

**Green(ing) School Grounds in the Toronto District School Board:
An Investigation of Potential**

By

Janet E. Dymont

A thesis in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
in Educational Studies

LAKEHEAD UNIVERSITY
THUNDER BAY, ONTARIO, CANADA

© 2004



Library and
Archives Canada

Bibliothèque et
Archives Canada

Published Heritage
Branch

Direction du
Patrimoine de l'édition

395 Wellington Street
Ottawa ON K1A 0N4
Canada

395, rue Wellington
Ottawa ON K1A 0N4
Canada

Your file *Votre référence*
ISBN: 0-494-10686-7
Our file *Notre référence*
ISBN: 0-494-10686-7

NOTICE:

The author has granted a non-exclusive license allowing Library and Archives Canada to reproduce, publish, archive, preserve, conserve, communicate to the public by telecommunication or on the Internet, loan, distribute and sell theses worldwide, for commercial or non-commercial purposes, in microform, paper, electronic and/or any other formats.

The author retains copyright ownership and moral rights in this thesis. Neither the thesis nor substantial extracts from it may be printed or otherwise reproduced without the author's permission.

AVIS:

L'auteur a accordé une licence non exclusive permettant à la Bibliothèque et Archives Canada de reproduire, publier, archiver, sauvegarder, conserver, transmettre au public par télécommunication ou par l'Internet, prêter, distribuer et vendre des thèses partout dans le monde, à des fins commerciales ou autres, sur support microforme, papier, électronique et/ou autres formats.

L'auteur conserve la propriété du droit d'auteur et des droits moraux qui protègent cette thèse. Ni la thèse ni des extraits substantiels de celle-ci ne doivent être imprimés ou autrement reproduits sans son autorisation.

In compliance with the Canadian Privacy Act some supporting forms may have been removed from this thesis.

Conformément à la loi canadienne sur la protection de la vie privée, quelques formulaires secondaires ont été enlevés de cette thèse.

While these forms may be included in the document page count, their removal does not represent any loss of content from the thesis.

Bien que ces formulaires aient inclus dans la pagination, il n'y aura aucun contenu manquant.


Canada

ABSTRACT

As school ground greening becomes more common in schools around the world, researchers from a number of disciplines and fields have begun to investigate the potential outcomes of the differing approaches, traditions and contexts of these projects. Much of the research on these initiatives has been performed within a single school, making it difficult to understand the nature of the impacts across a large sample of schools. In this study, I explored school ground greening projects at a school board level of analysis, using the Toronto District School Board (Ontario, Canada) as my site of investigation. I used a mixed-methods approach: 1) 149 questionnaires were completed by administrators, teachers, and parents associated with 45 school ground greening initiatives in the school board; 2) 21 in depth follow-up case studies were conducted at 5 schools across a range of socio-economic statuses; and 3) 6 interviews were conducted with school board administrators and an Evergreen employee. In this dissertation, I work within a critical environmental education framework to present and discuss findings of several key areas, including: 1) the profiles of individuals and schools who are involved in school ground greening projects; 2) the profiles of the actual projects; 3) the process of greening school grounds; 4) the impacts of green school grounds; and, 5) the key limiting and enabling factors for these initiatives. I conclude with a discussion of future research priorities.

ACKNOWLEDGMENTS

Many individuals and organizations assumed critical roles throughout various stages of my PhD journey. I am thankful to all of them.

None of this would have been possible without the guidance and support from my supervisor, Connie Russell – I am entirely thankful and appreciative of her unending enthusiasm, energy, critique, and passion for this project. Connie was a ‘dream come true’ in terms of supervisors and she always encouraged and expected the best from me. Thank you for giving me the wings to fly. Also from Lakehead, I am indebted to Hope Fennell, for her continued support and input to this project over the duration. Thanks also to David Hutchison, Anthony Bartley and Roger Hart for their helpful comments on this dissertation. The administrative team at Lakehead University (John O’Meara, Fiona Blaikie, Diana Mason) also provided me with considerable support during my PhD. Also, I am thankful to my colleagues and friends in ORPT at Lakehead University.

