GAINING GROUND:
The Power and Potential of School Ground Greening in the Toronto District School Board

by Janet E. Dyment, Ph.D.
Evergreen and Toyota Canada Inc., with its Dealerships, are working together to ensure that children’s school environments are as nurturing as possible. The **Toyota Evergreen Learning Grounds Program** represents a commitment to contribute positively to the health and well-being of future generations by educating children about the importance of restoring and preserving the environment. Teachers, students and community members are invited to participate in a nation-wide effort to reclaim Canada’s school grounds and to create healthy learning environments.

**Toyota Evergreen Learning Grounds Charter**

The Evergreen and Toyota Canada Inc. partnership represents a shared commitment to positively contribute to the improvement of school grounds and the natural environment in order to enhance the emotional and physical development of Canada’s children. We believe that the provision of educational resources and the support of caring citizens will transform school grounds into healthier, more dynamic places for learning. We believe that by combining Toyota’s commitment to corporate social responsibility with Evergreen’s ecological restoration practices we will enhance our combined reach and the quality of business, community and learning. We commit our organizations to lead by example, and to provide measurable and meaningful resources and support to Canada’s schools and to the communities in which we work. It is our sincere intent to foster a new spirit of community involvement and environmental stewardship within the hearts and minds of Canada’s future: children and youth.

**Geoff Cape**

Executive Director, Evergreen

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**Mr. Kenji Tomikawa**

President and CEO, Toyota Canada Inc.

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Foreword

*Gaining Ground* is the result of three years of collaboration between Janet Dyment and Evergreen that began with a shared interest in the power of hands-on learning in the outdoors. From there grew a desire to better understand and document the range of benefits of school ground greening in Canada. The international literature did not reflect the level of work being done in Canadian schools, and we felt it was important to test the ideas in the Canadian context. Focusing the study in the Toronto District School Board (TDSB) made sense because of the quantity and variety of existing projects, the socio-economic and cultural diversity of students in the board and the increasing level of institutional support for greening — in no small way the result of an ongoing partnership between Evergreen and the TDSB.

We are thrilled to present this report on the value of children’s outdoor environments at school. The study paints a compelling picture of how the benefits of school ground greening cut across cultural and socio-economic lines. It has reinforced our belief in the power of making improvements to this important public landscape, and in cultivating human and natural communities that nurture each other.

**Cam Collyer**  
Learning Grounds Program Manager

Acknowledgements

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Executive Summary

About This Report

*Gaining Ground* presents the findings of a 2003 study that systematically investigated the influence and potential of green school grounds in the Toronto District School Board (TDSB). The report was commissioned by Evergreen, a charitable organization whose mission is to bring communities and nature together for the benefit of both. *Gaining Ground* explores the impacts of greening initiatives on curriculum delivery and teaching practices, as well as on student learning, behaviour, play and environmental awareness. It also considers issues of social inclusion, health and safety. In so doing, it identifies the major challenges and opportunities that must be addressed to realize the full potential of greening.

The study took place in Toronto, Canada, a city of 2.48 million people of kaleidoscopic ethnic diversity. It included 45 elementary, middle and high schools in the TDSB, the country’s largest school board, with 558 operating schools. It involved 149 parents, teachers and principals through questionnaires and/or interviews.

This report presents clear evidence that green school grounds in the TDSB are a significant asset. They positively influence many aspects of students’ educational experiences, including their learning, their social interactions, their health and safety and their environmental awareness. Green school grounds have the potential to enrich the quality of life, education and the environment for present and future generations of young people.

Key Challenges and Opportunities

While the evidence gathered clearly points to the benefits of greening, the study revealed undeniable challenges as well. Many study participants felt that teachers were not using the green school ground nearly as much or as effectively as they could. They identified challenges such as fundraising, grounds design and maintenance, and teachers’ unfamiliarity with delivering the curriculum and managing classes outdoors. To meet these challenges, participants expressed the need for professional development, curriculum resources and wider, more consistent institutional support for those who want to teach on the school ground.

Ninety percent of respondents reported that student enthusiasm and engagement in learning increased on the green school ground.
Impacts of Green School Grounds in the TDSB

This study demonstrates that the impacts of greening initiatives in the TDSB are both broad-ranging and encouraging. Particularly striking is that the benefits described emerged across the board. Regardless of the differences among the schools and projects studied, participants perceived the following positive impacts:

- Teachers were able to deliver a broad range of subjects in the outdoor classroom created through greening projects.
- Student learning was enhanced on green school grounds.
- Teachers had renewed enthusiasm for teaching and were using a wide variety of innovative instructional strategies on green school grounds.
- Students demonstrated more positive social behaviour when learning and playing on green school grounds.
- The diversity of play spaces created through greening projects suited a wider array of students than conventional turf and asphalt school grounds.
- Green school grounds promoted the social inclusion of all people, irrespective of gender, race, class or intellectual ability.
- Green school grounds were safer and healthier spaces for students.
- Green school grounds promoted environmental awareness and stewardship.

Recommendations

The following general recommendations identify opportunities for change and are offered as reference points for decision-makers and advocates of green school grounds:

1. Policy Development

As this study indicates, institutional endorsement of greening initiatives is crucial to their long-term success. High-level support at the provincial policy level, for example, would provide a stable, recognized commitment to guide Ontario’s College of Teachers, Faculties of Education, school boards, administrators and teachers.

Recommendations

- The Ontario Ministry of Education should officially recognize, at the policy level, the educational, social and ecological benefits of hands-on, outdoor learning on green school grounds.
- The policies developed by the Ontario Ministry of Education should support and promote school ground greening initiatives by addressing issues related to funding, training and curriculum.
2. Curriculum Development
The mandated Ontario curriculum does not explicitly endorse or support the use of school grounds for curriculum delivery. This study indicates that without such explicit endorsement and guidance, teachers are discouraged from using the school ground for hands-on, outdoor learning.

Recommendations
- The Ontario Ministry of Education should ensure that curriculum policy documents explicitly recognize the value of hands-on, outdoor learning and provide concrete examples of how the curriculum can be delivered on school grounds.
- The Ontario Ministry of Education, in conjunction with school boards across the province, should ensure that curricular resources are developed to facilitate the delivery of the mandated curriculum on school grounds.

3. Teacher Education
This study reveals that many teachers in the TDSB lack the skills and confidence to use the school ground for outdoor learning. While the TDSB currently offers a series of workshops on green school grounds, many study participants reported that they were either unaware of the workshops, unable to participate, or wanted even more workshops. Without adequate professional development to address such challenges as project design and maintenance and delivering the curriculum outdoors, green school grounds will remain an underused resource.

Recommendations
- Faculties of Education should recognize the value of hands-on, outdoor learning and provide professional development opportunities for student teachers and practising teachers who wish to engage in greening initiatives and make full use of the educational potential of school grounds.
- The TDSB and school boards across the province should provide professional development opportunities for practising teachers who wish to engage in greening initiatives and make full use of the educational potential of school grounds.
4. School Board Initiatives

As described in this study, a variety of new initiatives within the TDSB (Ecoschools Program, Evergreen-TDSB Partnership) are fostering the recognition and support needed to more fully realize the promise of green school grounds. These leading-edge initiatives provide a model for school boards across the province.

Recommendations

• The TDSB should continue to expand planning and design support for green school grounds to ensure that Master Plan designs and school-initiated projects incorporate practical, sustainable and engaging design elements, as well as long-term maintenance plans. School boards across the province should follow this lead.

• School boards should elevate the importance of green school grounds in terms of funding priorities, given their many benefits and the harsh reality that many schools that want to improve their grounds are limited by their ability to raise funds.

Conclusion

The diversity of schools and projects examined in this study clearly demonstrates that greening in the TDSB holds tremendous promise. The findings are in keeping with the benefits and potential described by researchers of greening initiatives elsewhere in Canada and internationally. *Gaining Ground* is thus of interest not only to students, teachers, parents and administrators within the TDSB, but also to school communities, school boards and provincial ministries of education across Canada and around the world.
Introduction

School grounds in the Toronto District School Board (TDSB) are changing. Hard, hot, unimaginative expanses of turf and asphalt are being “greened”¹ and transformed into thoughtfully designed places that include a variety of natural features such as trees, butterfly gardens, ponds, floral gardens and vegetable patches. Some also incorporate innovative and appealing design elements such as art, murals and gathering areas to complement and enhance their socio-ecological value.

As these green school grounds become more common in the TDSB and around the world, researchers from a number of disciplines are beginning to investigate the differing approaches, traditions and contexts that define them. Their research indicates that students attending schools with green grounds experience many benefits. These include: increased play opportunities (Barbour, 1999; Moore, 1996; Tranter & Malone, 2004); enhanced social relations (Alexander, Wales North & Hendren, 1995; Titman, 1994); unique opportunities to become engaged and reflective citizens (Dyment, 2004; Mannion, 2003); safer and less hostile outdoor environments (Cheskey, 1994; Evans, 2001); increased learning opportunities (Bell, 2001b; Centre for Ecoliteracy, 1999); enhanced relationships with the natural world (Bell, 2001a; Malone & Tranter, 2003b); and improved academic performance (Lieberman & Hoody, 1998; Simone, 2002). Similarly, teachers are experiencing such benefits as unique opportunities for curriculum development (Moore & Wong, 1997) and reduced classroom management problems (Lieberman & Hoody, 1998). The ecological potential of green school grounds to contribute to urban greening and urban planning (e.g. through the (re)introduction of wildlife and biodiversity corridors, refuges and/or islands in urban landscapes) has also been noted (Cronin-Jones, 2000; Rosenthal & Dyment, 2002).

While much of the research points to the benefits of greening projects at individual schools, it has not yet addressed whether these benefits are broadly representative of a large number of schools. This study offers to fill, at least partially, this knowledge gap. By exploring the impacts of greening initiatives across an entire school board located in Canada’s largest city, Toronto, it demonstrates that the benefits of greening are being widely realized.

Three main questions guided the research:

1. What are the impacts of green school grounds in the TDSB?
2. Are the impacts emerging across a range of different schools and projects?
3. What are the key challenges and opportunities to fully realizing the positive impacts of green school grounds?

¹ A number of terms have been used to describe the changes occurring on school grounds in the TDSB, including “school ground gardening”, “school ground naturalization”, “school ground restoration”, and “school ground greening”. While there are important differences between each term, and while each term is itself somewhat contested, for the purpose of this report, “school ground greening” will be used as an umbrella term to describe these initiatives.
The TDSB was an ideal study site to answer these questions given that so many of its schools, from widely varying contexts, have begun the process of greening. Approximately 20% of the more than 500 schools in the board have initiated greening projects. Those profiled in this study offer a diversity of circumstances and approaches — for example, some schools have only 200 students, while others have more than 1,500; some are located in Toronto’s wealthiest neighbourhoods, while others are in its poorest; some of the greening projects are brand new, while others are more than ten years old; some have budgets of only a few hundred dollars, while others have access to hundreds of thousands of dollars; and some have very complex designs including ponds, murals, outdoor classrooms, vegetable gardens, mazes and butterfly gardens, while others are much more modest and consist of only a few trees.

Working with a large number of schools (45) under a single board administration, this study explored how green school grounds influence:

- curriculum delivery
- student learning and academic achievement
- teaching practices
- student behaviour and social development
- student play
- social inclusion
- student health and safety
- environmental awareness and stewardship.

