

However, with regard to the curriculum issue, Denis McGowan, Education Officer at Curriculum and Assessment Policy Branch of the Ontario Ministry of Education, argued that there is a strong emphasis on environmental education everywhere in the Ontario Science Curriculum for Grades 1-8 (1998):

Elementary curriculum is built on three goals of scientific literacy; one of those goals is relating science to technology, society, and the environment. Frankly, there is a lot more Environmental Education in the elementary curriculum than there has ever been....For example, you asked about ecology, let’s look at Grade 4, “demonstrate an understanding of the concepts of habitat and community, and identify the factors that could affect habitats and communities of plants and
animals” [p. 21]; “describe ways in which humans can change habitats and the effects of these changes on the plants and animals within the habitats” [p. 21]. For example, in this section here, “describe ways in which humans can affect the natural world” [p. 22]; “show the effects on plants and animals of the loss of their natural habitat” [p. 22]. It’s all there.

...For Energy and Control, they deal with “Light and Sound Energy”: “describe the harmful effects of high noise levels” [p. 60]...Over here, “Rocks, Minerals, and Erosion”: “describe the effects of wind, water, and ice on the landscape” [p. 95]; “determine positive and negative effects of human alteration of the landscape” [p. 96]; “conduct their investigations of the outdoor environment in a responsible way and with respect for the environment” [p. 96]. That’s all there. (Denis McGowan)

In response to the comment that there is a lack of curriculum links with environmental education, Denis McGowan further argued:

I think environmental to my mind the link is the three goals, which the science curriculum is based...In terms of the actual practice, we provide expectations in the curriculum, the expectations describe the knowledge and skills that the students are expected to achieve....For example, the piece here [p. 7] talks about the importance of the environment and how the environment has been weaved into the curriculum, you’d have to really read the expectations.

...This is what teachers have to help students achieve....For example, if you look at “identify, through observation, various factors that affect plants and animals in a specific habitat” [p. 21], through observation means you have to
actually go and see it happening. It is possible that teachers can do this without ever going outside, but I’m really not sure how you would ever look at a thing and investigate things like habitats and communities or ecosystems without going outside.

...For example, in Grade 7, students “investigate the interactions in an ecosystem, and identify factors that affect the balance among the components of an ecosystem” [p. 27]. Again, they’re expected to go [outside]....If I have my class here in this building [900 Bay Street, Toronto], I can walk them over to Queen’s Park over there, which is 5 minutes or so. We could look at the natural habitat, what resources do you need for that?

...Toronto [District School] Board has all sorts of Outdoor Education Centres. I’ve been to some of them. They’ve got them all over the place....I live in Toronto, and I can’t imagine that the school in Toronto where within a few minutes there isn’t some sort of park setting that student could go, or even out to the schoolyard.

...Well, there is nothing to stop a teacher from taking kids outside and to the schoolyard...there are schoolyards. If you’re really in downtown, if you’re really in a concrete area, yes, I would agree with that that would make life a little bit more difficult. But I think boards do have funds to take kids to parks and so on, as far as I’m aware. I don’t know all the details of funding, but essentially, I don’t see how you could cover this curriculum without going into the natural environment, and I don’t know why teachers wouldn’t be able to do that. I can see
that maybe in the odd downtown school, but even we’re right downtown here [there is the Queen’s Park]. (Denis McGowan)

Denis McGowan felt that their responsibility at the Curriculum Assessment and Policy Branch of the Ontario Ministry of Education is to set up guidelines, and it is up to the boards and the individual teacher to decide how to implement these expectations:

I think certainly from our perspective in the Curriculum Branch, we provide the curriculum, and we provide examples of how students can achieve the expectations in the curriculum. Again, you’re right, it’s on paper. We do provide guidance but it’s up to boards to decide how to implement the curriculum; it’s up to the individual teacher to decide how to implement this in the classroom. When I look at this [science curriculum], a lot of this is on, for example, the ecosystem. I really don’t know how would you do some of this without actually going outside?

...But certainly there is natural environment all around us, whether or not a specific school will have funds to build a garden....We just write the curriculum, we provide examples so that the teachers have a sense of the things they can do to help students achieve these skills and knowledge. But we don’t tell them, “You have to go out into a garden to do this, you have to go out to a local park to do this”...here you go, “formulate questions about and identify the needs of various living things in an ecosystem” [p. 27]. Then it gives you a list of examples, “determine how the structure of specific plants helps them withstand high winds, live on the surface of water, or compete for sunlight” [p. 28]. Isn’t it something you would go out and investigate?
…I can’t see why anyone can possibly look at this curriculum and say there is no relation to the natural environment. I don’t think they’re looking very far and how you can observe all these different things and not go outside, it’s beyond me. Unless you would have to put in every single expectation, “YOU MUST GO OUTSIDE.” I think that would be treating teachers like children, don’t you think so?

…They don’t have specific directions, do this or do that, those are usually developed by the Board….But yeah, I can see why they might need resources to do some of those things….I know that the Toronto [District School] Board has developed all sorts of resources for those, though I don’t know where they are….But certainly what we have tried to do it here is to put in examples of how they could help students, but we don’t say, “Go to Queen’s Park and investigate this.” We don’t make it as specific as that. But to me it looks pretty specific about what you’re supposed to do here. I’m not quite sure what they’re after. (Denis McGowan)

Bruce Day further revealed that the union issue is another limiting factor:

As far as the grounds crews are concerned, we do whatever we can to help these people with supply of materials and labour, but there is usually a dollar figure attached to this. There is some issue there between volunteerism and actually having a grounds-person be paid to do some of this work and with a union climate, at the TDSB here, we have to be sensitive to volunteering versus the union issues. The union can go only so far on that.
There are also some union issues here where volunteers want to come in with a tractor or truck to renovate a schoolyard or garden area where our collective agreements are in place. This equipment work needs to be done by union staff. Once we get the planting beds prepared, then the children can be involved with planting of anything that can be carried essentially, potted shrubs, burlap, shrubs, perennials, annuals, bulbs, seeds. This is all smaller landscape material. (Bruce Day)

Bruce Day also revealed that the health and safety issues can be limiting factors, too:

The issue here is health and safety. The TDSB has to make sure that there are not going to be injuries associated with this gardening project. When it comes to motorized equipment, whether it’s a chainsaw, or rototiller, dump truck, or tractor, the preparation of the planting areas and the construction of the garden areas need to be done by union staff. After that, it’s passed over to the students. (Bruce Day)

Bruce Day further revealed that it can be a limiting factor if the champion parent moves on when his/her child graduates, and the school does not have anyone else to take on the leadership role:

The other thing here is that principals, teachers, caretakers, and parents move quite a bit. If you can have somebody at the school who’s really, really interested in a gardening project, it’s what we’ve called a “Champion” at the school, they’re someone who’s really keen and they organize other people to help them with this. If that champion moves, if their child goes from elementary school up to
secondary school, you may find that the parent goes to the secondary school and there is nobody left at the elementary school to lead the way.

So in some cases these garden projects collapse and they’re not maintained, that’s why we are always pushing for this link to the curriculum. If the project is tied to the school through teaching, learning, and the maintenance elements, then the chances for success and sustainability are going to be there. The issue of the champion is an important one as the champion moves on, and if they don’t have a solid team behind them, then quite often these projects fail.

(Bruce Day)

Ways to Support Student Involvement

With regard to the ways of supporting student involvement in schoolyard gardening, Richard Christie, Heidi Campbell, Bruce Day, Cam Collyer, and Denis McGowan shared their experiences and perspectives. This section is further divided into four subsections: teachers, parents, principal, and the TDSB, to describe the ways that each role may play to contribute to sustainable student involvement in schoolyard gardening.

Teachers: make efforts to make the gardening project happen; support and lead the project; attend workshops; ask for site visit to design site-specific conditions; make Daycare kids do watering in the summer. For example, Cam Collyer observed that teachers have key roles to play in involving students in the schoolyard gardening project:

I think teachers have key roles....Arguably the teachers might be able to do the most in lieu of nothing else happening without the support from the principal, without support from the school board, without the support from the parents.
We’ve seen a number of projects where teachers have made significant efforts to make these projects happen…they certainly have a key role in the ongoing stewardship and maximizing the long-term educational benefits of these sites…and that teachers have a significant influence particularly on young children. (Cameron Collyer)

Bruce Day observed that teachers who attend workshops of various topics can enhance their knowledge on how to involve students in schoolyard gardening:

Some of the things that they [the teachers] do are that they attend the workshops that we hold and there’s a wide spectrum of topics that cover from fundraising, to getting started, to organizing volunteers, to maintenance issues. Teachers do have the opportunities to attend those workshops. (Bruce Day)

Bruce Day also felt that teacher’s request for site visits and landscape design consultations in regard to planning and designing with site-specific conditions have enlarged the educational benefits of the schoolyard gardens:

Obviously the other side of the coin is that the teachers usually ask us to come for the site visits to the schools, in which case we’re able to resolve a lot of issues for them in a very short period of time if the teachers are organized. We can do a site visit and landscape consultation of the school and if they have all the trees marked out on a plan, we can tell them what types of trees they have on their property in a very short period of time so that if they’re planting or want to plant new trees, they can say, “OK, we already have eight or nine or 15 different types of trees, we’re going to select something different so that they can use this as a teaching
tool for the children...so that the educational component is enlarged.” I think the
site visit meetings and landscape consultation are very important. (Bruce Day)
Bruce Day also noticed that some schools are very creative in finding ways to maintain
the schoolyard garden during the summer, such as having daycare children do watering:
There are some schools that have a very strong team and involve the daycare,
which is still located at the schools. They may get daycare kids to do some
watering with the small little buckets. Some schools are very creative in how they
bridge that gap when schools end at the end of June until they come back at the
beginning of September, and how they plan for maintenance of that garden during
the months of July and August. (Bruce Day)

Parents: help watering and weeding the schoolyard garden during the summer; and help
food growing and community gardening after school. For example, Bruce Day noted that
parents have an important role in sustaining the schoolyard gardens during the summer:
In some cases there are parents that don’t have cottages or summer places to go
and they are apartment dwellers who don’t even have a garden of their own. In
this particular case, they may want to get involved in a gardening project at the
school because they have no other way of promoting greening and other
environmental issues. The business of summer watering and weeding is not a
chore that most people enjoy. But for the sustainability of these projects, it’s a
very important maintenance component. In a lot of cases, the teachers and the
principals are not there during the summer months. The only ones that can sustain
these projects are the parents. (Bruce Day)
Cam Collyer observed that after school, parents can grow food in the schoolyard gardens for the community to share and enjoy:

Parents have a key role as well. Typically, parent involvement happens at the schools where parents have a little bit more free time, which tends to be middle to upper income schools. There are a number of things the school board and the principal can do to make their site publicly accessible, to make it relevant to their community, such things as food growing could be a priority for a number of families in the area, an opportunity to access a community garden, parents can seize upon those opportunities, they can use the site on the weekends. We know that there are a number of successful projects after school use...there is no question that parents are the primary influence on their children....They have a significant role in endorsing, supporting, leading these projects, and their influence can not be underestimated. (Cameron Collyer)

**Principals**: pull together teachers, parents, and caretakers; cultivate relationships with the TDSB and teachers; and develop strategies for healthy and safe schools. For instance, Bruce Day observed:

The principal is very often the king pin in this role. They’re often the ‘Champion.’ If the principal can get involved in this and pull together teachers, parents, caretakers, and Heidi and I, obviously the results are totally different from a school that doesn’t have strong leadership right from the top. Working with the principal is really, really very important. (Bruce Day)
Cam Collyer also observed that the school principal has a leadership role in cultivating relationships with the school boards and teachers, and in developing strategies for healthy and safe schools:

What’s clear to me is that school principals have a primary leadership role related to this idea, that sometimes nebulous idea of school culture. Every school has a different culture, and a lot of it falls from the leadership of the principal, whether it’s their active interest or whether it’s an interest they allow to grow, they have an important role to play. This is clearly played out in relation to school gardening, and we’ve seen that.