I appreciate the support provided by both Evergreen and the Toronto District School Board – in particular Cam Collyer, Anne Bell, Richard Christie, Heidi Campbell, and Bruce Day.

I also appreciate the financial support from the Social Science and Humanities Research Council of Canada and Evergreen.

I am most grateful to the schools and study participants who were involved in this study - I do hope I have represented your stories adequately. Thanks also to Wendi Martinek – for her excellent transcription services.

To friends and colleagues I have met at conferences – you continue to inspire me to excellence.

I appreciate the warm welcome extended by the Sustainable Communities Research Group in the School of Geography and Environmental Studies at University of Tasmania (Elaine Stratford).

As always, I am most thankful for my amazing group of friends in Canada and Australia who provided me with endless support (and distractions) during my PhD and who never stopped believing that I could do it.

And of course, to my family, who has always believed in me and supported me throughout this process! Thank you for all the wonderful encouragement and backing over the last few years – and for creating our beautiful Sharbot Lake cottage that sheltered me during my winter writing retreat.

Finally, I am thankful for Mel's support and love throughout this journey.

“In my dream the angel smiled and said, ‘if we fail this time, it will be a failure of imagination.’ And then she placed the world gently in the palm of my hand.”

TABLE OF CONTENTS

<i>ABSTRACT</i>	<i>ii</i>
<i>ACKNOWLEDGMENTS</i>	<i>iii</i>
<i>TABLE OF CONTENTS</i>	<i>v</i>
<i>LIST OF TABLES</i>	<i>xi</i>
<i>LIST OF FIGURES</i>	<i>xii</i>
<i>LIST OF APPENDICES</i>	<i>xiii</i>
CHAPTER 1: THE PROBLEM	1
Introduction	1
Statement of Purpose	3
Definition of Terms	4
Significance of the Study	5
Limitations and Delimitations	7
Implications of the Study	8
Organization of Remaining Chapters	8
CHAPTER 2: A REVIEW OF THE LITERATURE	9
Introduction	9
School Ground Greening: A Review of the Research	9
Green School Grounds and Learning	10
Qualitative Evidence	10
Quantitative Evidence	11
Evidence From Other Settings: Children.....	13
Evidence From Other Settings: Adults.....	15
Summary	17
Green School Grounds and Social/Behavioural Development.....	17
Pre-School Children	18
School-Aged Children	18
Adults	21
Restoration and Behaviour	22

Summary	24
Green School Grounds and Play.....	24
Preference for Natural Settings	24
Play Behaviour in Natural Settings	25
The Importance of Cubbies, Dens, Forts, and Special Places	28
Summary	29
Green School Grounds and Environmental Awareness and Stewardship	29
Green School Grounds and Environmental Awareness.....	29
Green School Grounds and Environmental Stewardship	30
Developmental Stages of Environmental Connections	31
How to Best “Do” Environmental Education.....	31
Summary	32
Green School Grounds and Health.....	32
Nature and Health Recovery	33
Nature, Illness Prevention and Health Promotion	33
Summary	35
Green School Grounds and Safety	36
Safety at Schools?.....	36
Summary	37
Summary of Review of Impacts	38
School Ground Greening and Critical Environmental Education.....	38
Resisting Anthropocentrism	41
Grounding Teaching and Learning in Students’ Lives.....	42
Attention to Place/Bioregionalism	43
Action.....	43
Diverse Voices and Resistance.....	44
Environmental Education in the City	45
School Ground Greening in Canada.....	47
A Canadian Perspective.....	47
Estimated number of schools.....	48
Not-for-profit organizations.	48
Funding agencies.....	48
Academic research.....	48