The remainder of this report is divided into the following major sections. In the Study Design section, the research approach is explained, including the design of the questionnaires and interviews and the process of data collection and analysis. In the Results section, the findings are presented and organized into eight key areas: curriculum delivery, learning and academic achievement, teaching practices, student behaviour, play, social inclusion, health, safety and environmental awareness. In the Challenges and Opportunities section, several priority issues affecting the success of greening initiatives are discussed. This discussion is followed by a section highlighting supportive initiatives being undertaken by the TDSB. Finally, in the Conclusion and Recommendations section, a number of general suggestions indicate how the potential of greening efforts may be more fully realized and are offered as reference points for decision-makers and advocates of green school grounds.
Study Design

The study began with an extensive review of the literature to identify major gaps in the understanding of green school grounds. Afterwards, three research questions were identified.

1. What are the impacts of green school grounds in the TDSB?
2. Are the impacts emerging across a range of different schools and projects?
3. What are the key challenges and opportunities to fully realizing the positive impacts of green school grounds?

To answer these questions, a mixed-methods research approach of questionnaires and follow-up interviews was selected.

Questionnaires

The questionnaires were designed to gather results from and understand trends across a large number of schools, thus ensuring adequate breadth and statistical relevance to the study. Prior to distribution, they were piloted on two occasions and refereed by a jury of six professionals and academics who were familiar with school ground greening research and practice.

A package of four questionnaires was distributed to 100 schools with green school grounds (total of 400 questionnaires). At each school, the questionnaires were to be completed by:

- Principal
- Teacher involved in the greening project
- Teacher NOT involved in the project
- Parent involved in the greening project.

Those invited to complete the questionnaires thus had varying levels of experience in greening efforts and offered a variety of perspectives (administrator, teacher, parent). To further tease out a range of responses, the questionnaires provided participants with opportunities to indicate if and how their greening initiative influenced students in both positive and negative ways.

Out of the 100 schools invited to participate, 45 returned at least one questionnaire (45% response rate at the school level). As expected, given the range of schools originally contacted, the schools that responded were very diverse. They included elementary, middle and high schools, had small-to-large staff and student populations and were located in some of Toronto’s poorest and wealthiest neighbourhoods (Table 1).

In terms of individual questionnaires, 149 out of a possible 400 questionnaires were returned (37% response rate at the questionnaire level). Forty-one principals, 39 involved teachers, 36 uninvolved teachers and 33 parents completed questionnaires. These individuals differed in terms of their age, gender and teaching experience, as well as their level of involvement and interest in greening initiatives (Table 2).
Table 1  Profile of 45 Schools Participating in Questionnaires

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Count</th>
<th>Percentage of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level of school</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elementary (Kindergarten to Grade 5/6)</td>
<td>32</td>
<td>71.1</td>
</tr>
<tr>
<td>Middle (Grade 5/6 – Grade 8)</td>
<td>6</td>
<td>13.3</td>
</tr>
<tr>
<td>Secondary (Grade 9 – Grade 12)</td>
<td>7</td>
<td>15.6</td>
</tr>
<tr>
<td><strong>Socio-economic status of school catchment area</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very high</td>
<td>9</td>
<td>20.0</td>
</tr>
<tr>
<td>High</td>
<td>11</td>
<td>24.4</td>
</tr>
<tr>
<td>Medium</td>
<td>8</td>
<td>17.8</td>
</tr>
<tr>
<td>Low</td>
<td>9</td>
<td>20.0</td>
</tr>
<tr>
<td>Very low</td>
<td>8</td>
<td>17.8</td>
</tr>
<tr>
<td><strong>Length of school ground greening project (years)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 2</td>
<td>6</td>
<td>13.3</td>
</tr>
<tr>
<td>3 – 5</td>
<td>14</td>
<td>31.1</td>
</tr>
<tr>
<td>6 – 10</td>
<td>14</td>
<td>31.1</td>
</tr>
<tr>
<td>&gt; 11</td>
<td>6</td>
<td>13.3</td>
</tr>
<tr>
<td>Unknown</td>
<td>5</td>
<td>11.1</td>
</tr>
<tr>
<td><strong>Number of students</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 200</td>
<td>1</td>
<td>2.2</td>
</tr>
<tr>
<td>201 – 500</td>
<td>26</td>
<td>57.8</td>
</tr>
<tr>
<td>501 – 1000</td>
<td>11</td>
<td>24.4</td>
</tr>
<tr>
<td>&gt; 1000</td>
<td>7</td>
<td>15.6</td>
</tr>
<tr>
<td><strong>Number of teaching staff</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 20</td>
<td>11</td>
<td>24.4</td>
</tr>
<tr>
<td>21 – 40</td>
<td>20</td>
<td>44.4</td>
</tr>
<tr>
<td>41 – 60</td>
<td>7</td>
<td>15.6</td>
</tr>
<tr>
<td>&gt; 60</td>
<td>7</td>
<td>15.6</td>
</tr>
</tbody>
</table>

**Interviews**

The follow-up interviews allowed for a deeper exploration of the results from a smaller number of schools. They were conducted at five schools, selected to ascertain more fully if and how socio-economic status influenced greening projects. Thus one school from each category of socio-economic statuses (i.e., very high, high, medium, low, very low) was selected. The researcher visited the five schools and spoke to the principals, teachers and parents who were involved in the greening project. A total of 21 individuals were interviewed (five principals, seven teachers and ten parents). During the interviews, participants were asked to describe the impacts of their project in a number of areas and were encouraged to share all of their perspectives, both positive and negative.

**Data analysis**

The questionnaires were analyzed using a statistical analysis program to understand basic trends in participants’ responses and to explore if and how responses differed as a function of individual characteristics (age, gender, experience), school characteristics (number of students, socio-economic status of the school catchment area) and greening project characteristics (history, amount of funding).

Data from the interviews were fully transcribed and reviewed with a view to identifying potential themes and topics that were relevant to the research questions.
Table 2  Profile of the 149 Questionnaire Respondents

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Count</th>
<th>Percentage of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Role</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Principal</td>
<td>41</td>
<td>27.5</td>
</tr>
<tr>
<td>Involved teacher</td>
<td>39</td>
<td>26.2</td>
</tr>
<tr>
<td>Uninvolved teacher</td>
<td>36</td>
<td>24.2</td>
</tr>
<tr>
<td>Parent</td>
<td>33</td>
<td>22.1</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>26</td>
<td>17.4</td>
</tr>
<tr>
<td>Female</td>
<td>123</td>
<td>82.6</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 – 29</td>
<td>7</td>
<td>4.6</td>
</tr>
<tr>
<td>30 – 39</td>
<td>40</td>
<td>26.8</td>
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<tr>
<td>40 – 49</td>
<td>56</td>
<td>37.6</td>
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<td>50 – 65</td>
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<td>30.9</td>
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<tr>
<td>Highest level of education completed</td>
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<td></td>
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<tr>
<td>College diploma</td>
<td>23</td>
<td>15.4</td>
</tr>
<tr>
<td>Undergraduate</td>
<td>73</td>
<td>49.0</td>
</tr>
<tr>
<td>Masters</td>
<td>36</td>
<td>24.2</td>
</tr>
<tr>
<td>Doctorate</td>
<td>2</td>
<td>1.3</td>
</tr>
<tr>
<td>Other</td>
<td>15</td>
<td>10.1</td>
</tr>
<tr>
<td>Years working in public/private education system²</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 – 2</td>
<td>4</td>
<td>3.4</td>
</tr>
<tr>
<td>3 – 5</td>
<td>8</td>
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<tr>
<td>6 – 10</td>
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</tr>
<tr>
<td>11 – 20</td>
<td>36</td>
<td>31.0</td>
</tr>
<tr>
<td>More than 20</td>
<td>56</td>
<td>48.3</td>
</tr>
<tr>
<td>Number of years involved with school ground greening projects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>31</td>
<td>20.8</td>
</tr>
<tr>
<td>1 – 2</td>
<td>20</td>
<td>13.4</td>
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</tr>
<tr>
<td>11 – 20</td>
<td>11</td>
<td>7.4</td>
</tr>
<tr>
<td>More than 20</td>
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<td>0.7</td>
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<tr>
<td>Level of involvement with school ground greening projects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not at all involved</td>
<td>24</td>
<td>16.1</td>
</tr>
<tr>
<td>Not very involved</td>
<td>27</td>
<td>18.1</td>
</tr>
<tr>
<td>Fairly involved</td>
<td>39</td>
<td>26.2</td>
</tr>
<tr>
<td>Very involved</td>
<td>59</td>
<td>39.6</td>
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<tr>
<td>Level of interest with school ground greening projects</td>
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<tr>
<td>Not at all interested</td>
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<td>2.0</td>
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<tr>
<td>Not very interested</td>
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<td>6.0</td>
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<tr>
<td>Fairly interested</td>
<td>49</td>
<td>32.9</td>
</tr>
<tr>
<td>Very interested</td>
<td>88</td>
<td>59.1</td>
</tr>
</tbody>
</table>

² Responses from administrators, involved teachers and uninvolved teachers only (n=116).
Researchers who have studied green school grounds have noted numerous benefits emerging for students, teachers, the surrounding community and the environment. Through qualitative investigations of greening projects at a single school (or a small number of schools), they have demonstrated that students who attend schools with green grounds benefit from increased play opportunities (Malone & Tranter, 2003b; Moore, 1996), enhanced social relations (Titman, 1994), unique opportunities to become engaged and reflective citizens (Dyment, 2004; Mannion, 2003), safer and less hostile outdoor environments (Cheskey, 1994; Evans, 2001), increased learning opportunities (Centre for Ecoliteracy, 1999) and enhanced relationships with the natural world (Bell, 2001a; Nabhan & Trimble, 1994; Tranter & Malone, 2004).

Similarly positive results emerged in this study of green school grounds in the TDSB: the majority of research participants agreed strongly that their school ground greening projects were having significant positive impacts on many aspects of students’ and teachers’ experiences at school. They indicated that green school grounds in the TDSB were having a positive influence on curriculum delivery and teaching practices, on student learning, behaviour, play and environmental awareness, and on issues relating to social inclusion, health and safety. These findings confirm that the benefits noted anecdotally and documented through research at a small number of schools are being realized at a much larger and statistically relevant level.

Particularly striking is the fact that the results varied little across the board, despite the differences among the schools, projects and research participants involved. The 149 questionnaire respondents and 21 interviewees associated with 45 different greening projects consistently reported positive impacts. Irrespective of the respondent’s characteristics (gender, age), the school’s characteristics (grade level, socio-economic status of the school catchment area), or the project’s characteristics (history, amount of funding), positive impacts were evident across the majority of areas investigated. Given this overall similarity in responses, this report provides minimal commentary on the statistical tests conducted to explore how school, project and demographic differences influenced results.

These positive impacts notwithstanding, the majority of teachers, parents and principals who participated also expressed concerns about their projects, suggesting that many green school grounds had not reached their full potential. For example, many study participants felt that teachers were not using the green school ground nearly as much as they could be — mainly because they lacked the training, knowledge, curriculum materials and administrative support to do so. They pointed to the need for wider, more consistent support for teachers who wished to use the school ground for hands-on, outdoor learning. Again, what is striking is that these concerns did not differ as a function of school or project characteristics or respondent demographics, indicating that they were relevant across a range of schools in the board. These concerns are raised and discussed throughout the report.