A school principal can do it in many ways: they can do it from guiding discretionary funding, but I think that’s even small part of it; they can be actively promoting environmental issues in general at school; they can be cultivating the relationships with the TDSB, and with the facility staff at the TDSB level and the school level; they can be actively cultivating and supporting professional development opportunities for their teachers to develop the skills teaching outside, to develop skills and looking after their site, to develop new patterns of behaviour on the school ground, new patterns of surveillance on the school ground. It can be part of their strategies for healthy schools, it can be part of their strategies for safe schools, and all of these priority areas can be realized through the greening strategy. (Cameron Collyer)

**Board:** establish TDSB/Evergreen partnership; establish the EcoSchools program; link the EcoSchools program to schoolyard gardening; set five-step process involving students as key in the EcoSchools guide; implement the Environment Report; publish the School
Ground Greening guide; promote Evergreen resources that include money, expertise, publications, workshops, and assistance in research; set teachers' networks; tour good garden examples; plan and design for site-specific conditions; email and telephone support; write specifications; establish Tree Replacement program; have three grounds crews; declare priorities; and get more involved in maintenance.

Bruce Day considered that the partnership between the Toronto District School Board and the Evergreen Foundation is surely an effective way to help the teachers, principals, and parents to initiate the schoolyard gardening project:

The Toronto District School Board is partnered with the Evergreen Foundation, and since that partnership has occurred, there have been quite a few changes with the way that these gardening projects are approached and how they're handled. And certainly with Heidi's arrival, I work closely with Heidi and have done so for the last 3 1/2 - 4 years. She has a wealth of knowledge and resources from the Evergreen Foundation, which I've learned a lot from. This is support primarily for teachers, principals, and parents.

She [Heidi] has learned a lot from me on the operations or maintenance side, on the practical sides. She has the educational information and we have the construction and maintenance information, so that working together has made the teamwork on our side a very strong team. There have been Greening Workshops, which we've talked about getting started, fundraising, maintenance issues, and all types of landscape related topics. That has certainly helped principals and teachers who attend these workshops. (Bruce Day)
Cam Collyer shared the same view that the TDSB/Evergreen partnership has provided a powerful endorsement to the schools that want to participate in the gardening project:

...as soon as the partnership began, there was the enormous sense of relief...there was a sense of excitement, there was a sense of openness, this kind of feeling of coming out of the closet that those people that were doing this work with no longer did they have to sneak around to do this work, they can in fact do it in a climate that was supportive and that's a very powerful thing. (Cameron Collyer)

Richard Christie said that the TDSB is using the School Ground Greening guide, Evergreen resources, workshops, and the EcoSchools guide as the strategies to support student involvement in schoolyard gardening:

I guess there are a number of strategies. I think the first strategy is you can see it in the School Ground Greening Guide: Designing for Shade and Energy Conservation. In our printed materials that involving students is a major component, different strategies introduced to use, different tools for them to use. I think that is one thing.

We also heavily promote the Evergreen resources and we promote it in many, many different ways. In the Evergreen resources, student participation is also something that is highly encouraged. In addition to our guides and print materials, workshops would be second main place for this to happen. Right now, Heidi is running a series of workshops...that idea of involving students would be highlighted there as well...my sense of her work with schools at the school level again that would be strongly encouraged....EcoSchools guide justify on the five-
step process and involving students as key disciplines, and that process is highly encouraged as well. (Richard Christie)

Richard Christie explained how the TDSB’s EcoSchools program as a whole has facilitated in creating a board-wide culture to support student involvement in schoolyard gardening:

I do a fair amount of public speaking at conferences and what I talk more about is our EcoSchools program as a whole and with school ground greening as one part. At conferences, I’m a strong advocate for the work that we’re doing. In the audience, there would be provincial government officials and politicians. My own view is that we have very few resources for a very big school board and what we need to do is to prove that it can work; we will have to make it work here, greening, and EcoSchools as a whole.

To me, that’s the biggest contribution we can make because there is a little bit of risk until a school board really shows how all of these can work, it’s still a little bit theoretical, right? If we’re saying we should do this, we should do that, but how? I think it’s important for us to actually prove that it can work, show how all these can work. I think that will be very influential itself. Also you can spend a lot of time and effort on trying to lobby government... and get nowhere. In the meantime, you’re not focusing on the work we have to do here. (Richard Christie)

Heidi Campbell also shared the same view that the EcoSchools program and its potential links to the schoolyard gardening is an important way of supporting student involvement:

I think our new EcoSchools program is really going to be a strong link to children’s involvement which starts-up that process, and with schools’
participating in the certification, I think that’s going to help our work a lot....I’m looking forward to growing that process and finding more links between the EcoSchools programs and gardening for schools. Right now, we’re focusing on shade and tree planting, and that in itself has been a successful approach to helping the TDSB see that this is an important aspect to greening. (Heidi Campbell)

Richard Christie further revealed that the TDSB is preparing the Environment Report as another strategy to support student involvement in schoolyard gardening:

We’re the world first school jurisdiction that’s publishing an Environment Report. It’s going to board on the 18th [of May]. It’s modeled on corporate environment reports and sustainability reports. Basically, it’s showing the four priority areas that we have, this is curriculum here, school ground greening is one, and typically we talk about why this work is important in schools, the highlights from that school year 2003/04. And then we also talk about what we’re doing to support schools, what’s going on at the school level and at the board level, the strength of the work we’re doing, where we need to improve, and what we’re doing next.

In some of the areas that are more advanced like energy, we’re also able to show the results of our work. We cut our electricity consumption by over 8% last year that saves the TDSB millions of dollars. To me, the Environment Report expense is for us to be accountable to trustees and public, but I think what this all can do is to government. I would say they could be influenced by this at another school board and say, “Well, gee, look at this Toronto District School Board is
doing, look at the great results, why aren’t we doing this?”...So in an indirect way, I think we are influencing others.

...As soon as the TDSB passes it [the Environment Report] on the 18th [of May], there will be release to the public. They’ll be on TDSB’s website, we’ll issue a press release, we’ll give it out at conferences, and even having an EcoSchools section on the TDSB’s website...that sends a very strong message to provincial government, to other school boards that this is valued. (Richard Christie)

Cam Collyer also considered that the EcoSchools program and the Environment Report are important ways to support student involvement in schoolyard gardening:

I think in the case of the Toronto District School Board, the evidence has been in a number of ways, for they struck the partnership was one layer to that, the fact that their EcoSchools program that has been designed by the Environmental Education Department that included schoolyard greening is another step. The fact that EcoSchools was adopted by the TDSB and officially endorsed, not just a program of the Environmental Education Department, but embraced by the TDSB to the top level, that was another level of endorsement. Further level of endorsement include what happened this week the Environmental Report card, that reported on the environmental practices at the TDSB, that included school ground greening, all point to this high degree of endorsement, of activity, of interest, and an apparent desire to support these activities. (Cameron Collyer)
Bruce Day felt that their on-site visits to schools and landscape design consultations that Bruce and Heidi do at the schools help plan and design with site-specific conditions, is an important way of supporting these projects:

The other thing that has changed here is the onsite visits. We set up meetings with the schools and when they send us a drawing or a sketch, and a vision of what they hope to accomplish, we do the onsite visits, which means a lot to the people at the school because it is site-specific. We’re not doing that from a computer or from a remote office, we meet them at the site and we talk about soils, “What type of soils have you got? What is the exposure is it north, east, south exposure? What types of trees have you got?” We can identify trees and talk about species that would grow well in wet areas that are low or areas that they’re trying to develop which may be dry. Those site-specific conditions are really helpful to the schools because we can take a look at all those individual site-specific situations which can make or break their project. If they don’t have the right plants in the right location, the sustainability of their garden project could be questionable.

So we do the site visits, we talk to them about the drawing that they have, and we critique that drawing and do written reports for the Gardening Committee at the school to make sure that there is no misunderstanding of what types of trees or what types of shrubs will do well at their school, and we recommend sources of materials, whether it is soil amendments, mulches, sand, or different types of materials. We want to make sure that they get the right materials from reliable sources. (Bruce Day)
Bruce Day further revealed that their email and telephone support in the maintenance of the schoolyard gardens is crucial to these projects:

We also do email and telephone support. Subsequent to the site meetings, they are given a detailed report that has Heidi’s and Bruce’s names and numbers on it so that they can call us at any time for clarification of who is supposed to do what, how far can the union go, how far can the parents go, and talk about materials or whatever other concerns they may have. We also have grounds crews at the TDSB. There are currently four grounds crews that look after this type of project, and we do project preparation, landscape work, and maintenance.

In most cases these garden projects are the responsibility of the school. If a major cleanup is needed, or a major pruning is needed, and it’s something that the parents or the kids can’t look after, then the school has to send a work order to the Grounds department, and they use that work order number to pay for the labour that’s involved in doing the cleanups.

These projects are supposed to be maintained and looked after by the school to a point, and this is another gray area, that once trees get to certain maturity or height, you can’t have parents climbing trees and doing pruning because there is liability issue there. We have to make sure that on these projects, we spell out at the beginning what they can and can’t do and what they can and can’t maintain. And in some areas that’s very gray. We are hoping that the TDSB can get more involved in long-term maintenance.