Publications.....	49
Conclusion of Literature Review	50
Chapter Summary.....	51
CHAPTER 3: RESEARCH METHODOLOGY & METHODS.....	52
Introduction	52
Researching Change: Doing Transformative Research.....	52
Personal Ground: My Methodological Leanings.....	55
My Identities.....	55
Recognition of Multiple Truths and Limits of Generalizing.....	55
The Politics of School Grounds.....	56
Methods	57
Case Study: Theoretical Foundations.....	58
Description of the Site for the Study	58
Rationale for Selection of Samples	58
Selection of School Board: Rationale.....	58
Selection of Schools, Questionnaire Respondents and Interviewees: Rationale	64
Access.....	68
Procedures	69
Questionnaires.....	69
Interviews.....	74
Analysis.....	75
Questionnaires.....	75
Interviews.....	78
Comparing Data	78
Ethical Considerations.....	78
Chapter Summary.....	79
CHAPTER 4: RESULTS AND DISCUSSION.....	80
Introduction	80
SCHOOL, RESPONDENT, INTERVIEWEE AND PROJECT PROFILES.....	81
Questionnaires	81

Response Rates.....	81
School Demographics.....	81
Respondent Demographics.....	81
Follow-Up Case Studies	85
Interviewee Profiles.....	85
Case Study School and School Ground Greening Profiles.....	88
School A	90
School B	92
School C	94
School D.....	96
School E	97
Section Summary.....	99
<i>PROFILE OF SPACE TYPES</i>	<i>102</i>
Questionnaires	102
The Project Elements.....	102
Importance and Adequacy of Elements.....	102
Results of Importance/Adequacy	103
The Effect of Independent Variables.....	103
Discussion	108
Section Summary.....	113
<i>PROCESS OF GREENING SCHOOL GROUNDS</i>	<i>114</i>
Questionnaires	114
Who Provided the Initial Impetus?.....	114
Who was Involved?.....	114
Initial Phases.....	117
On-Going Maintenance	117
Who Provided the Most Volunteer Time?.....	117
Involvement and Independent Variables	117
Follow-Up Case Studies	122
Student Involvement.....	122
Teacher Involvement.....	130

Parental Involvement.....	135
Principal Involvement	139
Ephemeral School Communities	143
School Board Involvement.....	146
Section Summary and Conclusions.....	152
<i>IMPACTS OF GREEN SCHOOL GROUNDS.....</i>	<i>154</i>
Questionnaires and Follow-Up Case Studies	154
Spheres of Influence.....	155
Curriculum.....	155
Teaching Practices.....	164
Student Learning and Academic Achievement	167
Student Behaviour and Social Development	170
Play.....	171
Environmental Awareness and Stewardship	173
Health	176
Safety.....	177
Inclusivity.....	180
Composite Thematic Perceptions	183
Effect of Role: Results.....	185
Effect of Level of Interest: Results.....	185
Discussion of Composite Thematic Variables.....	187
Additional Impacts Described by Interviewees.....	188
Sites for Community Outreach.....	188
Sites for Political Activism.....	190
Section Summary and Conclusions.....	192
<i>LIMITING AND ENABLING FACTORS.....</i>	<i>194</i>
Questionnaires	194
Limiting Factors	194
Enabling Factors: Past and Future	196
Follow-Up Case Studies and Questionnaires	196
Funding Issues.....	196
Teamwork and Leadership	199

Relationship with Custodial Staff and School Board	202
Teacher Education	204
Curriculum Constraints	204
Design Issues	205
Section Summary and Conclusions.....	209
CHAPTER SUMMARY	212
CHAPTER 5: REFLECTIONS AND RECOMMENDATIONS.....	213
Summary of Research	213
School, Respondent, Interviewee and Project Profiles (Objective 1A and 1B)	213
Profile of Space Types (Objective 1B).....	213
Process of Greening School Grounds (Objective 1C).....	214
Impacts of Green School Grounds (Objective 2)	214
Limiting and Enabling Factors (Objective 3).....	215
Significance of Research	216
Reflections on my Journey.....	217
Reflections on Critical Environmental Education.....	218
Resisting Anthropocentrism	218
Ground Teaching and Learning in Student’s Lives.....	219
Attention to Place/Bioregionalism	219
Action	220
Diverse Voices and Resistance.....	221
Priorities for Research on Green School Grounds.....	221
Recommendations for Green School Grounds in the TDSB	224
REFERENCES.....	229