The discussion of the results that follows is organized around eight impact areas that were identified through the literature review and examined in both the questionnaires and the interviews. For each impact, the numeric results from the questionnaires and the in-depth stories and explanations from the interviews are presented. Table 3 contains the numeric results from the questionnaires.
### Table 3  Study Participant Questionnaire Responses

**Curriculum Enrichment**

I use our school ground to help me instruct curricular material related to:

<table>
<thead>
<tr>
<th>Curriculum</th>
<th>Percentage of Respondents Reporting</th>
<th>Number Reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Never/Rarely</td>
<td>Sometimes</td>
</tr>
<tr>
<td>1. Science</td>
<td>21</td>
<td>32</td>
</tr>
<tr>
<td>2. Physical education</td>
<td>24</td>
<td>29</td>
</tr>
<tr>
<td>3. Language arts</td>
<td>41</td>
<td>39</td>
</tr>
<tr>
<td>4. Geography</td>
<td>46</td>
<td>32</td>
</tr>
<tr>
<td>5. Mathematics</td>
<td>52</td>
<td>36</td>
</tr>
</tbody>
</table>

**Student Learning and Academic Achievement**

As compared to teaching indoors, when I teach on the green school ground, I find that:

<table>
<thead>
<tr>
<th>Learning and Academic Achievement</th>
<th>Greatly decreased/</th>
<th>Increased somewhat/</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Somewhat</td>
<td>Not changed</td>
</tr>
<tr>
<td>6. Student enthusiasm and engagement for learning has</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>7. Student ability to retain knowledge and skills has</td>
<td>0</td>
<td>28</td>
</tr>
<tr>
<td>8. Student ability to think more creatively has</td>
<td>0</td>
<td>23</td>
</tr>
<tr>
<td>9. My ability to meet the learning styles of a diversity of students has</td>
<td>0</td>
<td>34</td>
</tr>
<tr>
<td>10. Student academic learning, as measured by performance on standardized tests and improved mastery of curriculum standards, has</td>
<td>1</td>
<td>60</td>
</tr>
</tbody>
</table>

**Teaching Practices**

As compared to teaching indoors, when I teach on the green school ground:

<table>
<thead>
<tr>
<th>Teaching Practices</th>
<th>Strongly disagree/</th>
<th>Agree/</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Disagree</td>
<td>Neutral</td>
</tr>
<tr>
<td>11. I use an interdisciplinary approach when I am teaching on the school ground.</td>
<td>3</td>
<td>33</td>
</tr>
<tr>
<td>12. Other teachers support my use of the school ground for teaching.</td>
<td>6</td>
<td>26</td>
</tr>
<tr>
<td>13. My administrators (e.g., principal, vice-principal) support my use of the school ground for teaching.</td>
<td>1</td>
<td>9</td>
</tr>
</tbody>
</table>

As compared to teaching indoors, when I teach on the green school ground:

<table>
<thead>
<tr>
<th>Teaching Practices</th>
<th>Greatly decreased/</th>
<th>Increased somewhat/</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Somewhat</td>
<td>Not changed</td>
</tr>
<tr>
<td>14. My motivation for teaching has</td>
<td>1</td>
<td>29</td>
</tr>
<tr>
<td>15. My willingness to use innovative instructional strategies has</td>
<td>0</td>
<td>28</td>
</tr>
<tr>
<td>16. The amount of team teaching I do has</td>
<td>3</td>
<td>63</td>
</tr>
<tr>
<td>17. My ability to maintain class control has</td>
<td>16</td>
<td>63</td>
</tr>
<tr>
<td>18. My need for assistance (e.g., parent helpers, volunteers) has</td>
<td>4</td>
<td>55</td>
</tr>
<tr>
<td>19. The amount of time I spend preparing lessons has</td>
<td>2</td>
<td>67</td>
</tr>
</tbody>
</table>
Table 3  **Study Participant Questionnaire Responses**  (continued)

<table>
<thead>
<tr>
<th>Student Behaviour and Social Development</th>
<th>Greatly decreased/</th>
<th>Increased somewhat/</th>
<th>Increased greatly</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Greatly decreased</td>
<td>Increased somewhat</td>
<td>Increased greatly</td>
</tr>
<tr>
<td>20. The level of positive and civil behaviour amongst students has</td>
<td>3</td>
<td>25</td>
<td>72</td>
</tr>
<tr>
<td>21. The amount of effective communication between students has</td>
<td>1</td>
<td>36</td>
<td>63</td>
</tr>
<tr>
<td>22. Cooperation among students has</td>
<td>1</td>
<td>30</td>
<td>69</td>
</tr>
<tr>
<td>23. Positive social interactions between teachers and students have</td>
<td>2</td>
<td>29</td>
<td>69</td>
</tr>
<tr>
<td>24. Student discipline problems have</td>
<td>44</td>
<td>40</td>
<td>16</td>
</tr>
<tr>
<td>25. Aggressive behaviour amongst students has</td>
<td>45</td>
<td>53</td>
<td>2</td>
</tr>
<tr>
<td>26. Overall student pro-social behaviour (cooperation, respectful, non-violent) has</td>
<td>2</td>
<td>25</td>
<td>73</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Play</th>
<th>Much less/</th>
<th>More/</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Less</td>
<td>Not changed</td>
</tr>
<tr>
<td>27. Promotes cooperative and collaborative play.</td>
<td>0</td>
<td>27</td>
</tr>
<tr>
<td>28. Promotes diversity in the types of play.</td>
<td>0</td>
<td>24</td>
</tr>
<tr>
<td>29. Encourages students to be bored.</td>
<td>74</td>
<td>23</td>
</tr>
<tr>
<td>30. Promotes negative and aggressive play.</td>
<td>66</td>
<td>30</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Social Inclusion</th>
<th>Much less/</th>
<th>More/</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Less</td>
<td>Not changed</td>
</tr>
<tr>
<td>31. Inclusive with regard to gender.</td>
<td>0</td>
<td>46</td>
</tr>
<tr>
<td>32. Inclusive with regard to socio-economic status.</td>
<td>0</td>
<td>53</td>
</tr>
<tr>
<td>33. Inclusive with regard to ability.</td>
<td>1</td>
<td>47</td>
</tr>
<tr>
<td>34. Inclusive with regard to ethnicity.</td>
<td>1</td>
<td>53</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Health and Safety</th>
<th>Greatly decreased/</th>
<th>Increased somewhat/</th>
<th>Increased greatly</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Greatly decreased</td>
<td>Increased somewhat</td>
<td>Increased greatly</td>
</tr>
<tr>
<td>35. The amount of shaded space has</td>
<td>4</td>
<td>32</td>
<td>64</td>
</tr>
<tr>
<td>36. The likelihood of “knock and bump” injuries has</td>
<td>42</td>
<td>47</td>
<td>11</td>
</tr>
<tr>
<td>37. The incidence of crime (e.g. vandalism, graffiti, trespassing) on the school ground has</td>
<td>33</td>
<td>55</td>
<td>12</td>
</tr>
</tbody>
</table>
Table 3  Study Participant Questionnaire Responses  (continued)

<table>
<thead>
<tr>
<th>Environmental Awareness and Stewardship</th>
<th>Percentage of Respondents Reporting</th>
<th>Number Reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td>As compared to a more typical flat, turf and asphalt school ground, when students are learning and playing on the green school ground, I find that:</td>
<td>Much less/</td>
<td>Not changed</td>
</tr>
<tr>
<td></td>
<td>Less</td>
<td></td>
</tr>
<tr>
<td>38. Students are more likely to explore .......... widely.</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>39. Students are able to learn .............. about their local environment.</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>40. Students show ............. care and respect for the school ground.</td>
<td>2</td>
<td>18</td>
</tr>
</tbody>
</table>

As compared to a more typical flat, turf and asphalt school ground, I find that our green school ground:

<table>
<thead>
<tr>
<th>Environmental Awareness and Stewardship</th>
<th>Percentage of Respondents Reporting</th>
<th>Number Reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Much less/</td>
<td>Not changed</td>
</tr>
<tr>
<td></td>
<td>Less</td>
<td></td>
</tr>
<tr>
<td>41. Provides ............. stimulation of students' curiosity and sense of wonder.</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>42. Provides opportunity for students to have .............. interaction with the natural environment.</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>43. Fosters ............ environmental awareness in students.</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>44. Fosters ............ environmental stewardship in students.</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>45. Provides ............ opportunities for students to have something to care about.</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>46. Provides ............ opportunities for students to understand their relationship to the natural world and to understand that they are a part of nature.</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>

Note: The wording included in this Table represents the exact wording found on the involved teacher’s survey. Slight changes were made among the four different questionnaires to ensure that each question was relevant to each respondent. For example, question 8 on the principal questionnaire reads “As an administrator, I support my teachers’ use of the school ground for teaching”, the uninvolved teacher questionnaire reads “My administrators support teachers who want to use the school ground for teaching” and the parent questionnaire reads “The administrators support teachers who want to use the school ground for teaching”.

Ninety-two percent of respondents said that green school grounds provide more or much more stimulation of students’ curiosity and sense of wonder.
3.1 Curriculum Enrichment

Greening projects in the TDSB are supporting the formal curriculum in significant ways. As has been noted in many studies (Adams, 1990; Lieberman & Hoody, 1998; Moore & Wong, 1997; Rickinson et al., 2004), these outdoor classrooms are providing inspirational settings and subject matter for programs across the curriculum. Indeed, a wide array of subjects is currently being taught on green school grounds in the TDSB, and the potential to do even more is considerable, according to study participants.

Questionnaire respondents indicated that green school grounds in the TDSB were used most often to teach science (79% of respondents) and physical education (76%), two subjects that are readily associated with the outdoors. In addition, about half of the respondents also indicated that language arts (59%), geography (54%) and mathematics (48%) were also taught there on a regular basis. Other subject areas mentioned were art and drama, illustrating the potential to integrate these spaces widely across the curriculum.

Benefits

Green school grounds offered easily accessible opportunities for hands-on, experiential approaches to learning. In so doing, they helped teachers accommodate students with many different learning styles. One principal’s comments illustrate how a green school ground could bring life and excitement to the curriculum:

“Our grade ones have just finished a unit on bugs. Four years ago we didn’t have any bugs in our school yard. Now we have a lot. In fact our trees were totally covered with ladybugs for about a week, and a whole variety of types of ladybugs, which is quite exciting. I didn’t know that there were that many different types of ladybugs until the students went out there. They had their magnifying jars and their reading buddies, older students who were their science buddies for that day. They went out looking for bugs and they found all kinds of wonderful bugs. Before we’d have to put them on a bus, send them to a conservation centre, or walk down into Riverdale Park, which is tough to do with short-legged grade ones. But now all they have to do is go out back.”

(Principal)
While science was the subject most often taught on green school grounds, this same principal noted that other subject areas have also been enriched:

*Sketching, there’s lots to sketch out there now. Before there was nothing. My French Immersion grade 5/6 teacher is really into art and goes out there all the time with students just to do their five-minute sketches of different types of trees or rocks. We’ve got trees and rocks now to sketch which we didn’t have before.*

Many study participants provided similarly positive descriptions of the teaching and learning that were occurring outdoors, noting how green school grounds could be used to deliver the basic curriculum related to literacy and numeracy:

*Our biggest initiatives are literacy and mathematics. And I would say that the courtyard is a perfect place for working on these initiatives. There’s the potential for classroom teachers to direct kids to doing research on naturalization and learning about the environment, about the plants that we put in there, what their names are and so on, so there are opportunities for reading. There certainly are opportunities for math…everything from measurement to budgeting. I guess measurement is the biggest one that comes to mind. I’m not just thinking about measurement of the plants but things like volume too, how much earth we had to move in and how much we had to move out. Watching things grow, that’s certainly linear measurement there.* (Principal)

While enthusiastic about the benefits, study participants also commented extensively on the untapped potential of greening initiatives. They were anxious to see much more of the curriculum delivered outdoors and in fact expressed keen disappointment at the relatively small percentage of teachers who were using the green school grounds (less than 10% of the teachers at most schools). In the words of one parent: “…curriculum is the biggest area in which we have failed…teachers seem to prefer traditional indoor teaching and there has been very poor participation by teachers.”

This sentiment was echoed at all the schools where follow-up interviews occurred. Participants felt convinced that more teaching could and should be done in the outdoor classroom. They also identified a number of ways to make this happen.