The way it is right now is that the only thing that’s really supplied to the schools is Heidi’s and my salary, and this pays for our expertise to go to the
schools and help them out. The other thing here is that the capital project must be paid for by the school. If it is a garden that’s already established and it needs more compost or it needs more mulch, those costs are not charged to the school. It’s the initial startup that is charged to the school. After that, materials such as compost or mulches are supplied free of charge by the TDSB. So the TDSB is helping out on established projects. We feel that because it’s an educational component at the school, although it’s not inside the four walls of the school, it’s an outside learning area that should be covered by the TDSB, but we’re not there yet. (Bruce Day)

Bruce Day went on to say that their written specifications and the Tree Replacement program will help support student involvement in schoolyard gardening:

The other thing is that we’ve been writing Toronto District School Board Landscape Standards. The TDSB did not have anything written down in the way of landscape standards, so I have been writing those for the last 2 or 3 years. It is a living document that changes all the time; we’re always adding more standards to it....We’re trying to make links with the Parks and Recreation in the City of Toronto to get free mulch from the City...which we have had verbal OK to get started in the fall of 2005, with the City doing some tub grinding for us and also getting a mulching program started for trees in the spring of 2006. This is also underway.

The other item we have been working on is the Tree Protection Zone Specifications, which basically involves protection of existing trees, to make sure there is no excavating, trenching, or footings within the drip line of trees. If some
structure is required under the drip line of trees, we look at other ways of constructing those facilities without damaging trees and their root structure. The other thing the TDSB is doing to support our greening projects is that we have a Tree Replacement program. If a tree dies, we have a 'one-for-one' tree replacement program. We would like to change that ratio to 'two-for-one.' But for now, we only have a 'one-for-one' replacement program. (Bruce Day)

Heidi Campbell revealed that in their workshops she focused on teachers' networking for them to share knowledge and experiences in schoolyard gardening:

I think in going out to schools, the number of schools we see, and the number of people that we meet at the workshops, we begin to help them network with one another, and see that even within their family schools who are working on certain projects, how they can share information. I think our strong focus on networking helps bring people together, they're sharing their ideas, they're exchanging emails, and they want to come and see what's happening and learn from each other. We can help support that. We're thinking of a tour for the fall of school ground projects...plus making it very clear how they can gain points for their EcoSchools certification, getting really clear about how their projects will fit into the certification process. (Heidi Campbell)

Heidi Campbell further revealed that student involvement is the key factor for schools to obtain the Evergreen Funding, and that Evergreen has funded numerous schools since 2004:

Currently, Evergreen has a $2000 grant twice a year, and TD Canada Trust Friends of the Environments fund is another way they [schools] can fund their
garden projects. And they can get community support too – donations and volunteer time. We help them to look beyond just the most common granting processes; we help them get donations of volunteer time, materials, and sometimes money too from their own communities. But some communities find it very difficult to even raise a few hundred dollars and have fundraised for 5 years just to put in a small piece of play equipment and a few trees - getting all their funding through lunch time hot dog sales at the school. I mean some of them are really struggling to build what they want to build. But I think with the certification maybe there’ll be some extra [dollars] support from the TDSB eventually.

...Basically, they [schools] have to show in two places on the grant how the students are involved, who’s involved in the project, how are they involved, and how many. Even in the Evergreen grant they have to do that. But Evergreen is really trying to press upon schools that involvement is an important aspect for them to be receiving the grant. They ask for any kind of representation they can give to Evergreen of the children’s involvement: pictures, diagrams, or maybe even the whole design is done by the students. In the second part of the grant is the maintenance plan, and again they have to show who’s involved, how many, and how students are involved in that. (Heidi Campbell)

Cam Collyer felt that declaring a priority is very important for the school community because it creates a feeling of endorsement:

One of the things that we know is that simply by declaring a priority...can make a huge difference because...the adults and in turn the students that are involved in
these projects get the feeling that the activities are endorsed and that feeling of endorsement is very powerful for the school community. (Cam Collyer)

Cam Collyer explained how Evergreen has made various promotion efforts in trying to support the schoolyard gardening initiative:

Promotions are part of this work, but it's very much influenced by budget. For Evergreen's part, there are many layers to that work that are both separate and connected to the work in the TDSB. There are specific things like regular promotional brochures that go out to all schools, there is presentation to EcoSchools staff which does promote the schoolyard greening, and all that is done to each principal in the TDSB. There is annual flyer that goes out telling people about things, it does have a space on the TDSB website. So internally in the TDSB, there is actually a significant amount of promotion.

Externally, there is also all of Evergreen promotion to schools in general, which includes everything from our website and all the promotional materials, to the mailing out of our outdoor classroom newsletter which goes to every school in the country twice a year. It also includes things like public service announcements on television, that are part of the social marketing this organization does....You've got to try and reach people and you can't call the job over, it's ongoing. You can't promote one year and think you're good for 5 years. You've got to do it regularly in an ongoing way. Those are some of the principles at least we take going into this. (Cameron Collyer)
Cam Collyer went on to say that other things that the TDSB does in supporting the schoolyard gardening initiative are money, expertise, publications, workshops, and assistance in research:

The fact that money has been put again in these initiatives, the fact that there is an increased level of expertise available for these projects, there is an increased level of education, from publications to workshops, the fact that the TDSB is cooperating in research, which is including your own, and including our own as well, that work we’ve done with Janet Dyment, these are all indicators of the TDSB putting its money where its mouth is. The more they do that, the more it creates a culture that supports student involvement in schoolyard greening.

...The promotions with *Gaining Ground*, in particular Janet Dyment’s research at this point is ongoing, and we have some tremendous opportunities. For example, we got media exposure on CBC radio...we did send out a bit of press release and we received some interests on the most popular radio station in Toronto, which is listened to by a lot of people, we got a lot of response after that from all sorts of different people, general public, people work in the health sector, or the education sector, lots of interesting things, it’s all ongoing. (Cameron Collyer)

Cam Collyer revealed that a number of organizations provide funding for Evergreen and Evergreen’s order of priorities and ability to fund schools is dictated by their fundraising:

For example, we had money from the federal government through Health Canada and we had money through Environment Canada at the federal level. But all those come and go in the years, some are multi-year, some aren’t....We get money from
charitable foundations. We get money from individuals, and we get money from corporate sources as well. In any given year, some mix all four of those, which is constantly changing.

...We’re always looking for ways to make things more stable here because clearly your ideal state of an organization like this is to be creating a strategy and following it through by your own priorities that you identify internally. Whereas the reality is that you’re implementing what you can raise money for, which sometimes matches your strategy and your order of priorities...So sometimes priorities five becomes priority one because that’s what you’ve got funding for in any given moment. (Cameron Collyer)

Cam Collyer felt that student involvement should be highlighted in future practices:

I think that further steps could be taken and it will include just highlighting this area of student involvement in the process, and making sure that it is highlighted as not only one of the possible outcomes of this work, but potentially identifying that there is ripe potential for student involvement, and that should be seized upon. (Cameron Collyer)

Ministry: provide funding; provide curriculum link; and provide teacher training. For example, Denis McGowan revealed that the Ontario science curriculum for Grades 1-8 (1998) is being reviewed in September 2005. There will be some changes made to the current science curriculum, and the Ministry will provide teacher training based on the changes:

What are the solutions? I don’t know, could be some sort of envelop within the budget for school facilities....We’ll be starting to review the science curriculum
this September, we’re beginning to review it, and then based on the changes made, we’ll be providing training, but that’s a couple of years down the road.

(Denis McGowan)

**Chapter Summary**

This chapter presented in-depth and detailed findings of the research study on adult perceptions of student involvement in schoolyard gardening. It is a collective case study of three schools in the Toronto District School Board that are currently running a schoolyard gardening project. It was based on interviews and photographs. The chapter contained three sections: within-case analysis, cross-case analysis, and holistic analysis, and each section was further divided into four subsections: amount of student participation, enabling factors for student participation, limiting factors for student participation, and ways to support student involvement. In the next chapter, I will conclude with my summary, reflections, implications, and recommendations.
CHAPTER FIVE: REFLECTIONS AND RECOMMENDATIONS

Mountain and River is Nature's Pair,

Mountain stands still forever,

As if he has an unshakable faith in the present air.

River moves forward in a thousand miles,

Constantly in search of her future heir,

And finally she finds the future heir encompasses the past air.

– The Researcher, “Mountain and River,” January 2004

Global environmental issues have been increasingly recognized by people from a variety of professions around the world. This research study is in response to the UNESCO’s call for environmental education to raise young people’s environmental awareness and to reconnect them with the natural world. The purpose of this research is to investigate through adult perceptions what factors have enabled and limited student participation in schoolyard gardening, and how to support student involvement in schoolyard gardening. It is a collective case study of three schools in the Toronto District School Board (TDSB) that are currently running a schoolyard gardening project. This chapter concludes the study in four main sections: 1) summary of the study; 2) reflections on the journey; 3) implications of the study; and 4) recommendations.

Summary of the Study

The results of this study show that two of the three case study schools, as well as the over 80 TDSB schools that annually run a schoolyard gardening project, did not or do not involve students in the initial planning or design stage of the project. Student
participation typically occurs in the planting stage or cleanup days, but when it comes to the ongoing maintenance, the amount of student involvement dramatically drops.

My results show that the common factors that are repeatedly emphasized by the three schools that have *enabled* student participation in schoolyard gardening are teacher’s initiative and commitment, principal’s leadership and support, parental involvement and donations, and the TDSB’s EcoSchools program and workshops. The results also show that the common factors that have *limited* student participation in schoolyard gardening are time, money, and the unions’ “work-to-rule” issue.

My findings further reveal that the ways to support student involvement include teachers integrating the gardening into the curriculum; parents making donations to the school and creating a family gardening culture; principals supporting in money or budget and taking the lead; the TDSB providing funding, awards, incentives, and more maintenance; and the Ontario Ministry of Education supplying funding, curriculum link, and teacher training.