LIST OF TABLES

<i>Table 1 Categories and Spaces Types on Green School Grounds</i>	73
<i>Table 2 A Summary of Statistical Analysis by Objective Statement</i>	76
<i>Table 3 Profile of Questionnaire Respondents (Phase 1)</i>	82
<i>Table 4 Profile of Schools from Questionnaires (Phase 1)</i>	84
<i>Table 5 Profile of Case Study Interviewees from Five Schools (Phase 2)</i>	86
<i>Table 6 Profile of Additional Interviewees (non school case study specific) (Phase 2)</i>	87
<i>Table 7 Profile of Case Study Schools (Phase 2)</i>	89
<i>Table 8 Percentage of Green School Grounds Containing Elements</i>	104
<i>Table 9 Importance and Adequacy of Space Types</i>	105
<i>Table 10 Importance and Adequacy by Interest Level</i>	107
<i>Table 11 Importance of Space Types by Socio-economic Status</i>	110
<i>Table 12 Adequacy of Space Types by Socio-economic Status</i>	111
<i>Table 13 Individuals that Provided Initial Motivation</i>	115
<i>Table 14 Involvement of Individuals During Initial and Ongoing Maintenance Phases</i>	116
<i>Table 15 Volunteer Time Donated by Individuals/Groups</i>	118
<i>Table 16 Initial and On-Going Involvement of Individuals by Gender and Length of Program</i>	120
<i>Table 17 Initial and On-Going Involvement of Individuals by Socio-economic Status</i>	121
<i>Table 18 Student Participation in Various Phases of Greening Initiatives</i>	129
<i>Table 19 Collapsed Perceptions of Entire Sample</i>	156
<i>Table 20 Percentage of Teachers that Instruct on Green School Grounds</i>	159
<i>Table 21 Collapsed Thematic Perceptions by Role</i>	184
<i>Table 22 Collapsed Thematic Perceptions of Interested/Uninterested Respondents</i>	186
<i>Table 23 Limiting Factors</i>	195
<i>Table 24 Past/Future Enabling Factors</i>	197

LIST OF FIGURES

Figure 1. Ladder of Participation 127

LIST OF APPENDICES

<i>Appendix A Involved Teacher Questionnaire</i>	246
<i>Appendix B Interview Schedule</i>	263
<i>Appendix C Thematic Codes used to Analyze Interviews</i>	264

CHAPTER 1: THE PROBLEM

Introduction

Canadians under 18 years old are legally required to spend a considerable amount of time in a formal educational environment. Usually, the physical setting for the educational process is a school building. A typical school building is comprised of individual classrooms, a library, a gymnasium, administrative offices, and maintenance facilities. A considerable amount of research has examined the relationship between the design of ‘inside’ school environments and the learning outcomes of young people. Many classrooms, gymnasias, and libraries are designed consciously with a view to maximizing students’ learning experiences and to creating safe learning spaces (Johnson, 1982; Oritz, 1994; Sanoff, 1994). Research has focused on the ‘inside’ school setting because this is where the majority of teaching and learning in public schools in Canada takes place.

Recently, there has been a growing body of literature that examines the learning and socialization that students experience ‘outside’ the typical school building, particularly on the school ground (Adams, 1990; Bell, 2001a; Gump, 1988; Malone & Tranter, 2003b; R.C. Moore & Wong, 1997; Stine, 1997; Weinstein & Pinciotti, 1988). Students attending public elementary schools in Canada spend a small, but important, part of their day on the school ground before and after school, as well as during recesses and lunch hour. Students learn and socialize in the ‘informal’ classroom of the school ground: for example, they play, read, eat, interact, construct, imagine, talk, create and undoubtedly learn positive and negative social skills during the time they spend on the school ground.