“There certainly are opportunities for math…everything from measurement to budgeting. I guess measurement is the biggest one that comes to mind. I’m not just thinking about measurement of the plants but things like volume too, how much earth we had to move in and how much we had to move out. Watching things grow, that’s certainly linear measurement there.” (Principal)
Challenges and Opportunities

The amount and type of teaching that occurred on the green school ground was influenced by many factors, including the stage of the project, the grade level, the interest of teachers and the support of the principal. Several participants anticipated, for example, that more teaching could occur outside once the project site matured. As one parent explained: “Last year the trees were a little thin, so it wasn’t really all that inviting... But they’re now starting to mature and I think it will be a different space in a couple of years and will be a more inviting space for teaching.”

Several participants also indicated that certain subject areas or grade levels lent themselves more easily to using the green school grounds. As one teacher observed: “For some grades, it is easy to find ways to use the outdoor garden; for others it is almost impossible.” Where the mandated Ontario curriculum links were most obvious — for instance, the grade three Science and Technology Curriculum (e.g., Earth and Space Systems, Life Systems) — teachers were more likely to take students outdoors. Where curriculum ties were not apparent, however, it could be difficult for teachers to justify teaching outdoors. In the words of a grade six teacher, for example: “We’ve got to teach a massive curriculum in less than ten months, because they’re testing at the beginning of May, so basically in eight months you’ve got to cover everything, and probably something like the garden is too disconnected from the curriculum unfortunately.” Because of situations like these, some study participants suggested that curriculum packages were needed to give teachers the justification and tools to take classes outdoors.

At some schools, greening initiatives were seen as an add-on to the school programming, and in competition with existing programs in sports, drama or music. One teacher noted, for example, that teachers were heavily involved in sports and dramatic productions at her school and so were already stretched in terms of their time available to devote to other activities. To respond to this sort of concern, curriculum guides and training would be helpful to broaden practitioners’ understanding of how green school grounds could support rather than compete with these areas of specialization.

Another factor limiting teachers’ willingness to make use of the outdoor classroom was their lack of training and experience. As one parent explained, “It’s not always obvious how to use these spaces, especially when you have a standard routine and you’ve always taught in a classroom.” In such cases, some participants felt that professional development opportunities, for example workshops geared to particular grades or subject areas or school ground features, could be extremely beneficial for practising teachers.

Curriculum guides and training would be helpful to broaden practitioners’ understanding of how green school grounds could support rather than compete with sports, drama or music.
As some study participants suggested, however, the challenge lies much deeper: Teachers were often limited by conventional assumptions about education — about their own need to master the subject area, to have all the answers prepared in advance and to address first and foremost the minds of their students. Such assumptions sat uneasily with the realities of teaching outdoors where the learning environment was less easy to control, where learning outcomes were less predictable and not necessarily measurable and where learning experiences were more fully embodied. As one teacher explained, “it’s just easier and safer maybe to teach the old way in the classroom.” Or as another put it, “teachers who focus on the three Rs are going to be resistant to using the outdoor classroom…fearing it will take away from the most important teachings.”

The fear of losing control was a challenge identified by a number of participants. Classrooms offered familiarity and security, important considerations when one is responsible for so many students. In the words of one teacher, “outside it’s an open area, it’s not a classroom; there’s less control with your students…so it is harder to teach in that environment. So maybe some people are hesitant to teach out there.”

Teachers need environments that are safe, comfortable and conducive to learning and that accommodate large classes. The design of school grounds was thus a critical factor in enabling teachers to deliver the curriculum outdoors. Areas were needed, for instance, where teachers could communicate with their students as a class. One parent described such a site: “In the initial planning, we had the idea of a Learning Circle — hard rocks surrounded by trees, so that teachers and classes would have an alternative to the straight rows of learning. And the idea of people learning in a circle is really old as well, so that’s good. The rock formation has given teachers a safe space to facilitate teaching outside.”

Another significant factor identified by many study participants was the role played by the principal. Principals, they suggested, set the culture for learning at schools and were often the drivers of greening initiatives. The whole school could feel their encouragement — or lack thereof. According to one questionnaire respondent, “you really need a strong leader to encourage the teachers to go out and use it…if your principal doesn’t support you, you’ll never use it.” Given the many responsibilities that fall on a principal’s shoulders, however, greening initiatives can easily become too much of a burden without broader, institutionalized support. This is why teacher education and curriculum resources are needed. Without them, green school grounds can be seen as optional, and lack legitimacy.
Taking the curriculum outdoors: challenges and opportunities

Challenges:

- curriculum links are not explicit
- many teachers do not understand how green school grounds can be used
- conventional assumptions about education as an indoor pursuit limit outdoor efforts
- teachers lack experience in managing classes outdoors
- school grounds may not safely and comfortably accommodate large classes
- outdoor learning is often seen as optional and lacks legitimacy

Opportunities:

- develop explicit links between outdoor learning and the mandated curriculum
- develop guides and packages illustrating how the curriculum can be delivered outdoors
- offer professional development opportunities to practising teachers
- ensure that the physical design of school grounds facilitates outdoor learning
- provide administrative support for greening projects

“I believe that the installation of the bushes and the trees and the plants has gone a long way to making our schoolyard more peaceful and to providing alternatives for kids. They don’t just have to play soccer or sweat to death on the asphalt in June. There are places to sit down; there are places to go that are quiet.” (Principal)
3.2 Student Learning and Academic Achievement

When students in the TDSB have the opportunity to use their green school ground as an outdoor classroom, both the process and product of learning differ from an indoor classroom. This finding is consistent with other research (Centre for Ecoliteracy, 1999; Lieberman & Hoody, 1998; Moore & Wong, 1997; Rickinson et al., 2004), which suggests that many aspects of student learning, such as enthusiasm, engagement and creativity, are enhanced outdoors on a green school ground. Evidence from the literature also suggests a positive correlation between academic achievement and outdoor learning (Lieberman & Hoody, 1998; Simone, 2002). The impacts noted in these studies are also evident in the TDSB.

Student Learning

Study participants clearly indicated that student learning was positively influenced by the green school ground. They overwhelmingly reported that students showed more enthusiasm and engagement for learning when it occurred on the green school ground (90% of respondents). The majority also indicated that students were better able to retain knowledge (72%) and think more creatively (77%) when they were learning on the green school ground.

Participants offered many explanations as to why student learning was enhanced on the green school ground. Some suggested that students found it to be a more meaningful context for education than an indoor, book-centered environment. Learning easily came alive outdoors, as students were able to handle, touch, smell and even taste the materials they were learning with and from. A principal described how the context for learning was more meaningful when the outdoor compost became the teacher:

"We teach them a lesson about the compost with everyone outside looking at the three bins and talking about what is happening. They see the steam rise out of it and we talk about the aeration, the necessity of aeration and the whole process that occurs to help create soil. And then from that, the teachers will take it further and have a mini-compost in the classroom with a glass jar and will watch the decomposition under different conditions. We can get into the science, the skills of observation, and it feeds right into the curriculum of what we have to teach."

Some participants postulated that learning was enhanced because nature provided endless opportunities for learning about interconnections. For example, since skills were often required from many subject areas to complete a single task in the outdoor classroom, students experienced firsthand the interconnections between subjects like math, language arts and science. Students also had opportunities to see the interconnections between their education, their home lives and their future. A principal noted, for instance, how learning with a weather station helped young people to make connections:

"The students get so excited when we use the weather station. I think it is because they start to see how it applies to their everyday lives. When you start to focus on one part of the natural environment it doesn’t take long before it gets extended into other things."

(Principal)
Other participants suggested that the outdoor classroom provided a much more inviting, less tightly regulated learning environment. The pace of learning was not so strictly moderated by a clock; instead it was more determined by the sequences of nature (e.g. daily movement of the sun, the flowering of plants, the seasonal changes). Learning outdoors also meant being exposed to unexpected events, such as the migration of Canada Geese, the formation of storm clouds or the work of ants. Participants noted that learning in tune with natural phenomena provided opportunities for students to learn at their own pace, in a more flexible sequence:

The important thing about a garden is that when you’re one with nature, time flows in a different way. Generally, children’s lives are totally chopped up in terms of ‘this hour we do this for 10 minutes and do that for 5 minutes and then you go out for 15 minutes’ and things like that…and they have absolutely no sense of the flow of time. In the garden, though, time flows naturally so they learn naturally…they are not rushed. Learning just happens. (Teacher)

The majority of participants (66%) indicated that a teacher’s ability to meet a wide range of learning styles increased on a green school ground. As one principal noted, “many students who do not excel in classroom-based, print-centered learning are able to shine in the outdoor classroom.” Similarly, a teacher commented that “students whose learning styles are interpersonal and bodily kinesthetic show fresh enthusiasm when they are learning in the yard.”

Participants were clearly pointing to dimensions of learning that are often not recognized nor valued in traditional educational systems. Enthusiasm, engagement, creativity and sensory experience, for example, do not lend themselves to measurement through standardized tests, pre-determined outcomes and report cards. Yet these important dimensions of learning are critical to the development and education of a young person; and they are seeds that can be sown and tended through greening initiatives — though they may take years to fully bud and flower.

Enthusiasm, engagement, creativity and sensory experience, for example, do not lend themselves to measurement through standardized tests, pre-determined outcomes and report cards. Yet these important dimensions of learning are critical to the development and education of a young person.
Student Academic Achievement

While the vast majority of participants felt certain that student learning improved on the green school ground, the research findings were much less conclusive with regard to academic achievement. The question relating to student academic achievement had the lowest response rate of the entire questionnaire. Only 57% of respondents answered this question whereas more than 80% answered the questions about student learning. This suggests that participants were unsure about the relationship.

Indeed, it is difficult to measure the relationship between test results/grades and learning outdoors. Many of those who did not answer the question explained that they were unable to answer since, for example, no “...hard data exist to measure this” (Teacher). And since typically, what is valued in schools are precisely the ‘hard data’ that represent students’ knowledge and understanding as measured through test scores, the benefits of outdoor learning can be easily overlooked. The value placed on measurable achievements overshadows other equally important yet hard-to-measure outcomes, such as enthusiasm for learning and creativity.

Despite the low response rate for this section of the questionnaire, a noteworthy percentage (39%) of those who answered did report that they had seen a positive change in student performance on standardized tests and/or improved mastery of curriculum standards. One parent, for example, felt convinced that her child performed better when she was learning on the green school ground: “My child is often bored in the classroom... she doesn’t do very well. But when learning happens outside, she gets so keen, so enthusiastic, so excited. She does much better on her tests too.”

Based on other research, there is reason to believe that a positive relationship does exist between academic performance and outdoor learning. In Closing the Achievement Gap, Lieberman and Hoody (1998) found that 92% of students who had been in outdoor learning programs academically outperformed their peers in reading, writing, math, science and social studies. Further research would be necessary, however, to ascertain whether the relationship holds true in the TDSB.

Learning benefits of green school grounds

- greater enthusiasm and engagement
- better knowledge retention
- more creative thinking
- wider variety of learning styles accommodated
- more opportunities for hands-on learning
- more meaningful and inviting context for learning
3.3 Teaching Practices

Green school grounds in the TDSB are benefiting not only the students, but the teachers as well. Study participants noted that when teachers used the outdoor classroom, many of their teaching practices were positively influenced. These findings support existing research that likewise points to the benefits of outdoor classrooms for teachers (Lieberman & Hoody, 1998; Moore & Wong, 1997).

The majority of participants (70%) reported that teachers’ motivation increased when they were teaching on the green school ground as compared to indoors. Energized by student enthusiasm for learning outdoors, teachers found renewed enthusiasm for their work. One teacher with eight years of teaching experience described a deeper sense of accomplishment arising from the opportunities that she was able to create for students:

“It's inspiring to teach outside because... I guess when I see the faces of the kids involved in the planting, involved in the research for the plant descriptions, and I see a real strong caring attitude towards what is happening, I realize how much I have given these kids. It really makes me feel warm to my heart to think that I can help open them up and let them see what is possible. That just keeps me going. If I can get a spark from them, then it becomes a spark for me.”