Based on the original data, I created three descriptive tables to summarize all the research findings. Table 4 summarizes the amount of student participation in schoolyard gardening based on all the inputs from the three school participants and the TDSB/Evergreen representatives. Table 5 summarizes all the enabling and limiting factors for student participation in schoolyard gardening observed by the three school participants and the TDSB/Evergreen representatives. Table 6 summarizes the ways to support student involvement in schoolyard gardening for the teachers, parents, principals, the Toronto District School Board, and the Ontario Ministry of Education.
Table 4

Summary of Amount of Student Participation in Schoolyard Gardening

<table>
<thead>
<tr>
<th>Stage</th>
<th>Amount of Student Participation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning &amp; Design</td>
<td>No student participation in this stage at two profiled schools; All students participated in this stage at one profiled school; Some student participation in this stage among the 80 TDSB schools that have an active schoolyard gardening project each year; The TDSB would like to see more students involved in the initial planning and design stage of the schoolyard gardening project</td>
</tr>
<tr>
<td>Planting</td>
<td>Full (100%) student participation in this stage at the three profiled schools; About 80% student participation in this stage across all the 80 TDSB schools</td>
</tr>
<tr>
<td>Maintenance</td>
<td>Much less student involvement than the planting stage at two profiled schools; Ongoing student involvement through Gardening Club at one profiled school; High student involvement on special event such as the “Cleanup Day”</td>
</tr>
</tbody>
</table>
Table 5

Summary of Enabling and Limiting Factors for Student Participation in Schoolyard Gardening

<table>
<thead>
<tr>
<th>Enabling Factors</th>
<th>Limiting Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>teacher’s leadership and commitment;</td>
<td>scheduling, time, and money;</td>
</tr>
<tr>
<td>principal support;</td>
<td>no leading teacher;</td>
</tr>
<tr>
<td>parental involvement;</td>
<td>no parent volunteer;</td>
</tr>
<tr>
<td>teachers’ interest;</td>
<td>unions’ “work-to-rule” issue;</td>
</tr>
<tr>
<td>curriculum integration;</td>
<td>teachers’ lack of interest;</td>
</tr>
<tr>
<td>teamwork;</td>
<td>not linked to the curriculum;</td>
</tr>
<tr>
<td>TDSB’s EcoSchools program;</td>
<td>leading teacher lack of time for other teachers;</td>
</tr>
<tr>
<td>teachers making students understand about the importance of the project;</td>
<td>leading teacher lack of time for other students;</td>
</tr>
<tr>
<td>students seeing their accomplishments;</td>
<td>student not willing to participate;</td>
</tr>
<tr>
<td>school making it compulsory;</td>
<td>parent not wanting their child to get dirty;</td>
</tr>
<tr>
<td>good relationships with the custodial staff;</td>
<td>teachers not getting together to talk about it;</td>
</tr>
<tr>
<td>“Penny Drive” fundraising initiative;</td>
<td>teachers worrying about kids getting skin cancer;</td>
</tr>
<tr>
<td>having a Gardening Club;</td>
<td>not having a Gardening Club;</td>
</tr>
<tr>
<td>supports from White Rose and Canadian Native Plants;</td>
<td>not an ongoing thing;</td>
</tr>
<tr>
<td>funding and support from the Friends of the Rouge Watershed, and TD Friends of</td>
<td>upkeep in the summer;</td>
</tr>
<tr>
<td>the Environment;</td>
<td>weather, soil and ground conditions; allergies;</td>
</tr>
<tr>
<td>ownership of teachers and students who initially involved in the garden;</td>
<td>materials/tools got stolen;</td>
</tr>
<tr>
<td>special activities such as “Wind Break”; competition with other schools;</td>
<td>cost of flowers;</td>
</tr>
<tr>
<td>City’s or TDSB’s supports and challenges; fundraising through selling seeds/</td>
<td>lack of ‘publicity’ within the school;</td>
</tr>
<tr>
<td>plants to the Community;</td>
<td>age of the kindergarten students;</td>
</tr>
<tr>
<td>teacher’s initiative in using classroom budget;</td>
<td>lack of gardening tools and storage space;</td>
</tr>
<tr>
<td>TDSB helping teachers understand the project;</td>
<td>lack of information/communication;</td>
</tr>
<tr>
<td>letting students and teachers make choices;</td>
<td>teacher’s inexperience with these projects;</td>
</tr>
<tr>
<td>Evergreen’s and TDSB’s printed resources;</td>
<td>parent-driven and their lack of knowledge;</td>
</tr>
<tr>
<td>student outreach to community;</td>
<td>parents’ impatience with the process;</td>
</tr>
<tr>
<td>Evergreen’s and TDSB’s workshops;</td>
<td>parent’s varied goals, values, and motivations;</td>
</tr>
<tr>
<td>using survey to involve students in the design of the gardens</td>
<td>poor design and poor planning;</td>
</tr>
<tr>
<td></td>
<td>lack of short-term and long-term plans;</td>
</tr>
<tr>
<td></td>
<td>too big a scale;</td>
</tr>
<tr>
<td></td>
<td>caretaker left out;</td>
</tr>
<tr>
<td></td>
<td>unions’ volunteerism issue;</td>
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<tr>
<td></td>
<td>health and safety issues;</td>
</tr>
<tr>
<td></td>
<td>parent moving on when child graduates;</td>
</tr>
</tbody>
</table>
Table 6

Summary of Ways to Support Student Involvement in Schoolyard Gardening

<table>
<thead>
<tr>
<th>Role</th>
<th>Ways to Support Student Involvement</th>
</tr>
</thead>
</table>
| Teachers | integrate the gardening into the curriculum;  
try doing it with other teachers;  
have multi-grade involvements;  
do presentations on issues;  
make visits to farms;  
continue to let the students know about the benefits of gardening;  
take ‘Nature Walks’ in the garden;  
use the garden as reading area;  
build a garden in front of the school;  
get involved in community cleanups;  
plant plants in classrooms;  
model respects for greenery;  
make a new banner for the school foyer with ‘garden’ as the theme;  
start a Gardening Club;  
let students grow plants in the schoolyard garden and let them take the plants home;  
create indoor winter gardening activities;  
emphasize the composting and recycling programs;  
support and lead the schoolyard gardening project;  
attend the TDSB’s workshops;  
ask for site visit to design site-specific conditions;  
make daycare kids do watering during the summer |
| Parents  | reinforce and discuss more about the gardening project at home;  
support teachers;  
communicate with teachers;  
donate money or trees to the school;  
be a role model by doing gardening at home;  
participate in community cleanups;  
fundraise for the schoolyard garden;  
donate plants, bulbs, seeds, literature, and time to school;  
support your children’s plant growth at home;  
give your children opportunities to do gardening at home;  
take your children for ‘Nature Walks’ in community park;  
help watering and weeding the schoolyard garden during the summer;  
help food growing and community gardening after school |

*(table continues)*
<table>
<thead>
<tr>
<th>Role</th>
<th>Ways to Support Student Involvement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Principals</strong></td>
<td>support teachers; cover classes; provide money, budget, networking, and resources; encourage teachers to take students outside in the schoolyard garden; take the lead or ‘lead by example’; start a Gardening Club; provide moral support to both teachers and students; encourage newsletter and announcements; make announcements and reinforce behavior on gardening events; be positive with feedback and suggestions; encourage student participation; pay speakers to come and talk to students about environmental issues; pull together teachers, parents, and caretakers; cultivate relationships with the TDSB and teachers; develop strategies for healthy and safe schools</td>
</tr>
<tr>
<td><strong>Board</strong></td>
<td>establish TDSB/Evergreen partnership; establish EcoSchools program; initiate the Environment Report; establish Tree Replacement program; publish the School Ground Greening guide; set five-step process involving students as key in the EcoSchools guide; send flyers; give building permission; encourage schools to initiate gardening projects; promote Ecokids.ca website; link the EcoSchools program to schoolyard gardening initiatives; promote Evergreen resources that include money, expertise, publications, workshops, and provide assistance in research; set teachers’ networks; tour good garden examples; declare priorities; plan and design for site-specific conditions; email and telephone support; write specifications; have four grounds crews; provide professional development during the day-time; establish more partnerships; provide funding, awards, or incentives; hire more grounds crews; provide more gardening programs and tools; get more involved in maintenance</td>
</tr>
<tr>
<td><strong>Ministry</strong></td>
<td>provide funding; provide curriculum link; provide teacher training</td>
</tr>
</tbody>
</table>
Reflections on the Journey

According to John Dewey (1938/1997), "To reflect is to look back over what has been done so as to extract the net meanings which are the capital stock for intelligent dealing with further experiences. It is the heart of intellectual organization and of the disciplined mind" (p. 87).

In reflecting on my journey as a researcher, it is interesting to find that being a researcher is a pleasure and a privilege because it allowed me to be connected with some key individuals in the field and to tap into the core of the issue under investigation. This is what I have always wanted as a profession. I enjoyed talking with these participants; their insights into the topic have deepened my understanding and have broadened my horizon.

This work is a result of my 2-year exploration in the field of educational philosophy, combined with my prior knowledge in the built environment, and my desire to expand my knowledge to include the natural environment. As I stated earlier, the research topic, the methodology used to conduct the research, and the findings from the research are a political statement about who we are. In this study, I have unconsciously avoided categorizing the schools into different socioeconomic statuses because, in my mind, this is constantly changing, and I do not see people in terms of their socioeconomic class. In my view, the ultimate goal for education is to improve human intelligence in all aspects, and we should judge people by the end result of that. This may attribute to the Confucian influence that education should have no class distinction; by nature humans are alike, it is through education and practice that they become differentiated, and everyone can succeed if one works hard.
I feel that the only limitation that has constrained this research is time. When doing my research proposal, I took too long to do the literature review to find a research focus, I underestimated the amount of waiting time required for obtaining all the approvals from my Thesis Committee, the Brock University Research Ethics Board, and the Toronto District School Board External Research Review Committee, as well as the amount of waiting time for getting the participating schools’ responses. Therefore, it has left me with inadequate time to complete the rest of the thesis after data collection. Future research should take into account the amount of time required for the process mentioned above. Now, I will discuss some interesting and surprising findings from the research.

**Curriculum as Dual Factor**

An interesting debate I find is the Ontario curriculum being both an enabling and a limiting factor. This debate not only occurred between the teachers and the principals at School A and School B, but also between Richard Christie, District-wide Coordinator of Environmental Education for the TDSB, and Denis McGowan, Education Officer at the Curriculum and Assessment Policy Branch of the Ontario Ministry of Education.

This discrepancy is probably due to the fact that there is unevenly distributed emphasis on environmental education throughout the Science Curriculum for Grades 1-8 (1998) and that the curriculum demands in other subject areas (i.e., the arts, language, mathematics, social studies, history and geography, and health and physical education) are so heavy nowadays that they take up so much time that could have been spent on learning about nature and the environments. It would be beneficial if schoolyard gardening is linked to all the subject areas in the Ontario elementary curriculum, and made compulsory.
Community Gardening Culture as Dual Factor

Another dual factor I find that is both enabling and limiting is the community gardening culture. For example, at School C, there is a strong family gardening tradition in the area, so it is very easy for the school to get community support or donations; whereas at School B, the situation is reversed. School D\(^1\) shares a similar neighbourhood condition with School B, as the parent volunteer observed:

The other limiting factor is a lot of students from their family background are not encouraged to do the gardening. I think a lot of families that are here, if you’ve looked around about the houses, a lot of houses don’t really have gardens….So maybe their parents themselves don’t show an interest. I know from my own experience that when I asked parents to contribute to what they would want out of the garden, I’ve had no response. No one made any response, so it’s obviously not a strong concern for parents right now. That’s the difficulty of setting this up. That’s why we had to use the Cubs & Scouts. If we can get a Gardening Club running, then we can get the children interested. (Parent, School D)

Gardening Club as Important Enabling Factor

An important enabling factor I find is the Gardening Club. For example, the highly involved parent at School C felt that having a Gardening Club is an enabling factor because students can participate in indoor gardening activities through the Club at winter time. And the parent volunteer at School A felt that not having a Gardening Club at the school is a limiting factor because gardening is a ‘one day event,’ and as such students cannot get access to participate in the gardening all year round. The parent volunteer at School D also observed that not having a Gardening Club is a limiting factor:

\(^1\) School D is starting to renovate their Courtyard Garden (see Figure 18) but is not part of the case studies.
Apparently about 5 or 6 years ago, they [the school] had some money injected from, not a company, but a Medical Centre that put some funding into it. Once that was done, no one then took over to maintain it. It was allowed to become overgrown. It just needs to be tidied up, and then set up the Gardening Club in order to maintain the garden, and be used as an educational facility....At the moment, mainly we have nothing like a Gardening Club. We don’t have teachers on board at the moment to run that...the principal would have to put a teacher in charge of running a Garden Club....Yet the principal needs to make sure that there is a system in place to maintain the garden. (Parent, School D)

My finding differs from the findings of Gardner and Go (1999) that the existence of a Garden Club has minimal effect (9%).