An emerging national and international movement is focusing on the design and culture of school grounds with a view to improving the quality of a child’s school ground experience. This movement focuses primarily on the concept of school ground ‘greening’ whereby students, parents, teachers, neighbourhood residents, and school and city officials work to upgrade the physical environment and to re-establish the natural habitats that existed prior to asphalt. Some school grounds in Canada are now thoughtfully designed spaces that include a variety of natural elements including trees, butterfly gardens, ponds, and vegetable patches. A number of terms have been used to describe these changes occurring on school grounds, 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 dissertation, “school ground greening” will be used to describe collaborative efforts to improve school grounds.¹

When a school ground is greened, it appears that numerous benefits emerge for students, teachers, the surrounding community and the environment. While much of this research has been performed in elementary schools, recent research has explored the potential of these spaces in secondary schools (Kerby & Egana, 2001; Rickinson, Sanders, Chillman, Doyle, & Jameson, 2003; Titman, 1999). Research indicates that students attending schools with green grounds benefit from increased play opportunities (Malone & Tranter, 2003b; R.C. Moore, 1996), enhanced social relations (Titman, 1994), unique opportunities to become engaged and reflexive citizens (Dyment, 2004; Mannion, 2003), safer and less hostile outdoor environments (Cheskey, 1994; Evans, 2001), increased learning opportunities (Centre for Ecoliteracy, 1999), increased connections to the natural environment (Bell, 2000, 2001a; Nabhan & Trimble, 1994; Tranter & Malone, 2004) as well as improved academic performance (Lieberman & Hoody, 1998; Simone, 2002). Teachers working at schools that have been greened report unique curriculum development (R.C. 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 has also been noted, e.g. the (re)introduction of wildlife and biodiversity ‘corridors’, ‘refuges’ and/or ‘islands’ in urban landscapes (Rosenthal & Dyment, 2002). While this emerging research points to the potential of green school grounds, much research remains to be done, particularly in Canadian contexts.

¹ I am not suggesting that these terms (i.e., school ground gardening, school ground naturalization, school ground restoration, school ground improvement, school ground greening) all mean the same thing. Nor am I suggesting that debate about their definitions is not worthy. Such debate is, however, not the main focus of this dissertation, which reports on a study of school ground greening in a school board in Canada. For a more detailed explanation of the differences between each term, see Houghton, 2003.

Statement of Purpose

While it would be fascinating to gather information on all green school grounds in Canada, such a large project exceeded the scope of resources that were available for the dissertation research. Instead, my research was conducted within the boundaries of one selected urban school board in southern Ontario: the Toronto District School Board (TDSB).² I chose this school board because approximately 20% of the school grounds within the boundaries of the board have been greened, making this area an ideal location to investigate a large number of green school grounds.

The purpose of my research, based on a case study of the TDSB in southern Ontario, was to determine administrator / teacher / parent perceptions of school ground greening and to generate a status report on the state of existing green school grounds in this board, focusing on salient characteristics and limiting or enabling factors of school ground greening projects. The following objectives guided the research:

1. To describe the status of the 100 green school grounds in the TDSB by:
 - a. Generating a profile of the individuals who are involved in greening projects (e.g., age, gender, years of experience) *and* a profile of the schools where greening projects are taking place (e.g., number of students, socio-economic status of neighbourhood (SES)); and,
 - b. Generating a profile of the actual greening project (e.g., elements found on school ground, sources and amounts of funding; importance/adequacy of different space types); and,
 - c. Generating an understanding of the process of greening (e.g., who provided leadership and motivation, reasons for greening, who was involved in initial/ongoing planning and maintenance)
2. To determine if and how administrators, teachers, and parents perceive their green school ground as providing spaces that influence a) curriculum delivery, b) teaching practices, c) student learning, d) student behaviour and social development, e) student play, f) environmental awareness and stewardship, g) student health, h) school safety, and i) inclusivity; and,
3. To report the factors that have limited or enabled the success of school ground greening projects.