The majority of participants (72%) also indicated that teachers’ willingness to use innovative teaching strategies increased as well. Teachers in the study reported using a variety of innovative strategies, including team teaching, across-grade teaching and project-based teaching. The outdoor classroom also provided teachers with countless natural teaching aids to replace the usual complement of books and blackboards.

Participants also noted that outdoor teaching provided opportunities for teachers to develop different and potentially more rich and positive relationships with their students. They observed that when teaching outdoors, students and teachers seemed more relaxed and open to more meaningful relationships. In the words of one teacher:

“When I’m outside with my students, it is so different from inside. Somehow everyone’s guard goes down... it’s like we’re real people again. These are my favourite times with students, because I get to know them a lot better.”

"When I am teaching outside, I feel excited again... I realize that I still have a lot of passion for teaching.”
(Teacher)
When teachers had the opportunity to teach on the green school ground, the effects extended well beyond the immediacy of the teaching moment. To illustrate, one teacher reported that when she was deciding where to teach, she chose her school because of the greening project. She said, “it really was the deciding factor for me…I believe in outdoor teaching…so it helped me make up my mind.” Another teacher, who was close to retirement, reflected that her time spent teaching in the garden was “one of the most beautiful teaching experiences in my life that I have ever had.”

While most teachers found that the green school ground encouraged innovation in their teaching practices, it is important to note that this did not necessarily translate into a heavier workload. In fact, the majority of questionnaire respondents indicated that the need for assistance and the amount of time spent preparing lessons remained unchanged (55% and 67% respectively). Most respondents (84%) also reported that their ability to maintain class control had either remained unchanged or had increased. These positive results run counter to the common perception that teaching outdoors requires much more effort to maintain class control and prepare lessons.

Nevertheless, a notable number of participants did report a decrease in teachers’ ability to maintain class control (16%), an increase in teachers’ need for assistance (41%) and an increase in time spent preparing lessons (31%) when teaching on the green school ground. These concerns are not surprising given that most teachers have no experience or training in teaching outdoors. Teachers are justifiably concerned about taking young people outside if they lack appropriate strategies for management and taking the curriculum outdoors. These findings point to the need to offer professional development to student teachers and practising teachers and to develop curriculum guides and materials.

Benefits of green school grounds for teachers

- renewed enthusiasm and energy
- sense of accomplishment
- opportunities to innovate with teaching strategies
- more meaningful relationships with students

Challenges for some teachers

- concerns about classroom control
- concerns about assistance needed to teach outdoors
- concerns about extra time needed to prepare lessons

Opportunities

- provide professional development opportunities
- develop curriculum resources
3.4 Student Behaviour and Social Development

Green school grounds in the TDSB are encouraging positive changes in student behaviour and social interactions. Study participants reported that when students were learning and playing on a green school ground, they were being more civil (72%), communicating more effectively (63%) and were being more cooperative (69%). These improvements were noted not only among students; interactions between students and teachers were also enhanced (69%). These encouraging findings are not surprising given that a notable number of environment-behaviour researchers have likewise documented the positive influence of exposure to green spaces on social behaviour (Alexander et al., 1995; Cheskey, 2001; Faber-Taylor, Wiley, Kuo, & Sullivan, 1998; Huttenmoser, 1995).

Participants provided numerous examples of how the green school ground encouraged students to be more well-mannered, tolerant and polite with each other during recess and lunch hour. They noted that there was less fighting, more sharing of toys and more kindness. In the words of one principal, the students were “generally having more fun and being nicer to each other.” This particular situation stood in stark contrast to that which existed prior to the greening initiative at the school, as described by one of the teachers:

*Before the greening project, we were having major troubles in the schoolyard at recess. Kids were not happy; they were discontent, running around doing nothing, with no focus. Most of our yard was asphalt or terribly hard-packed ground. We did have a soccer field, but then they fought about who was going to play in the soccer field. Always fights at recess. It was terrible.*

Generally, the positive influence of green school grounds on social interactions extended beyond recess and lunch time. Many principals and teachers commented that students were more cooperative and communicative when they were having formal classes on the school ground as well. They indicated that students were able to work in small groups more effectively and that they had more patience for their tasks. They also noted that students who normally found it difficult to interact with other students were able to work better with others when learning outdoors.
Many participants suspected that these improved social and behavioural skills were fostered through active student involvement in the process of greening. They reported that when students were given opportunities to work with other students, teachers, parents and community members on greening projects, they learned important life skills. They learned, for example, that through teamwork, cooperation and dedication they could make a difference:

*The greening project has shown kids the power of their collective action. While working with the entire school community...over several years...they learned about lots more than gardening. It shows them that when they put their minds together and lean shoulder to shoulder into the task, they can accomplish just about anything. They can take something that looks like a wasteland and turn it into something that has a purpose. This took hard work, teamwork and dedication.* (Principal)

At one school, the green school ground was used as part of a behaviour modification program for students who were having difficulty working with other students and teachers in a conventional classroom setting. Students in this program were involved in all aspects of the greening project, including design, fundraising, planting and maintenance. The social benefits of the program were clear to one teacher who indicated that “…students from the program…experience a greater development of positive self-esteem. Through leaf-raking, digging and planting, negative energy is transformed into positive life force. Students learn to question, observe, discover and appreciate the natural world as it develops.”

Just under half of the study participants (44%) reported that student discipline problems had decreased on the green school ground and an almost identical percentage (45%) reported that incidents of aggressive behaviour had decreased. Participants suggested that school grounds consisting of only turf, pavement and manufactured play structures were very dull and boring, and that this led to student frustration and aggression. As one parent recalled: “Before we built our garden, we used to have a 70s-style big adventure wooden playground, and that kind of building really allowed for some bullying because there were big fort spaces…there just wasn’t enough to do...so some kids used to just pummel other kids when there were no teachers around.” In contrast, participants suggested that the diversity of environments on green school grounds provided for a variety of activities, thus decreasing incidents of bullying and other aggressive behaviour.
It is notable that the decrease in discipline and behavioural problems attributed to green school grounds in the TDSB stands in stark contrast to the increase in aggressive behaviour and bullying at schools described in a growing body of literature (Borg, 1999; Craig, Pepler, & Atlas, 2000; Evans, 1998, 2001). Relevant to this field of inquiry, some researchers are pointing to the relationship between the design of school grounds and student behaviour (Evans, 2001; Moore, 1986; Rivkin, 1995; Titman, 1994), arguing that playgrounds become much more peaceful and harmonious when play spaces are diversified. Improvements can be even more dramatic if students are involved in the process of greening (Hart, 1997; Mannion, 2003; Titman, 1994). These findings certainly underline the potential of greening initiatives as an approach to fostering positive social interactions at school.

Nevertheless, one of the factors limiting these potential benefits was the size and/or degree of student access to the green areas of the school grounds. When a greening program was spatially small and/or isolated, some participants questioned its potential influence. For example, some greening projects in the TDSB were located entirely at the front of the school and students were prohibited from playing in those areas. As one teacher noted, “the green area is in front of the school and not accessible during active time. Students aren’t allowed to play on it…so I doubt it has a big impact on their behaviour.” While access to selected green school ground sites needs to be regulated (e.g., to deal with safety issues around aquatic features) and managed (e.g., to protect newly planted sites), site plans should allow students the maximum amount of direct interaction with the green space.

Social and behavioural impacts of green school grounds

Benefits:

- more civil behaviour
- better communication
- enhanced interactions among students and teachers
- fewer discipline problems
- less aggression

Challenges:

- students need to be actively involved in the full process of greening (e.g. identifying problems, planning, design, fundraising, development and maintenance)
- site designs need to allow students maximum access to the site, while ensuring their safety and the protection of planted areas
3.5 Play

Green school grounds in the TDSB provide an important venue for something all children love and have a right to do: play! Unlike conventional school grounds with their limited options for play, green school grounds can open up a world of creative play possibilities, as many researchers have documented (Herrington & Studtmann, 1998; Kirkby, 1989; Malone & Tranter, 2003a; Weinstein & Pinciotti, 1988).

Study participants noted that green school grounds positively influenced many aspects of play, reporting an increase in cooperative and collaborative play (73%), an increase in the diversity of play (76%), a decrease in boredom (74%) and a decrease in negative and aggressive play (66%). In discussing these impacts, many participants expressed the view that play was about much more than simply expending surplus energy. Rather, they felt that play fulfilled an important role in the intellectual, physical and social growth of children, a role that was better served by green school grounds than by conventional ones.

According to participants, where play areas were dominated by turf and asphalt, they promoted only limited types of play, notably active, repetitive, rule-bound play through games like tag, soccer and four-square. In contrast, green school grounds offered a wide range of play opportunities and students were often less bored. A principal described the changes in play options:

*The installation of the bushes and trees and plants has gone a long way to providing alternatives for kids, so they don’t just have to play soccer or sweat to death on the asphalt in June. Now there are places to sit down, there are places to go that are quiet, where they can eat a snack with a friend. Before you had two choices: on the asphalt or on the grass. And usually on the grass is football and soccer, and it’s not everybody’s cup of tea.*

Many study participants insisted that the diversity of play spaces allowed students more freedom in their play. Students could choose an activity, ranging from physically active rule-based games (like basketball) to quiet creative activities (like sketching), depending on how they were feeling on any given day. As one teacher put it, green school grounds provided spaces for students who just wanted to “wander around the garden and lie down and look at the sky and do whatever it is they need to do.”

The greater diversity of play spaces on green school grounds also enabled students to gather comfortably in different sized groups. There were settings where students could play by themselves, in pairs, in small groups or in large groups, as they preferred. Many participants noted that this was especially important for girls, who often enjoyed playing in smaller groups.
Another benefit, according to participants, was the way that green school grounds stimulated children’s imaginations. Whereas the barren spaces and manufactured play equipment on conventional school grounds supported repetitious patterns of behaviour, the nooks and crannies created by the rocks, shrubs and trees on green school grounds invited exploration and imaginative play. The butterflies, bugs and worms could become new friends; the hills could become theatres; the mud and water could become magic potions, and so on.

Participants stressed the importance of allowing young people to make forts, cubbies and dens, an almost universal experience of childhood that has also been noted by other researchers (Cobb, 1977; Kylin, 2003; Sobel, 1993). The diverse and moveable elements of green school grounds were well suited to such world-making activities. As one teacher described:

The garden is an enchanting play space for them... in which they play games of the imagination, which you can’t do when there’s asphalt and concrete and chain link fence. I saw them playing house on the hillside, dividing it into the ground floor and the second floor and third floor. And they kind of used the spaces between the bushes as chambers. Groups of little friends would go and sit in the summer when it was beautiful underneath, and they played hide-and-seek.

Offering a diversity of play spaces was especially important for those young people who had few other opportunities to play outdoors. A notable number of participants emphasized the fact that, for many students, their only outside playtime happened at school, either because many parents worked after school, because parents were concerned about their children’s safety outdoors, because there was a lack of outdoor play spaces nearby, or because children were enrolled in after-school programs. Diverse play opportunities on the school ground were considered so important by some parents that they chose their child’s school on that basis. In the words of one parent:

The biggest reason I chose my school was the natural ecosystem provided for play and exploration. I turned down a school closer to me due to the typical asphalt and turf. It is easier to use and stretch your imagination in a play environment that is diverse.

The butterflies, bugs and worms could become new friends; the hills could become theatres; the mud and water could become magic potions.