Children Educating Parents

During the interviews, an interesting discovery contrary to my expectation is that all the participants at School B revealed that in their multi-cultural community it is the children educating the parents rather than the parents educating the children about environmental ethics. This is a good thing because we know then that, when the newer generation grows up, they will have a deeper understanding of and a greater appreciation for the environments in which they live.

TDSB Hiring More Grounds Crews

During the interviews, I heard from a number of participants that the TDSB is going backwards in terms of helping with the maintenance of the schoolyard gardens because they do not provide the same amount of maintenance support as they did 10 years ago. From talking to Bruce Day, District-wide Grounds Team Leader who has
Figure 18. School D courtyard garden, May 2005.
worked for the TDSB for 21 years, it seems to me that because there are more and more
schoolyard gardening initiatives board-wide, and because the grounds crews are getting
busier looking after new emerging projects, such as doing onsite visits and landscape
design consultations for new schoolyard gardening initiatives, they are probably spending
less time taking care of the existing gardening projects that have already been established.
Therefore, it is imperative for the TDSB to hire more grounds crews in the near future.

*More Publicity for the TDSB's Publications*

Another criticism that I heard from the interviewees is that there is a lack of
resources from the TDSB. But when I asked some of them if they were aware of the
brochures that the TDSB has published, or the Evergreen’s web resources, or the
workshops run by Heidi Campbell and Bruce Day, their reply was often “No.”
Obviously, they have not done adequate research to look for these resources, or there is a
lack of communication between the TDSB and the school. More publicity for the TDSB’s
publications is, therefore, necessary.

*Consistency with Dyment's (2004) Findings*

My findings that teacher’s initiative and commitment, principal’s leadership and
support, and parental involvement and donations as enabling factors are consistent with
Dyment’s (2004) that the top enabling factors are ‘teacher involvement, parental
involvement, and principal involvement’ (p. 216). The common three limiting factors I
find are time, money, and the unions’ “work-to-rule” issue, which are also consistent with
Dyment’s that ‘money and time’ (pp. 199, 215) were the top two limiting factors. In
Dyment’s (2005) *Gaining Ground* published by Evergreen, she made similar
recommendations that ‘policy development, curriculum development, teacher education,
Hello!

I'm a helpful assistant. How can I assist you today?
and school board initiatives' are the areas that could be addressed by the Ontario Ministry of Education so as to promote the school ground greening initiatives.

**Implications of the Study**

These research findings have implications for both theory and practice. In this section, I will discuss two implications: for theory, and for practice, respectively.

**Implications for Theory**

In an influential article entitled *A Ladder of Citizen Participation*, Arnstein (1969) advocated community involvement in city planning and urban design. Based on Arnstein's concept, Roger Hart (1997) wrote a remarkable book *Children's Participation*, in which he used a 'ladder' as a metaphor to illustrate the different degrees of children's initiation and collaboration when working on environmental projects with adults. The ladder contains eight rungs, with the lowest representing the least participation (see Figure 19). In Hart's view, the first three rungs of the ladder (Manipulation, Decoration, and Tokenism) are non-participation; they are unacceptable.

From the interviews with participants at School A, I found that their school did not have student participation in the planning or design of the schoolyard garden; the students were "Assigned but Informed" (Rung 4). As the principal said, "the kids aren't involved in the planning around that, they just do the work." Hart observed that the fourth rung of the ladder is the most commonly used approach to children's participation internationally; it is 'social mobilization,' which can be used effectively as a first stage in more meaningful participation projects with children. As Hart asserted:
Figure 19. Hart's (1997) ladder of children's participation.
Social mobilization alone achieves very little in the democratization of children. These efforts carry simple messages from the top down – that is, from adults to children – and have only a short-term impact. They must be quickly followed with more genuinely participatory experiences, or what will remain in children’s minds is the notion that children are to be used when needed, rather than the idea that the children’s perspectives are themselves important. (p. 43)

Hart (1997) also argued that, “Only a person within the culture who also understands political system can make this judgment” (p. 42) on where a social mobilization project lies along the continuum of the system. To find out which level each school stands on the ‘ladder of children’s participation,’ I contacted the highly involved teacher at School B and the highly involved parent at School C to clarify this.

From the perspective of the highly involved teacher at School B, their level of student participation in the “Butterfly Garden” was “Consulted and Informed” (Rung 5), they did not have any students participate in the planning or design of the Butterfly Garden. According to this teacher, “it was the Friends of the Rouge Watershed who designed it.” The students were informed about the design decision later.

From the reply of the highly involved parent at School C, their “Peace Garden” was initiated by a kindergarten teacher, and all the students participated in the planning, design, and planting of the garden. Therefore, their level of participation was “Adult-Initiated, Shared Decisions with Children” (Rung 6). During my visit to the three schools, I observed that this level of student involvement was well reflected in their garden conditions; the gardens at School C indeed looked nicer than the ones in School A and School B.
Hart (1997) further suggested involving students in the entire process to make the participation more meaningful:

To achieve real shared-decision projects, children need to be involved in some degree in the entire process....Even if children cannot have a voice in these discussions they should be able to understand how and why compromises are made. In this way, they will be less likely to assume that their participation was merely token and more likely to gain a realistic idea of how environments are created. (p. 44)

With these three schools, it seems to me that room still exists to achieve higher and more meaningful student participation in schoolyard gardening, which are “Child-Initiated and Child-Directed” (Rung 7) or “Child-Initiated, Shared Decisions with Adults” (Rung 8). However, this is somewhat a controversial issue for many people working with children. Essentially, the debate is which of these levels of participation is actually the most meaningful? Many people believe that shared decision-making is most beneficial to both children and adults. Others believe that children are most empowered when they are making decisions without the influence of adults. Most often, this does not exclude adults but reduces their role to that of support. Both arguments have merit; ultimately, it is up to each group to determine which form of decision-making best fits with the groups’ needs (Freechild Project, 2005).

Hart (1997) advised that this ladder should not be used as a measure to create a sense of inferiority for children operating at lower levels. He maintained:

All children may operate at one of the upper rungs of the ladder depending upon their ability and interest in a particular project. But this does not imply that any
project where children are operating at level 4 is necessarily inferior to one where they are operating at level 8. (p. 40)

One of the biggest outcomes of schoolyard gardening is allowing children to acquire skills related to democracy, participation, and citizenship during the gardening process. The defining historical event related to children’s participation was the Convention on the Rights of the Child adopted by the United Nations in 1989 (Chawla, 2002a, p. 25).

In 1992, the United Nations Conference on Environment and Development (UNCED) at Rio de Janeiro further defined the concept of ‘sustainable development,’ which is to balance development with the protection of the environment “so as to equitably meet developmental and environmental needs of present and future generations” (United Nations, Rio Declaration, 1992, Principle 3). Agenda 21, the plan of action that the collective governments endorsed, identified children and youth as a major group who must be involved in decision-making concerning the environment and development. It stated that governments should take measures to “ensure that the interests of children are taken fully into account in participatory processes for sustainable development and environmental improvement” (United Nations, Agenda 21, 1992, Chapter 25).

Children can learn democratic skills by working together with other children and with adults to bring about positive environmental changes, and this kind of practical experience may help them grow into responsible citizens (Chawla, 2002a, 2002b; Hart, 1997). A schoolyard garden is ultimately for children. When students are not involved in the schoolyard gardening activities, they will not be able to benefit from the many educational values that gardening can bring.
Implications for Practice

On a practical level, the results may benefit all the schools in the Toronto District School Board that have a garden in place or want to start a schoolyard garden. They will know what factors enable or limit student participation in the schoolyard gardening project (see Table 5), and follow the suggestions made on the ways to support student involvement in schoolyard gardening (see Table 6), so as to fully realize its educational values.

Furthermore, the research findings may make a direct contribution to the Toronto District School Board and the Ontario Ministry of Education in making sound policies on effectively incorporating schoolyard gardening or outdoor education into the elementary curriculum, especially at the moment when the Ontario Ministry of Education is starting to review their Science Curriculum for Grades 1-8 (1998) in September 2005. The research findings may also have implications for the school communities, school boards, and provincial ministries of education across Canada and around the world. What I hope to see is that there will be ‘a garden in every school’ as a result of this research.

Recommendations

Based on the detailed research findings documented in Chapter Four, I would like to make two recommendations: for future research, and for future practice.

Recommendations for Future Research

Further research on student perceptions of their involvement in schoolyard gardening would be an interesting comparison to make with the current research findings as children might have completely different responses to these questions. It is very important to obtain students’ views also because a critical component of schoolyard
gardening is to ensure that young people's voices and concerns are being heard and considered during the gardening process. For example, what do they like/dislike about schoolyard gardening? What are the factors that have helped them participate in schoolyard gardening? What are the factors that have prevented them from participating? How do the teachers, parents, and principal help them participate in schoolyard gardening? An international or comparative cross-site/country investigation will also be warranted in future research.

Time is a common limiting factor for the three schools. Future research could explore ways of resolving this issue creatively. For example, how could the TDSB work together with the school teachers to produce a practical manual on integrating all the curriculum areas with the schoolyard gardening project so that time spent on learning in the garden is not something extra at the teacher's expense but is part of the whole curriculum implementation process?

Money is another common limiting factor. Future research could focus on finding plausible solutions on financing these schoolyard gardening projects so as to make them more sustainable. Interviews with the Ontario Minister of Education, Minister of Finance, and the School Trustees could proceed with regard to the funding issue.