Play benefits of green school grounds

- more cooperative and collaborative play
- more diverse play
- less boredom
- less negative and aggressive play
- more freedom to explore and engage in imaginative play
3.6 Social Inclusion

School grounds in the TDSB are helping to create environments that are welcoming of differences. This inclusiveness manifested itself in many different ways, with approximately half of all study participants reporting that green school grounds are more inclusive with respect to gender (54%), class (47%), race (46%) and ability (52%).

Several researchers have noted the different play behaviours of boys and girls throughout a number of developmental stages, and many have argued that play spaces need to be designed with their respective needs in mind (Cunningham & Jones, 1996; Hart, 1987; Moore, 1986; Nabhan & Trimble, 1994). Many participants in this study concurred with this viewpoint, noting that prior to greening, the school ground favoured the play activities of boys who dominated large open spaces with aggressive, competitive, rule-bound games such as hockey, baseball and soccer. Participants described how the transformed school ground provided a diversity of spaces that better accommodated the play interests and abilities of both girls and boys. For instance, girls had places where they could play in a manner that was more nurturing, more cooperative and less competitive.

Obviously, the play patterns of girls and boys are far more complex than such broad generalizations imply. There are, of course, girls who want to run and play active games and boys who want to engage in quieter activities. It is therefore important not to reinforce simplistic gender stereotypes. Nevertheless, the findings from this study (supported by the research mentioned above) point to the value of offering a diversity of spaces to accommodate a range of active and quiet play activities, irrespective of gender.

With regard to differences of class, researchers have described the particularly important role that outdoor common spaces, such as streets, parks and school grounds, play in the lives of children of less affluent backgrounds (Chawla, 2002; Malone, 2001; Rivkin, 1995; Thomson & Philo, 2004). Study participants from schools located in Toronto neighbourhoods of lower socio-economic status also noted this pattern. They suggested that, since many of these schools are surrounded by housing and industrial development, green school grounds might assume an especially significant role. Participants reported that the majority of students at these schools lived in dense housing units and did not have access to backyards or community green spaces within walking distance or opportunities to travel or camp with their families during school holidays.

At one school, where more than 73 different languages were spoken and many students were on a “pilgrimage” or “journey” to Canada from another country, study participants consistently commented that the green school ground played a particularly important role.
Issues of class were quite intertwined with issues of race in this study. While racial diversity is present throughout public schools in Toronto, in many of the schools located in neighbourhoods of lower socio-economic status there is very high racial diversity, and many of the students have recently relocated to Canada. A notable number of study participants suggested that green school grounds might be especially important for these new Canadian students who might not have had safe opportunities to connect with natural settings in their home countries. At one school, where more than 73 different languages were spoken and many students were on a “pilgrimage” or “journey” to Canada from another country, study participants consistently commented that the green school ground played a particularly important role. The principal explained: “These kids are so keen, so enthusiastic and so excited about having these opportunities. We’re planting bulbs and for the kids, once again, it’s probably not an experience that they would have had in their homelands.”

With respect to physical and intellectual abilities, there is ample literature that describes how school grounds can and should be designed to accommodate differences (Farnham & Mutrie, 1997; Nabors, Willoughby, Leff & McMenamin, 2001; Schleifer, 1990). The majority of participants in this study acknowledged, however, that there had been little explicit consideration of such issues during the design of the green school ground. While the literature suggests accommodating physical disabilities with specific design ideas such as accessible signage, wide pathways, inclusive toys and raised planting beds, these have been incorporated to only a small degree at some schools in the TDSB. Evidently, much more remains to be done.

Participants noted, however, that green school grounds in the TDSB were more inclusive of people with intellectual disabilities. Unlike conventional school grounds, green school grounds provided a diversity of play areas so that students with distinct needs were better able to find spaces that were safe and suitably challenging. They could also choose from among a wider variety of activities to find one more in line with their abilities and needs. One parent described how the green school ground provided safe spaces for students in the special education course:

   It was the special ed kids that hung out in that area. And a lot of autistic kids hang out in the shade and just hold on to a tree. So if you ask me, that was why we did it. You don’t have to go any further for an answer — that was pretty powerful to me...that those kids are not getting picked on and they feel they’re secure at recess.
Green school grounds enhance community connections by providing opportunities to meet new people, make new friends and strengthen old friendships.

The fact that green school grounds were more inclusive of people who may feel isolated on the basis of gender, class, race or ability suggests that these spaces promote, in a very broad sense, social inclusion. Some participants commented that green school grounds helped to provide an inclusive space for people with other differences as well, noting that they were welcoming of people of all ages, sexual orientations and religions. One principal indicated that they also seemed to be more inclusive of people who were having temporary difficulties in their lives:

*If they’re facing a real tragedy in their personal life, if life is really tough for them... for a whole variety of reasons, the group of parents just reaches out and connects them... hands them a shovel and says “come give us a hand,” and then there’s that opportunity for talking and listening and supporting.*

Evidently, green school grounds in the TDSB provide places where a range of individuals’ needs can be met. They help to draw people in, inviting them to share experiences and goals and to participate, as they are able. A parent captured many of these sentiments with these words:

*Everyone can join us in the garden. What a great place for a disenfranchised child to meet new people, dig and plant. Our garden is colour blind, inclusive and warm. Anyone can help us, and they do.*

**Broader Community Integration**

Students are not the only ones feeling more welcomed by green school grounds in the TDSB: study participants also commented on the important community connections fostered through greening projects. While not specifically targeted in the questionnaire, remarks about community connections arose often enough during the interviews to warrant inclusion in this section of the report.

Study participants noted that the green school ground enhanced community connections by providing opportunities to meet new people, make new friends and strengthen old friendships. Through their involvement in regular greening committee meetings or weekly gardening sessions, adults had opportunities to spend time together while working towards a common goal. As noted by other researchers (R. Barker, 1994; Glover, 2004; Lewis, 1992; Shapiro, 1995), community greening initiatives create inclusive and friendly social environments. Glover (2004) even suggests that community gardening projects are “less about gardening than they are about community.” With respect to greening initiatives in the TDSB, study participants generally reported knowing more people and feeling more positive about their community. One of the parents described how community bonds were developed through participation:

*...it’s not that I know everybody, it’s just you’re in the garden and you just say “Hi.”

“Hi, I’m still here”... “Hi, Hi”... every day... because you want to be friendly and welcoming.*
Many study participants commented that green school grounds were an especially important venue for inviting involvement from new Canadian parents. Given the tangible and physical nature of gardening, commonly cited impediments to their involvement in school activities, such as language barriers, were removed or mitigated. One interviewee, who had recently emigrated from Yugoslavia, indicated that her involvement in the greening project had been critical in easing her transition to Canada and had helped her to “learn the language, make some contacts and make some friends.”

The benefits of greening projects extend even beyond community members who are directly involved in the project. The community generally has access to more green space, always at a premium in a big city like Toronto. Not surprisingly, study participants reported that green school grounds were used extensively outside school hours. In the words of one parent:

_Before, it would just be empty all the time. Now, lots of people come just to sit, from the apartments or wherever. And the playground area as well is very used by the community. You always drive by and see somebody there._

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**Green school grounds are more welcoming of differences**

- they accommodate quieter activities preferred by some students
- they provide green space which may otherwise be inaccessible to poorer students and community members
- they create opportunities for involvement in school life regardless of language barriers
- they provide a wider range of activities to suit the varying abilities of students

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“If they’re facing a real tragedy in their personal life, if life is really tough for them...for a whole variety of reasons, the group of parents just reaches out and connects them...hands them a shovel and says “come give us a hand,” and then there’s that opportunity for talking and listening and supporting.” (Principal)
3.7 Health and Safety

Green school grounds are providing healthier, safer environments for students in the TDSB. According to study participants, after a school ground has been greened there are more shade spaces, fewer accidents and fewer incidents of crime.

One of the greatest health benefits provided by green school grounds is the provision of shade. Shade trees and sun shelters help protect students and staff from the detrimental health impacts of ultraviolet radiation. According to the majority of participants, green schools grounds have led to an increase in shade at schools in the TDSB (64%) or will do so in the near future as trees grow. Many also noted the important role that trees and shelters assumed in creating healthier, cooler and more comfortable play and learning environments for students. As one parent described:

_The school ground gets very, very, very hot in the last month of school...the kids used to just stand there, baking in the sun. Now they can at least get a bit of protection from the trees._

Just under half of the study participants (42%) indicated that green school grounds in the TDSB contributed to students’ physical health and safety, for example through the reduction of “knock and bump” injuries. Some speculated that their design could contribute to fewer injuries, as there were fewer hard surfaces like cement and manufactured play equipment, and more soft surfaces like sand, mulch and grass. One principal commented: “In terms of falling down and hurting themselves, it’s softer. We would have a lot more accidents if it weren’t for that space the way it is right now. If you had cement and asphalt you’d have a lot more scrapes and bruises.” Other participants speculated that the design of the school ground promoted more diverse play, more positive social interactions and less aggression, thereby leading to fewer incidents of fighting, bullying and rough-and-tumble playing.

Not surprisingly, however, green school grounds presented new health and safety issues, such as allergic reactions to vegetation or insects, injuries from natural elements such as rocks and logs, reduction in sight lines from trees and bushes, and safety concerns about water features. As with all outdoor play environments, risk-taking on the green school ground is an integral part of the learning and development that comes through play. As one principal acknowledged: “Climbing on a rock...that’s something kids need to experience... but I do realize that there is room for a potential disaster there.”

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3 Potential adverse health impacts include sunburn, suppression of the body’s immune system and, over the long term, skin cancer, cataracts and other eye ailments (World Health Organization, 2004).
The challenge, of course, is to develop school grounds that give due attention to safety without placing excessive limitations on behaviour (Evans, 1995). With regard to green school grounds specifically, study participants suggested that some of the new hazards could be readily addressed and mitigated through proper design and management. For example, compost bins could be properly placed to reduce the risk of bee stings, and trees could be planted to ensure that sight lines were not compromised.

In discussing these topics during the interviews, many participants interpreted the issues of health and safety more broadly than was possible through the questionnaire. They repeatedly described how students were healthier overall, in terms of social, mental and behavioral health, when they were not “boxed in” by “destitute” and “barren” landscapes. One parent noted, for instance: “I just really believe that there is a psychological benefit to being near a tree as opposed to a pole. The interconnections between children and their immediate environment has big impacts on health.”

Another measure of health and safety in a school community are the incidents of crime such as trespassing, graffiti and vandalism. Research has shown that communities that are healthy in terms of social dynamics often have fewer incidents of crime (Kuo & Sullivan, 2001a, 2001b). In terms of the TDSB, a noteworthy 33% of study participants indicated that crime had decreased on the green school ground. Speculating on the reasons for this decrease, some suggested that it was a result of student ownership and involvement in the greening initiative, a relationship that has been noted in other research (Kuo & Sullivan, 2001b; Trust for Public Land, 1995). Participants described how active involvement in the process of greening led students to care for and take care of the school grounds both inside and outside school hours. To illustrate, one parent described how a Halloween scarecrow outside the school had not been vandalized: “It’s amazing that scarecrow that was built is still there; it’s not been destroyed. And I think an awful lot of that has to do with the involvement of the children in the school with regards to the garden.”

Nevertheless, despite these promising signs, some crimes, such as vandalism, continue to be a problem on some green school grounds in the TDSB, and a small percentage (12%) of respondents indicated that it had actually increased as a result of the greening. Participants noted that interpretive signs were burned down, graffiti was painted, fences were broken and bird feeders, shrubs and vegetables were stolen from the garden.

Safer and healthier spaces for students

- increased shade helps to protect students from ultraviolet radiation
- physically softer surfaces decrease number of “knock and bump” injuries
- diverse natural landscaping promotes psychological well-being
- student involvement and sense of ownership may lead to a decrease in incidents of crime
3.8 Environmental Awareness and Stewardship

Green school grounds are playing an important role in fostering environmental awareness and stewardship in the TDSB. Through regular, hands-on involvement with the soil, rocks, plants and animals that are featured on these sites, students are becoming more familiar with and more caring about the natural world.

Over 90% of questionnaire respondents indicated that student environmental awareness and stewardship had increased on the green school ground. They also suggested that students were more likely to explore widely (90%), to learn about their local environment (91%) and to have a greater sense of wonder and curiosity (92%). This overwhelmingly positive response adds further support to the contention that intimate contact with nature is key to developing appreciative, caring relationships with other life (Abram, 1996; Bowers, 1996; Nabhan & Trimble, 1994; Pivnick, 1994).

As suggested by one teacher, there is an active, wonder-filled, participatory dimension to the awareness fostered on green school grounds: “Awareness is one of the most important results. I have seen young children picking and collecting ripe tomatoes, gazing in wonder at 15-foot sunflowers and picking beans off the vine.” In some cases, as students became more familiar with other organisms, as they held worms and insects in their hands, for example, they were able to overcome deep-seated fears and misconceptions.

One of the great advantages of a green school ground, of course, is that it offers easy, daily, hands-on access to the natural world. In the words of one parent:

“They actually get to sit near plants. A lot of people in this area live in apartment buildings and they don’t have a garden. To go out on a one-day field trip is kind of short…The fact that they get hands-on experience in the garden, whether it’s weeding, or learning about boundaries or just watching plants grow over the years…I think that’s the biggest thing that comes from the garden.”

Despite their generally positive perceptions, however, a number of study participants questioned whether all students were benefiting from greening initiatives. Some felt that only the students who planted and cared for the green school grounds would benefit directly.

It’s reasonable to assume that students with more intimate involvement would have different and perhaps richer experiences than other students. Nevertheless, many study participants emphasized that students were making use of the school grounds on their own time, before and after school and during breaks. The potential to foster environmental awareness and appreciation was thus not limited to formal class hours or instruction. One teacher commented, for example, that she “...loves to observe the students who are exploring and wandering in the garden on their free time. They turn over rocks and get all excited about their findings. The students who care about the garden protect it and take care of it.”
This budding sense of care and belonging was noted by many study participants. The vast majority indicated that students showed more care and respect for the green school ground (80%) and that the green school ground provided more opportunities for students to understand themselves as part of the natural world (94%). As students became more involved with the plants and animals on the school ground and more aware of their needs and interdependencies, they also became more determined to look after them. One teacher described this heightened attentiveness and solicitude as follows:

In the spring we have a butterfly-hatching program, so once the butterflies have hatched in the classrooms we then release them into the butterfly garden. You should see the students then... once we've released them, they want to take such good care of the plants where the butterflies live. It is really quite wonderful to see them caring so much.

Of great promise is the fact that this caring attitude seemed to permeate other aspects of students' lives. The school grounds provided opportunities to both model and discuss the importance of environmental stewardship. One teacher noted, for example: "The garden teaches them to care about all living things... if we find a bug in the classroom, we're all 'don't kill it, don't kill it'... we all take it very carefully and we put it outside. We talk about the importance of spiders and the importance of ants, and worms are good, and weeds are fine."

The underlying hope for many participants was that this sense of stewardship would develop into a deeper environmental commitment extending far beyond the school grounds themselves. In the words of one principal:

It's a small ecosystem... it's a little kernel in this big city, in this country and this world. So it's a jumping off point for the kids here. Hopefully as they grow they take with them a little piece of what this school was for them, and hopefully part of that piece is to respect the environment, so that growing up with it they can make changes as adults.

**Heightened environmental awareness and stewardship**

- easy, daily, hands-on access to natural phenomena
- opportunities to foster a sense of wonder
- opportunities to overcome fears of other organisms
- greater sense of care for the environment
Challenges and Opportunities

As this study indicates, the impacts of green school grounds in the TDSB are promising indeed. There is strong evidence that greening initiatives are enhancing student learning, diversifying student play, improving student behaviour, promoting environmental awareness and much more.

While the parents, teachers and administrators in this study were quick to point out the benefits of greening initiatives, they were also keen, however, to share ideas about areas for improvement. Many believed that important aspects of greening initiatives remained “untapped,” “under-realized” or “under-explored.” They identified a number of challenges and opportunities to address in order to maximize the potential benefits of green school grounds.

Questionnaire respondents were asked to choose from a list the barriers and enabling factors that had influenced the success of their projects, either positively or negatively. These were:

- availability of funding
- teacher involvement
- principal involvement
- student involvement
- parent involvement
- community involvement
- school board involvement
- availability of training opportunities
- availability of curriculum materials
- access to expertise
- access to physical materials
- other demands on time (barrier only)
- difficulty in maintenance (barrier only)
- vandalism (barrier only)
- key organizer moved on (barrier only).

Not surprisingly, what was a challenge for one project proved to be an opportunity for another. Based on the list above, the most commonly reported barriers were: 1) availability of funding, 2) demands on time, 3) difficulty in maintenance, and 4) lack of teacher involvement. The key factors that enabled projects were: 1) human resources (students, teachers, parents, and principals), and 2) funding. (See Figures 1 and 2 on page 40.)

These results suggest that adequate logistical support and human resources were critical to the success of greening projects. Both, in fact, were closely intertwined. When projects were stretched in terms of human resources and time, tasks like fundraising and maintenance became overwhelming. Conversely, projects blessed with many helping hands and donors/funders were able to overcome commonly cited barriers.
Interview participants discussed these issues in more detail. While many of the barriers and opportunities identified through the questionnaire re-emerged during the interviews, additional factors that had not originally received high rankings turned out to be critical. A more detailed discussion follows.
4.1 Funding Issues

Study participants affirmed that adequate and long-term funding is essential to ensure that the benefits of green school grounds are maximized (on the questionnaire, funding came out as Barrier #1 and Opportunity #2). Some study participants were very critical of aspects of the fundraising process, indicating that many external funding applications were lengthy and time-consuming, particularly in relation to the amount of money that was granted. Others expressed concern that funding could be secured for specific projects only (e.g., building composting stations or an outdoor classroom) and was rarely on-going, making fundraising a continuous project. Still others had misgivings about the fact that funders could dictate the nature of the project, so that projects were often shaped by the mandates of the donors rather than the goals of the school.

In light of the challenges of fundraising, some individuals asserted that more funding should come from the school or school board in order to ease the pressures of external fundraising. If funding could be secured for longer time periods, study participants felt that long-term planning could occur and relieve the burden of continuous fundraising. It would also allow funding to be directed at something other than capital costs (e.g. the operating costs involved in maintenance and curriculum development).

Study participants were aware of notable discrepancies among various schools’ abilities to fundraise. While some were readily able to raise hundreds of thousands of dollars, others struggled to raise even a few hundred dollars. Fundraising ability was closely related to issues of class: schools in neighbourhoods of higher socio-economic status were consistently able to raise more money for their projects than schools in neighbourhoods of lower socio-economic status. A small number of participants suggested that funding from the school board would help to level the playing field.

4.2 Teamwork and Leadership

Key to the success of greening initiatives was a dedicated group of teachers, parents, principals, students, custodial staff and TDSB grounds maintenance staff. When such teams were not in place and the workload was assumed by a small number of people (or even an individual), time-consuming tasks such as fundraising (Barrier #1) and maintenance (Barrier #3) emerged as major obstacles. Conversely, successful projects were characterized by having active involvement from a number of individuals with varying expertise so that the workload could be distributed (Opportunity #1, 3-5).

While some project teams were able to survive without certain team members (e.g., a committee without parents or community members), study participants consistently noted the important limiting or enabling role that teachers assumed. Indeed, teachers’ lack of involvement was seen as a key limiting factor (Barrier #4), while their active involvement was considered the most important enabling factor (Opportunity #1). To illustrate, one participant placed most of the blame for an unsuccessful project on the teachers: “Until the teachers decide to get involved, this project will go nowhere” (Parent). In contrast, one participant attributed the success of another project almost entirely to teachers:

*Teachers made our project happen. They had all the vision and energy. They are the only ones who know what is possible.*
In addition to teamwork, participants also stressed the importance of a single individual willing to assume a leadership role, provide direction and ensure that tasks, such as fundraising and maintenance, were accomplished. For instance, one teacher noted that: “We seem to be able to do small projects around the school, but until the key organizer is found, large-scale projects will have to wait.” Study participants cautioned, however, against placing too much emphasis on single leaders, as burnout could lead to a high turnover of greening team members.

Indeed, study participants described how greening projects typically suffered when the initial visionaries or drivers of the project moved on. Without their leadership and energy, green school grounds could become overgrown and unmaintained and turn into a burden for the remaining school community (Barrier #3). Additionally, on-going fundraising efforts could be stalled (Barrier #1). Participants stressed the importance of on-going recruitment to the greening team to ensure that projects were not left unattended for extended periods of time. They also noted the important role that TDSB grounds staff could assume in providing stable and continuous input to greening projects over the long term.

Interestingly, while study participants consistently pointed to the important role that adults assumed in the projects, they rarely identified the role that students played as either a key limiting or enabling factor (student involvement was Barrier #12 and Opportunity #5). Yet, a growing body of research points to the important role that students can and should assume during the process of greening (Dyment, 2004; Hunter, Layzell, & Rogers, 1998; Kenny, 1996; Titman, 1994). Among other things, this research points to the educational benefits of student participation, noting that kids can acquire skills related to democracy, participation and citizenship through the process of greening.

Why then are students in the TDSB not perceived to be more significant players in greening projects? Is it because of logistical constraints (e.g. scheduling, decision-making protocols)? A poor understanding of how to involve students in a meaningful way? A belief that adults can adequately represent the perspectives of students? Certainly the literature suggests that students can and should be intimately involved in all aspects of greening projects.
### 4.3 Professional Development

Given the vital role that teachers assumed in both limiting (Barrier #4) and enabling (Opportunity #1) school ground greening projects in the TDSB, it was not surprising that during the interviews, study participants emphasized the critical role of providing professional development opportunities. Many reported that teachers lacked the confidence and skills to teach outdoors. Commonly cited concerns about student health and safety, class management and extra time needed to prepare lessons dramatically reduced the amount of teaching that could occur.

Participants suggested that professional development opportunities could be offered to student teachers and practising teachers. In addition to providing teachers with the skills and confidence to use the outdoor classroom, training programs could also address commonly cited barriers such as fundraising, time management, maintenance (Barriers #1-3) and concerns about health and safety.

Some study participants also noted the need to offer training opportunities to other stakeholders, such as custodial staff and grounds maintenance staff. This training could be particularly valuable given that these individuals are often associated with schools and projects over the long term (whereas teachers are often relocated to new schools).

### 4.4 Curriculum Constraints

In addition to teacher education, study participants also identified the need for curricular materials to help teachers take students outdoors. Given that teachers are very busy (Barrier #2 = Other demands on time), participants noted that it would be an added burden for individual teachers to have to create the curricular links and develop the materials in isolation, without institutional support.

Participants also described a culture of inspection and accountability in Ontario (e.g., standardized testing), which has tended to reinforce classroom-based teaching practices. Schools appear to be placing increased emphasis on literacy and numeracy, with a view to “teaching to the tests” (Parent). According to one teacher, this often can leave little room for using the outdoor classroom:

> Teachers who focus on the three Rs are going to be resistant in using the outdoor classroom...fearing it will take away from the most important teachings that will be tested. As a result, the potential to use school grounds for hands-on, outdoor learning is diminished.
4.5 Design Issues

Many study participants indicated that issues related to the physical design of their green school ground either limited or enabled their projects. In raising concerns about design, they reported, for example, that projects were too large, too complex, without flow or direction, too high maintenance or not childproof. They also indicated that poorly designed school grounds were often underused because they were unsuitable as outdoor classrooms or off-limits as play areas. Not surprisingly, the problems associated with a poorly designed green space included issues related to maintenance (Barrier #3). Maintenance could be a time-consuming, daunting and expensive endeavour, especially if not taken into consideration at the design stage.