The unions' "work-to-rule" issue has been a big limiting factor for the schoolyard gardening project across all the TDSB schools during the year 2004/05. This fact was revealed in the email responses I received after sending out my research invitation to about 240 TDSB schools. Here are some of the replies:

Principal 1: Due to the job action of OSSTF and CUPE we will not be participating in this survey. (May 4, 2005)
Principal 2: We are currently experiencing a Work-To-Rule from both Unions in the TDSB....CUPE and OSSTF. Therefore staff will not participate in anything beyond their teaching duties. (May 5, 2005)

Principal 3: We currently have a work-to-rule situation that will prevent staff from responding. (May 5, 2005)

Principal 4: You may be aware that my teachers are on a Work to Rule....The elementary teachers were on WTR for months....I will bring it to their attention, but I would not expect follow through at this point in time. Perhaps you could wait until this situation is resolved and I am sure you would get a better response. (May 9, 2005)

Principal 5: I'm sorry, but [our school] will not be participating in this research. We would like to help but will not take anything extra on with work-to-rule and year end racing towards us. (May 9, 2005)

Principal 6: Thank you for your email regarding the gardening research that you would like to conduct. It sounds like an interesting survey but the entire TDSB is on strike right now. Our CUPE workers, teachers, and support personnel are all refusing to engage in certain aspects of their job descriptions. So, I feel that this is an extremely inappropriate time to ask for their participation in such research... (May 11, 2005)

Principal 7: My apologies for not responding sooner. This spring was very busy in the Toronto District School Board and our staff was on Work to Rule right until the end of the school year. (July 13, 2005)
Future research could investigate what the issues are between the unions and the Toronto District School Board and explore ways of preventing this situation from happening again. This is going to be a big topic, requiring economic and labour analysis.

Future longitudinal experimental research on the impacts of schoolyard gardening on the development of each child’s naturalist intelligence, ecological intelligence, emotional intelligence, and spiritual intelligence would be a valuable asset to our knowledge base.

Future research could also explore if having a schoolyard garden may increase the general health level of the children and adults, and if it may reduce the absentee rate for both teachers and students at the same school. This kind of quantitative research would have to take into account all the variables that might affect the findings of the research.

**Recommendations for Future Practice**

Coming from an architectural background, it is natural for me to consider the planning and design aspects of the schoolyard gardens. This section is essential because my research findings show that there was no student participation (0%) in the planning and design stage of the schoolyard gardening project in two of the TDSB schools. But involving students in the early stage is vital for the schools to make these projects sustainable.

In their practical manual *Success with School Gardens*, Guy, Cromell, and Bradley (1996, p. 13) asserted that ‘ownership’ is the key to developing long-term support for any schoolyard gardening project; involving the students early in the development process connects them with the garden and ensures their commitment to its success.
This section is essential also because the TDSB and Evergreen are currently creating a Master Plan for the design of all the new schoolyard gardens across the Board. These recommendations may offer suggestions for their current research on creating this Master Plan. In the following subsections, I will make two practical recommendations: schoolyard garden planning using square foot gardening, and schoolyard garden design using the Feng Shui concept.

**Schoolyard garden planning: using square foot gardening.** With the planning of the schoolyard gardens, Guy et al. (1996) believed that location is the most important factor in establishing a successful schoolyard garden: “Favorable sunlight, relatively level ground, access to water, good drainage, and decent soil are the critical elements to consider” (p. 37). Wydra (1997) suggested locating the garden in a visible place for adults to watch over children’s activities, and plan the garden that allows for both open spaces and small spaces to represent balance.

A vegetable garden should be a compulsory part of a schoolyard garden, where children can learn how to grow and enjoy the taste of their own food. ‘Square Foot Gardening’ is a good way to plan a vegetable garden (Bartholomew, 2005), which is to divide the site into 4’× 4’ blocks of 16 total squares, each containing a different vegetable, flower, or herb. To accommodate children’s smaller reach, modify it to 3’× 3’ blocks with a total of nine squares (Bartholomew, 2005, p. 240, see Figure 20). These blocks allow easy access to each square without stepping on the soil and they become permanent planting beds that will not be compacted by foot traffic, allowing the soil to retain its light, crumbly quality (Guy et al., 1996, p. 59).
Figure 20. Bartholomew's (2005) square foot garden 3' × 3'.

(Image source: 20kWeb.com, 2002)
Each square is easy to plant and maintain by a small group of students. This gardening system has been proved successful by numerous schools across the USA (e.g., a Home School in East Payson, Utah; Damascus School in Damascus, MD; Connie Lahr School, IN; Public School in Ceres, CA). Bartholomew (2005) further advised:

A garden for children should contain plants that are easy, quick to grow, colorful, and interesting to look at....The plant varieties selected should produce abundant amounts of fruit. Any of the vine-type cherry tomatoes would be good varieties for a child’s garden....Give your children the guidance they need to make their first garden a success, and they’ll come back for more every year and will retain their love of growing things throughout a lifetime of gardening. You can give a child or grandchild no better gift in life. (pp. 240-243)

A similar method was observed successful at the Environmental Centre in Edinburgh, Scotland, as Hart (1997) wrote, “the square metre cornfield has enabled thousands of children to plant and manage their own mini-farms, regardless whether they live in rural or urban areas” (p. 82).

**Schoolyard garden design: using the Feng Shui concept.** With the design of the schoolyard gardens, it is suggested to offer children with opportunities for exploration and adventure, as well as for developing their creative potential (Adams, 1993; Dannenmaier, 1998; Dovey, 1990; Freeman, 1995; Raymund, 1995; Sobel, 1990, 1993/2002; Stine, 1997; Titman, 1994; Wydra, 1997). Children have a natural sense of wonder and curiosity about so many things that surround them, and a schoolyard garden could become such a place to nurture this curiosity so that children can safely explore all kinds of things without the fear of being harmed or doing wrong. This teaches them to be
brave. The entrance to a schoolyard garden could be designed in such a way as to intrigue children's fantasy and will delight them in having an enchanting gateway to an outdoor world that tickles their imagination and invites their exploration (Dannenmaier, 1998; Jekyll, 1982/1990; Stine, 1997; Wydra, 1997).

Lyle (1994) brought a comprehensive environmental design perspective that embraced both architecture and landscape architecture to meet sustainable development values. Lyle stressed the critical cultural role of design in the sustainable development revolution. For him, “Environmental design is where the earth and its processes join with human culture and behavior to create form” (p. ix).

Moore (1995) advocated biodesign or regenerative design for the outdoor environments, which required that each component of the physical system to be designed to “include the full range of human needs in body, mind and spirit” (p. 223). Moore suggested that biodesign must focus on the ecology of individual, group, and community living, working, and recreating environments, and that all components of the human habitat must be designed as a subsystem of the biosphere.

Moore's (1995) approach to the design of a schoolyard garden somewhat reflects the Feng Shui concept. Feng Shui is an ancient Chinese geomancy (a kind of divination by means of figures or lines, formed by little dots or points, originally on the earth, and latterly on paper). The two Chinese characters for Feng Shui literally signify ‘wind and water.' The best way to understand it is to think of it as the earthly equivalent of astrology. While astrology seeks to find what fate holds in store from signs in the sky, Feng Shui takes its omens from the earth, in particular the relationships between buildings and their surroundings (Walters, 1991). Feng Shui has been used for
determining whether the potential house or garden site would bring health, prosperity or misfortune to the occupants. This principle has its roots in the Daoist philosophy.

Daoism holds that everything in the universe is made up of the same basic material, which is called the *qi*. Nominally, *qi* is air or breath. In essence, it may mean vital energy or a life force. Daoists contend that *qi* arises from the ultimate oneness, yuan *qi*, and evolve into a twofold primeval structure, with the positive (zheng *qi*, ‘good spirit’) and the negative (xie *qi*, ‘evil spirit’). A moral person (junzi) is expected to uphold and enhance the positive aspects of life to modify and restrain the negative in order to maintain a harmonious balance and to sustain life. *Qi* furthers the connection that one feels with nature: *qi* moves like the wind through the inner landscape (Dow, 2003).

Feng Shui is now a universally recognized design guide. When applied wisely, it may have a natural healing effect (Olds, 1989). A complete discussion of all its principles is beyond the scope of this thesis, but I have included a list of the elements to be incorporated into the design of a schoolyard garden so as to comply with the Feng Shui principles.

Children need space to exercise large motor skills in an outdoor area, such as balancing, jumping, throwing, rolling, crawling, running, and riding tricycles, etc.; having room to move about freely is essential in a schoolyard garden (Olds, 1989; Sting, 1997). Wydra (1997) contended in her book *Feng Shui in the Garden* (Chapter 14: A Child’s Garden) that “a moving object is a wonderful heart in a child’s garden because things that respond to movement are likely to inspire concentration” (pp. 113-114). Wydra suggested using a *swing* as a natural element for the heart of a child’s garden since “Swinging
engages all the senses. The eyes see new vistas, the skin feels the air differently, the nose inhales more deeply, and the ears fill with the sounds of pumping the swing” (p. 114).

Numerous empirical studies found that swinging is the most ideal childhood play activity (Freeman, 1995; Hüttenmoser, 1995; Raymund, 1995; Stine, 1997). Pumping a swing is an important motor activity for children as it reinforces their understanding that they learned a physical skill that provided them with independence and autonomy. Swings afford a variety of experiences in trust with adults and other children: they are good places to strengthen a friendship. As Robert Louis Stevenson (1981/1999, p. 36) recalled in his poem “The Swing” in *A Child’s Garden of Verses*:

> How do you like to go up in a swing,  
> Up in the air so blue?  
> Oh, I do think it the pleasantest thing  
> Ever a child can do!

Water is also a desirable feature for children. Water in some safe forms, such as fountains, ponds, streams, pools, or waterfalls, is an essential element for a schoolyard garden (Adams, 1993; Dannenmaier, 1998; Evergreen, 2002; Freeman, 1995; Stine, 1997; Wydra, 1997). When I was volunteering as a lunch assistant in an elementary school in Richmond Hill in 2004, I noticed that children seemed to have enormous curiosity about water in all kinds of forms, and never get bored at playing with it. There was a shallow ditch along the grassy field at the west end of the schoolyard, adjacent to the fence of the neighbourhood residential backyards. At almost every lunch time, a group of children would play around the ditch area, some with a tree stick in their hands, to test the water level, and to discover what was at the bottom of the ditch. In December,
Figure 21. Swing in a child’s garden. Source: Stevenson, 1981/1999.
when the ditch water got frozen, children then broke the ice into smaller pieces and played with them. Dannenmaier (1998) asserted in her beautifully illustrated book *A Child’s Garden*:

> The urge to seek water is one of the deepest human drives. Whenever children step outdoors, they seem to have an extrasensory ability to find water in any form....Being near water reduces a person’s heart rate, respiration, and blood pressure. Water’s soothing presence makes thoughts seem clearer, children sweeter, responsibilities lighter. In addition to its calming influence, water seems to heighten the senses. (p. 52)

The reason for human beings interested in water from an earlier stage runs deep in the human biological structure and consciousness. As Alexander et al. (1977) analyzed:

> We came from the water; our bodies are largely water; and water plays a fundamental role in our psychology. We need constant access to water, all around us; and we cannot have it without reverence for water in all its forms. (p. 323)

For a reflective person, the beauty of water in a garden would take on a spiritual significance since water is one of Daoists’ favourite symbols. Laozi (600 B.C.) said:

> *The supreme good is like water,*

> *which nourishes all things without trying to.*

> *It is content with the low places that people disdain.*

> *Thus it is like the Dao.*

> .... ....

> *Nothing in the world*

> *is as soft and yielding as water.*
Yet for dissolving the hard and inflexible,
nothing can surpass it.

(Dao De Jing, Verses 8 & 78)

Even Confucius could not avoid praising the harmonious aspects of water and, like the Daoists, he recommended it for its moral properties. He said, ‘in a water level, the water is in a most perfect state of repose. Let that be your model. The water remains quietly within, and does not overflow. It is from the cultivation of such harmony that virtue results’ (Keswick, 2003, p. 185).

Children love to be in tiny, cave-like places that are made of natural materials, such as rocks or stones. A castle built in a schoolyard garden by children themselves is much better than perfectly detailed, exactly finished ones made for them by adults (Alexander et al., 1977; Sobel, 1993/2002). These secret places arouse children’s natural sense of wonder and curiosity, like the grottos, which first appeared in the Italian and later the French gardens, grottos were reminiscent of primitive society, for people to rediscover and reinterpret the antique world. Ancient literature made innumerable references to sacred caves as retreats and earthly paradise (Adams, 1979).

Children like refuges – places that they can “see without being seen” (Kirkby, 1989, p. 7), such as treetops, tree houses, thick tree trunks, forts, dens, bush houses, or a staggered fence. These places give children a sense of peace, safety, security, and of being away from adult demands or pressures. A schoolyard garden could be provided with these hiding places (Alexander et al., 1977; Dovey, 1990; Raymund, 1995; Sobel, 1990, 1993/2002; Titman, 1994; Wydra, 1997). The game of hide-and-seek has survived among children for centuries. This game teaches children the skill of observation.
Children like to climb (Dovey, 1990; Freeman, 1995; Titman, 1994; Wydra, 1997). Climbing gives them a vantage point that they do not naturally have, and also because of the fun of the exhilaration of falling. A schoolyard garden is suggested to contain objects to climb, such as climbable trees or steel posts, and soft places to fall. As Stevenson (1981/1999, p. 15) described in his poem “Foreign Lands”:

> Up into the cherry tree
> Who should climb but little me?
> I held the trunk with both my hands
> And looked abroad on foreign lands.

> . . . . . .
> If I could find a higher tree
> Farther and farther I should see,
> To where the grown-up river slips
> Into the sea among the ships...

There must also be at least one seat in a schoolyard garden, and this seat must be placed in a quiet, sunny spot, sheltered from the wind, where children and adults can peacefully reflect and be in touch with nature (Alexander et al. 1977; Evergreen, 2002; TDSB, 2000/2004; Wydra, 1997). Moreover, Kritchevsky (1967) found that the higher the quality of the schoolyard garden, the more sensitive and friendly were the teachers and the more interested and involved were the students (as cited in Larson, Greenfield, & Land, 1990). Meyer (2001) noted that, in recent years in China, there have been many books and articles on gardening, and there has been a craze about gardens, which is demonstrated by placing stones or rocks in the middle of the schoolyards.
Figure 22. Child climbing a tree.

Figure 23. Children having tea in a garden. Source: Jekyll, 1982/1990.
There is a belief in China that the beauty of nature could shape moral character. As Zhang Chao said, "The plum tree leads a person to loftiness, the orchid to quietness, the chrysanthemum to unpolished simplicity, the lotus to contentment,...the peony to heroism, the canna to gracefulness, the pine to leisure, the phoenix tree to clarity, the willow to sensitivity" (as cited in Meyer, 2001, p. 234). A professor at Sichuan Normal College wrote, "Beauty is the bridge which leads to morality,...appreciation of the beauties of nature, artistic creativities, or experiencing the beauty of human nature in a social context – all these lead to a purification of the spirit" (as cited in Meyer, 2001, p. 234).

**Final Word**

At the end, I would like the reader to ponder this question: what is the meaning of the world? Well, to me, the meaning of the world is a Garden. As Quinn (1995) profoundly maintained:

The meaning of the world,...I think the third chapter of Genesis had it right. It's a garden – the gods’ garden....And there are two trees in the garden, one for the gods and one for us. The one for them is the Tree of the Knowledge of Good and Evil, and the one for us is the Tree of Life. But we can only find the Tree of Life if we stay in the garden – and we can only stay in the garden if we keep our hands off the gods’ tree....Apparently the gods intend this planet to be a garden filled with creatures that are self-aware and intelligent. (pp. 241-242)

Quinn (1995) continually argued that humans should leave the world in the hands of the gods because only the gods know how to rule the world and humans are not as wise as the gods:
The knowledge of good and evil is fundamentally the knowledge the rulers of the world must exercise, because every single thing they do is good for some but evil for others. This is what ruling is all about....The disaster occurred when, ten thousand years ago, the people of your [human] culture said, ‘We’re as wise as the gods and can rule the world as well as they.’ When they took into their own hands the power of life and death over the world, their doom was assured....Because they are not in fact as wise as the gods....The gods ruled the world for billions of years, and it was doing just fine. After just a few thousand years of human rule, the world is at the point of death. (pp. 165-166)

Aaron (2004) had a different interpretation of the story as, according to Judaism and the Jewish bible ‘Torah,’ humans are supposed to be as divine as God:

Adam and Eve were living a carefree life in the Garden of Eden. They had only one restriction. God commanded them not to eat of the Tree of Knowledge of Good and Bad. However, forbidden fruits tend to seem more tasty to people. In addition, having a seductive snake around encouraging them to eat it made the challenge all the more difficult....The snake did not say, “Hey, you know what? God doesn’t want you to eat from that tree because He knows that the day you eat from it, you’ll be rich”....The snake also did not seduce them by telling them that they would become famous....And the snake did not...claim that the forbidden fruit would give them a great sex life...this story is teaching us that wealth, fame, or sex cannot really seduce people into doing wrong....The snake said, “God does not want you to eat of that tree because if you do, then you too will be like God.” Now, that is appealing!
...According to the Torah, the root of all drives and ambitions of humanity is to be divine. Wealth, fame, and sexual pleasure appeal to us only as accoutrements of this most basic drive to be all-powerful and Godlike. But they do not fulfill our genuine inner desires....All we want to achieve in our lives is to be who we are....This was the underlying dilemma of Adam and Eve. In effect, they had to ask themselves: "Do we surrender our freedom and obey God, or do we affirm ourselves and do what we want?" They didn't realize that the answer is not either/or – it is yes and yes. (pp. 101-103)

An interesting cross-cultural comparison is found in the philosophical text of Zhuangzi (flourished between 350 – 300 B.C.), one of the two most popular Daoist texts in the Chinese tradition. In the following verse, Zhuangzi contended that wealth, fame, and success are, in fact, common human desires, but only the intelligent ones are concerned about their spiritual life:

The crowd cares for gain,
The honest man for fame,
The good man values success,
But the Wise Man, his soul.

(Waley, 1939/1974, p. 71)

This verse reflected the Daoist teaching of self-cultivation and the escape from societal pressure into an individual path of freedom. Whichever standpoint each of us takes, we must do whatever we can to resume the world into a Garden again!
Figure 24. Children under a tree.

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Appendix A
Interview Questionnaires

Teacher/Parent Code: 
School Name: 
Tel: 
Email: 
Date/Time: 

Role: 
Gender: [ ] Male [ ] Female 
Involved in Gardening? [ ] Yes [ ] No 
Years in the School: 
Subject(s) Taught: 

Q1. From your observation, what is the amount or percentage of student participation in the schoolyard gardening project? At what stage does this figure apply?

Q2. What factors have enabled student participation in the schoolyard gardening project? How has the teaching staff attempted to enable these factors?

Q3. What factors have limited student participation in the schoolyard gardening project? How has the teaching staff attempted to limit these factors?

Email: doniazhang@yahoo.com   Tel: (905) 886-7025
Q4. How do the teachers provide opportunities to ensure true and lasting student involvement in schoolyard gardening?

Q5. How do the parents create a family culture that supports their child’s/children’s true and lasting involvement in schoolyard gardening?

Q6. How does the school principal create a school-wide culture that supports true and lasting student involvement in schoolyard gardening?

Q7. How does the school board create a board-wide culture that supports true and lasting student involvement in schoolyard gardening?
Adult Perceptions of Student Involvement in Schoolyard Gardening
Donia Zhang, M.A. / M.Ed. (Candidate), Brock University, St. Catharines, Ontario

Name: 
Organization: 
Role: 
Gender: [ ] Male [ ] Female
Tel: 
Date/Time: 
Fax: 
Email: 

Q1. Why does the Ontario curriculum not explicitly support Environmental Education elements (e.g., schoolyard gardening) or Ecological Literacy (Ecoliteracy)?

Q2. How could the Ontario Ministry of Education officially recognize, at the policy level, the importance of Environmental Education and Ecoliteracy and provide the school boards with funding for such initiatives as schoolyard gardening?

Q3. How could the Ontario Ministry of Education help link Environmental Education (e.g., schoolyard gardening) with existing curriculum?

Q4. How could the Ontario Ministry of Education promote teachers to use schoolyard gardens as an outdoor classroom and provide teacher training for it?
Appendix B
Interview Opening Scripts

Script 1: Hello _____, thank you for coming to my interview.

My name is Donia Zhang, and I am a Master of Education student at Brock University. Currently, I am conducting a research project on *Adult Perceptions of Student Involvement in Schoolyard Gardening*. My faculty supervisor is Professor John Novak. This study has been reviewed and received ethics clearance through Brock University Research Ethics Board and the Toronto District School Board External Research Review Committee.

The purpose of this research is to investigate through adult perceptions *what* factors have enabled and limited student participation in schoolyard gardening, and *how* to support student involvement in schoolyard gardening. Please feel free to say anything you like as your name will not be identified in the thesis or the report except on my sheet. I will have to write some notes for myself, and I would like to tape-record our conversation for my data analysis. Your school will receive a summary report of my research results in September. You may discontinue participation at any time without penalty or loss of benefits, to which you are otherwise entitled. Do you have any questions?

Script 2: Hello Denis, thank you for taking the time to meet me today.