In contrast, at some schools, design was a key enabling factor in the greening process. Often with help from the school board, these schools designed their grounds with a long-term vision in mind, anticipating, for example, that it would need to be low maintenance (e.g. “designed for neglect” and/or “designed for sustainability”). When properly designed, green school grounds helped maximize the benefits outlined in this report. They provided places for outdoor learning, promoted diverse play, protected children from ultraviolet radiation and encouraged positive social interactions. They also helped minimize many of the barriers identified in this study, for example, by reducing the amount of maintenance needed or by making it easier for teachers to deliver the curriculum outdoors.
During discussions of the factors that limited or enabled greening projects in the TDSB, the significant contribution of the school board itself was a recurring theme. Study participants insisted on the need for institutionalized support and valued highly the recent steps taken by the TDSB to promote successful greening initiatives. These initiatives are particularly noteworthy given that the TDSB, like all school boards across Ontario, has faced significant budget restraints in recent years. For example, the TDSB has lost about one third of its caretaking and maintenance budget through rising energy costs and decreasing grants from the Ontario Ministry of Education. The challenge of allocating funding to school grounds projects is further complicated by a major shortfall in funding for capital projects. In 2004/05, the TDSB will receive $47 million from the Ontario Ministry of Education for building renewal projects and yet has an $812 million backlog of major repairs (e.g., new roofs and plumbing systems).

Despite these considerable financial constraints, since about 2001, the school board has been developing its new EcoSchools program, sending a clear signal of its intention to fulfill its environment policy commitment to support environmental literacy for all students and to develop environmentally sound operational practices in its schools.

Launched to all of its schools in 2003, the EcoSchools Program currently has four priority areas: waste minimization, energy conservation, ecological literacy (curriculum) and school ground greening.
Launched to all of its schools in 2003, the EcoSchools Program currently has four priority areas: waste minimization, energy conservation, ecological literacy (curriculum) and school ground greening (Toronto District School Board, 2003b). The Program emerges from a strong working relationship between the Board’s School Services (Curriculum/Program) and Facility Services departments.

The school ground greening component of EcoSchools is supported by a partnership between the TDSB and Evergreen. Currently in its fourth year, the TDSB-Evergreen partnership co-funds two full-time staff members who assist schools in designing, planning and implementing green school grounds. These two staff members organize and deliver an extensive workshop series for school staff and parents on topics such as design, maintenance, teaching in the outdoor classroom and volunteer management.

The TDSB and Evergreen also offer schools on-site design consultations in order to ensure that school ground greening projects incorporate meaningful, practical and sustainable design elements that require minimal maintenance over the long term.

The partners have also co-developed an EcoSchools guide called School Ground Greening: Designing for Shade and Energy Conservation (Toronto District School Board, 2004). The guide helps schools to increase the amount of shade on their grounds to protect students, staff and parents from over-exposure to ultraviolet radiation and to shade school buildings to conserve energy and increase the comfort of the indoor environment.

The TDSB has been involved in the creation of two key publications illustrating its commitment to innovation in greening and showcasing exemplary greening projects within the Board: 1) Transforming the Schoolyard: How Local Communities Design and Build their Playground Learning Environments (Toronto District School Board, 2000); and 2) A Breath of Fresh Air: Celebrating Nature and School Gardens (Houghton, 2003).

These recent initiatives, developed during a time of board-wide budgetary constraint, represent significant progress since the early years of school ground greening in the TDSB. Some participants associated with older greening initiatives noted that there was “little to no support” from the board in the early days. At that time, greening projects were initiated at the individual school level, with negligible coordination or cooperation among schools and almost no involvement from the board. Study participants reported feeling deep frustration during this time at being the “lone rangers of greening.”

In contrast, study participants associated with newer projects recognized and greatly appreciated the growing support from TDSB officials. If the TDSB continues to deliver and expand these initiatives, the potential of school ground greening should be much more fully realized. Greening would become a board-wide endeavour with an institutional framework to support projects over the long term and foster an education culture that officially endorses hands-on, outdoor learning.

**Where school board support is needed most**

- a policy commitment to guide administrators and help offset the uncertainty and instability created by the high turnover rate of dedicated students, staff, parents and principals
- assistance with physical design to ensure practical and sustainable projects
- development of curricular resources to support teachers in delivering the mandated curriculum outdoors
- provision of training for teaching, custodial and grounds staff
- funding (e.g. to cover capital construction costs and follow-up maintenance)
Conclusion and Recommendations

This report presents clear evidence that green school grounds in the TDSB are a significant asset. They have the potential to enrich the quality of life, education and the environment for present and future generations of young people. Whether greening initiatives are new or well-established, urban or suburban, or located in less or more affluent neighbourhoods, their benefits are broad-ranging and encouraging. They positively influence many aspects of students’ educational experiences, including their learning, their social interactions, their health and safety and their environmental awareness.

The greening movement in the TDSB is still relatively young, dating back only a dozen years or so. Thus, it’s safe to assume that the benefits discussed in this report represent only the early stages of what is actually possible once these programs mature. What this study suggests is that this maturing process could be substantially enhanced if the key impediments to greening initiatives were addressed. Most of these are institutional in nature, reflecting the dominant culture of schooling in Canada — a culture that does not typically recognize or value the benefits of hands-on, outdoor learning. Unfortunately, green school grounds are most often treated as something extra or outside the primary mandate of schools (see S. Barker, Slingsby, & Tilling, 2003; Fisher, 2001).

To overcome this hurdle and integrate green school grounds into the everyday lives of students and teachers, a fundamental shift in the culture of schooling is needed — a shift that can only occur if institutional barriers are removed. Changes are required, particularly with regard to educational policy, teacher training and curriculum.

Whether greening initiatives are new or well-established, urban or suburban, or located in less or more affluent neighbourhoods, their benefits are broad-ranging and encouraging.
The following general recommendations identify opportunities for change and are offered as reference points for decision-makers and advocates of green school grounds:

1. **Policy Development**
   As this study indicates, institutional endorsement of greening initiatives is crucial to their long-term success. High-level support at the provincial policy level, for example, would provide a stable, recognized commitment to guide Ontario’s College of Teachers, Faculties of Education, school boards, administrators and teachers.

   **Recommendations**
   - The Ontario Ministry of Education should officially recognize, at the policy level, the educational, social and ecological benefits of hands-on, outdoor learning on green school grounds.
   - The policies developed by the Ontario Ministry of Education should support and promote school ground greening initiatives by addressing issues related to funding, training and curriculum.

2. **Curriculum Development**
   The mandated Ontario curriculum does not explicitly endorse or support the use of school grounds for curriculum delivery. This study indicates that without such explicit endorsement and guidance, teachers are discouraged from using the school ground for hands-on, outdoor learning.

   **Recommendations**
   - The Ontario Ministry of Education should ensure that curriculum policy documents explicitly recognize the value of hands-on, outdoor learning and provide concrete examples of how the curriculum can be delivered on school grounds.
   - The Ontario Ministry of Education, in conjunction with school boards across the province, should ensure that curricular resources are developed to help facilitate the delivery of the mandated curriculum on school grounds.

3. **Teacher Education**
   This study reveals that many teachers in the TDSB lack the skills and confidence to use the school ground for hands-on, outdoor learning. While the TDSB currently offers a series of workshops on green school grounds, many study participants reported that they were either unaware of the workshops, unable to participate, or wanted even more workshops. Without adequate professional development to address such challenges as project design and maintenance and delivering the curriculum outdoors, green school grounds will remain an underused resource.

   **Recommendations**
   - Faculties of Education should recognize the value of hands-on, outdoor learning and provide professional development opportunities for student teachers and practising teachers who wish to engage in greening initiatives and make full use of the educational potential of school grounds.
   - The TDSB and school boards across the province should provide professional development opportunities for practising teachers who wish to engage in greening initiatives and make full use of the educational potential of school grounds.
4. School Board Initiatives

As described in this study, a variety of new initiatives within the TDSB (Ecoschools Program, Evergreen-TDSB Partnership) are fostering the recognition and support needed to more fully realize the promise of green school grounds. These leading-edge initiatives provide a model for school boards across the province and elsewhere in Canada.

Recommendations

- The TDSB should continue to expand planning and design support for green school grounds to ensure that Master Plan designs and school-initiated projects incorporate practical, sustainable and engaging design elements as well as long-term maintenance plans. School boards across the province should follow this lead.

- School boards should elevate the importance of green school grounds in terms of funding priorities, given their many benefits and the harsh reality that many schools that want to improve their school grounds are limited by their ability to raise funds.

This report clearly outlines the many benefits of hands-on, outdoor learning on green school grounds. It also points out the changes needed to more fully realize their potential. On one hand, the recommendations presented above are ambitious in that they target high-level provincial policy that ultimately shapes the educational system in which greening initiatives are embedded. On the other, they are firmly grounded in the real-life lessons learned by parents, teachers and administrators within the TDSB, a school board that is at the leading edge of school ground greening in Canada. The ambitious TDSB-Evergreen partnership sets a promising example of what is possible, given a systematic approach to school ground greening. The recommendations above are intended to provide further direction, with the hope that more favourable conditions can be created to assist schools across Ontario in taking better advantage of an existing, yet largely untapped educational resource: the school ground.
References

References


About the Author

Janet E. Dyment has extensive experience as both a practitioner and academic in the fields of outdoor education, environmental education and environmental science. She has worked with a number of organizations, including the Canadian Outward Bound Wilderness School, TREK and Project DARE. She holds a bachelor’s degree in Outdoor Experiential Education, a master’s degree in Resource and Environmental Management and a doctorate in Educational Studies. She has been on faculty at Lakehead University’s School of Outdoor Recreation, Parks and Tourism and Boston University’s School for Field Studies. She currently resides in Australia, where she is Senior Lecturer in Outdoor Education in the Centre for Human Movement, Faculty of Education at the University of Tasmania.
“Gaining Ground is an ambitious and focused study that uncovers both the benefits and ongoing challenges associated with school ground greening initiatives. By speaking directly with those who are daily involved in greening school grounds, Janet Dyment is able to paint a detailed and revealing portrait of the ecological restoration efforts currently underway in a Canadian school board. I highly recommend this report to those who are embarking on new school ground greening projects and those who are seeking to better understand the dynamics behind what’s been achieved thus far.”

David Hutchison, Associate Professor, Brock University and author of Growing Up Green: Education for Ecological Renewal

“Green school grounds point the way to a more socio-ecologically prosperous future. Gaining Ground provides a comprehensive and insightful analysis of the potential of these transformative learning places. Rich with inspiring quotes and practical examples, this report offers essential groundwork for anyone with an interest in advancing the educational power of Canadian school grounds.”

Lesley Curthoys, Associate Professor, School of Outdoor Recreation, Parks and Tourism, Lakehead University

“Gaining Ground is a well-structured study that deals with many aspects of school life and goes appropriately beyond aspects that would normally only be associated with school greening. The study presents clear evidence that the greening processes in schools in the Toronto District have a marked potential to enrich the quality of life, education and the environment for present and future generations of young people. This is apparent whether the greening of the school grounds is recent or has been underway for some time, whether the schools are in economically poor neighborhoods or in more wealthy contexts.”

Jim Taylor and Kim Ward, Wildlife and Environment Society of South Africa

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