My name is Donia Zhang, and I am a Master of Education student at Brock University. Currently, I am conducting a research project on *Adult Perceptions of Student Involvement in Schoolyard Gardening*. My faculty supervisor is Professor John Novak. This study has been reviewed and received ethics clearance through Brock University Research Ethics Board and the Toronto District School Board External Research Review Committee.

The purpose of this research is to investigate through adult perceptions *what* factors have enabled and limited student participation in schoolyard gardening, and *how* to support student involvement in schoolyard gardening. From the interviews that I conducted at the three TDSB schools, the participants kept telling me that the there has been a significant budget cutback in recent years at the provincial level, and that the Ontario curriculum itself has been the main limiting factor for student participation in schoolyard gardening. For the teachers who make the extra effort to teach in an outdoor classroom, they do not get the due support required in terms of funding and resources, since this is considered as an ‘add-on’ or ‘extra’ at the teacher’s expanse. The existing curriculum still puts a strong emphasis on literacy and numeracy, but not ecoliteracy.
DATE: April 01, 2005
FROM: Linda Rose-Krasnor, Chair
Research Ethics Board (REB)
TO: John Novak, Education
Donia ZHANG
FILE: 04-366 - ZHANG
TITLE: Adult Perceptions of Student Involvement in School-yard Gardening

The Brock University Research Ethics Board has reviewed the above research proposal.

DECISION: Accepted as Clarified

This project has received ethics clearance for the period of April 01, 2005 to June 25, 2005 subject to full REB ratification at the Research Ethics Board’s next scheduled meeting. The clearance may be extended upon request. The study may now proceed.

Please note that the Research Ethics Board (REB) requires that you adhere to the protocol as last reviewed and approved by the REB. During the course of research no deviations from, or changes to, the protocol, recruitment, or consent form may be initiated without prior written approval from the REB. The Board must approve any modifications before they can be implemented. If you wish to modify your research project, please refer to http://www.brocku.ca/researchservices/forms to complete the appropriate form Revision or Modification to an Ongoing Application.

Adverse or unexpected events must be reported to the REB as soon as possible with an indication of how these events affect, in the view of the Principal Investigator, the safety of the participants and the continuation of the protocol.

If research participants are in the care of a health facility, at a school, or other institution or community organization, it is the responsibility of the Principal Investigator to ensure that the ethical guidelines and approvals of those facilities or institutions are obtained and filed with the REB prior to the initiation of any research protocols.

The Tri-Council Policy Statement requires that ongoing research be monitored. A Final Report is required for all projects, with the exception of undergraduate projects, upon completion of the project. Researchers with projects lasting more than one year are required to submit a Continuing Review Report annually. The Office of Research Services will contact you when this form Continuing Review/Final Report is required.

Please quote your REB file number on all future correspondence.
The Brock University Research Ethics Board has reviewed the research proposal:

**Adult Perceptions of Student Involvement in Schoolyard Gardening**

The Research Ethics Board finds that your *modification request* to an ongoing project involving human participants conforms to the Brock University guidelines set out for ethical research.

LRK/hb

**Heather Becker, Office of Research Ethics**  
Brock University  
Office of Research Services  
500 Glenridge Avenue  
St. Catharines, Ontario, Canada. L2S 3A1  
phone: (905)688-5550, ext. 3035  fax: (905)688-0748  
email: hbecker@brocku.ca  
http://www.brocku.ca/researchservices/ethics/humanethics/

This communication and any attachments are intended for use only by the individual(s) to whom they are specifically addressed and should not be read by or delivered to, any other person(s). Such communication or attachment(s) may contain privileged or confidential information. If you have received this message in error, please notify me immediately by returning the communication to hbecker@brocku.ca. I thank you in advance for your co-operation and assistance.
April 25, 2005

Dear Donia Zhang and John Novak:

RE: Adult Perceptions of Student Involvement in Schoolyard Gardening

This is to confirm our approval of your request to conduct the above-mentioned study in three of our elementary schools that have won the EcoSchools Certificates. The revisions you submitted have satisfactorily addressed the issue outlined in our letter dated April 21, 2005.

Once you have the confirmed support from the principals of your targeted schools, please inform us in writing the names of the participant schools for our records.

We wish you luck with this project and look forward to receiving a report about your findings.

Sincerely,

Maria Yau
Maria Y.M. Yau, Chair
External Research Review Committee, TDSB
Phone: 416-394-4951
E-mail: maria.yau@tdsb.on.ca
Appendix D
Thesis Defense Handouts

Adult Perceptions of Student Involvement in Schoolyard Gardening


Why Gardens?

My initial interest in gardens may derive from my childhood experience in China

Background of the Problem

This research study is in response to the UNESCO’s call for environmental education to raise young people’s environmental awareness and to reconnect them with the natural world.

- Environmental Crisis of the Modern World
- Human Disconnection from the Natural World
- Environmental Education for the Postmodern Era
Statement of the Problem

This thesis examines the factors that have enabled and limited student participation in schoolyard gardening through the perceptions of adults, because:

- Previous research findings revealed that there is a lack of student involvement in schoolyard gardening, especially in the initial planning and design stage.
- Dyment (2004) found that students in the Toronto District School Board (TDSB) are not involved in school ground greening nearly as much as they should be.
- There has been no detailed Canadian research study on adult perceptions of student involvement in 'schoolyard gardening.'

Rationale for the Study

- Studying adult perceptions of student involvement is the best way to tackle this issue since the power and decision-making rest very much in the hands of adults.
- Interviewing students would require additional parental consents and audio transcriptions, which could be difficult to accomplish within the timeframe for a Masters thesis.

Research Questions

My research questions are as follows:

1. From the perceptions of adults, what is the amount of student participation in schoolyard gardening and at what stage are students mostly involved?
2. From the perceptions of adults, what are the factors that have enabled and limited student participation in schoolyard gardening?
3. From the perceptions of adults, how can schools maximize the enabling factors and minimize the limiting factors for student involvement in schoolyard gardening?

Theoretical Framework

Holism in Schoolyard Gardens

The schoolyard gardening movement situates itself within the holistic educational philosophy and the multiple intelligences theory that stress the development of the whole child. The key books on holistic education include:

- Krohn Miller's (1997) What Are Schools For?
History of Children Gardening

Many people may think that schoolyard gardens is something new that just came out recently in the 1970s or 1980s, but my literature research found:

- Forest Colonies in Ancient India
- Carol Martin’s (2000) A History of Canadian Gardening

Continuity of Schoolyard Gardening

My literature review shows that student participation in schoolyard gardening can enhance their:

- Healthy eating habits
- Academic learning
- Social, behavioral, and moral development
- Ecological literacy and environmental awareness

Research Design: Transformative Research

This research design was guided by the principles of transformative research (Deshler & Selener, 1991). My research design is connected to the work of Deshler and Selener in these ways:

1. Ethical - paying special attention to the preservation of environmental sustainability
2. Empowering - promoting the conservation and proliferation of different forms of life
3. Holistic - emphasizing, identifying, and revealing relationships and interconnectedness between the part and the whole, the micro and the macro, and the local and the global
Data Collection

It is a qualitative case study using interviews and site photos as the main data collection method.

- Email invitation was sent to about 240 TOSB schools during April 25 - May 7, 2005, along with my Letter of Invitation, Consent Form, Interview Questionnaire, and later, Interview Schedule.
- Interviews were conducted during May 13 - June 10, 2005.
- There were 16 interview participants.

Data Analysis

The data analysis applied Creswell's (1998) qualitative data analysis framework:

- Within-Case Analysis
- Cross-Case Analysis
- Holistic Analysis

Within each analysis, data were further organized under four subsections:

1) Amount of Student Participation
2) Enabling Factors for Student Participation
3) Limiting Factors for Student Participation
4) Ways to Support Student Involvement

Interviewees

TOSB schools:

- 2 principals, 3 most involved teachers, 2 less involved teachers, 3 involved parents that are associated with the three case study schools (plus 1 additional parent at a fourth school that is not part of the case studies)

TOSB/Evergreen representatives:

- Richard Christie, District-wide Coordinator of Environmental Education for the TOSB
- Heidi Campbell, TOSB/Evergreen School Ground Design Consultant
- Bruce Day, District-wide Grounds Team Leader for TOSB for 21 years
- Cam Colyer, National Learning Grounds Manager at Evergreen
- Denis McGowan, Education Officer at the Curriculum and Assessment Policy Branch of the Ontario Ministry of Education
Summary of Findings

The following theme, enabling and limiting factors are repeatedly emphasized by the three participating schools:

> Typically, students were not involved in the initial planning or design stage of the schoolyard gardening project
> Common enabling factors are teacher's initiative and commitment, principal's leadership and support, parental involvement and donations, and the TDSB's EcoSchools program and workshops
> Common limiting factors are time, money, and the Union's "work-to-rule" issue

Summary of Findings (continued)

Ways to support student involvement in schoolyard gardening include:
> Teachers integrate the gardening into the curriculum
> Parents make donations to the school and create a family gardening culture
> Principals support in money or budget and take the lead
> TDSB provides funding, awards, incentives, and more maintenance
> Ontario Ministry of Education supply funding, curriculum link, teacher training .
Implications

Roger Hart (1997) in his book, Children's Participation, used 'ladder' as a metaphor to illustrate the different degrees of children’s initiation and collaboration when working on environmental projects with adults. The ladder contains 8 rungs, with the lowest representing the least participation and the first 3 rungs non-participation; they are unacceptable.

Hart's (1997) ladder of children's participation

Recommendations

Recommendations for Future Research

> Investigate student perceptions of their involvement in schoolyard gardening
> Produce a practical manual on integrating all the curriculum areas with the schoolyard gardening project
> Find plausible solutions on financing these schoolyard gardening projects
> Explore what the issues are between the Union and the Toronto District School Board and searching for ways of preventing the "work-to-rule" situation from happening again
> Do longitudinal experimental research on the impacts of schoolyard gardening on the development of each child's naturalist intelligence, ecological intelligence, emotional intelligence, and spiritual intelligence
> Explore if having a schoolyard garden may increase the general health level of the children and adults, and if it may reduce the absentee rate for both teachers and students at the same school

Recommendations (continued)

Schoolyard Garden Planning: Using Square Foot Gardening

Cultural Significance of Gardens

There is a belief in China that the beauty of nature could shape moral character.

As Zhang Xioo said, "The plum tree leads a person to introversion, the orchid to quietness, the chrysanthemum to unpolished simplicity, the lotus to contentment...the poony to heroism, the camphor to gracefulness, the pine to leisure, the phoenix tree to clarity, the willow to sensitively" (as cited in Meye., 2001, p. 234).

A professor at Shihua Normal College wrote, "Beauty is the bridge which leads to morality...appreciation of the beauties of nature, artistic creativities, or experiencing the beauty of human nature in a social context -- all these lead to a purification of the spirit" (as cited in Mayer, 2001, p. 234).