² The Toronto District School Board agreed to be 'identified' in this study, thereby removing concerns around issues of confidentiality and anonymity. They agreed, I suspect, because they are quite proud of their school ground greening efforts and see this dissertation as a medium for showcasing their successes and for learning about how the potential of their greening initiatives could be maximized.

Definition of Terms

The following terms will be used repeatedly throughout this dissertation and are therefore defined below.

Green school ground: A school ground will be defined as being 'green' when explicit intervention has occurred to increase the presence of natural elements on the school grounds. As an example, a school that is beside a lake or forest would not be considered green; conversely, a school where some sort of intervention has occurred, in the form of treeplanting, gardening, or creation of trails, would be considered green (Evergreen, 2000b).

Greening: Whereas the term "green" as in school ground is an adjective and refers to the description of the school ground, the term "greening" school grounds is a gerund that refers to the actual process of transformation. Sometimes these two terms are used together, represented as 'green(ing) school grounds' and refers to both the product *and* the process (e.g., in the title).

Involved teacher: A teacher who has taken an active leadership role in facilitating the process of greening at a school. It is assumed that an involved teacher is actively involved in and interested in school ground greening.

Uninvolved teacher: A teacher who has not been involved in facilitating the process of greening. S/he may or may not have an interest in school ground greening.

Nature: Due to the socially constructed meaning of the term "nature," it remains a highly contested term (see Russell, 1999; St. Maurice, 1996). Different people have different interpretations of this word. For the purposes of my research, the term wild nature refers to spaces that are relatively free of human influence where the structure and function of ecosystems are operating within the natural range of variability.

Environmental education: Precisely what counts as environmental education a topic of much debate that is likely to continue (P. Hart & Nolan, 1999). There are many approaches to environmental education, each reflecting particular contexts and ideological predispositions. I favour a 'critical' approach. While there is no accepted universal definition of what exactly constitutes critical environmental education, the following criteria, for me, are essential (Fawcett, Bell, & Russell, 2002):

- *Resisting anthropocentrism*, by disrupting the dichotomous relationship between humans and the natural world;
- *Grounding teaching and learning in students' lives*, by advocating that educational practices and content should reflect the cultures and communities of the students;
- *Paying attention to place/bioregionalism*, by teaching students about natural spaces/functions near their home-places;
- *Recognizing diverse voices and resistance*, by critiquing mainstream 'universal' definitions of environmental education and resisting monocultural interpretations; and,
- *Encouraging authentic participation and action*, by resisting depoliticised environmentalism, claiming to 'save the earth' while maintaining social, political, economic status quo.

Significance of the Study

As green school grounds become more common in Canada and around the world, researchers from a number of disciplines and fields (including education, environmental studies, and urban planning) have begun to investigate the potential outcomes. As will be documented in the literature review, it appears that there are many potential benefits to the students, teachers, school environment, and surrounding communities.

Another indicator of the importance and potential of the school ground greening movement in Canada and elsewhere is the recent emergence of a number of not-for-profit organizations that facilitate the process of school ground greening. Organizations and programmes such as Evergreen in Canada, the Centre for Ecoliteracy in the United States, Learnscapes in Australia, Movium in Sweden, Ecoschools programs in South Africa, and Learning Through Landscapes in the United Kingdom continue to grow in their profile and scope. These organizations provide guidance, funding, and resources to administrators, teachers, and parents who are interested in beginning the process of school ground greening.

In response to the emerging support from the academic community and not-for-profit organizations, increasing numbers of schools are beginning the process of naturalizing their grounds. In the last decade, it is thought that approximately 1,200 school grounds in Canada have been transformed from homogenous environments comprised of asphalt and manicured grass into thoughtfully designed spaces incorporating trees, gardens, and ponds (Evergreen, 2000b). In the Toronto District School Board alone, approximately 100 of the more than 500 schools have been greened. This burgeoning interest and activity can be heralded as an indicator of success for the school ground greening movement.

Despite growing interest and recent research, there are still many gaps in our knowledge of the impacts of school ground greening programs. The majority of research on green school grounds has been conducted in the United States (Centre for Ecoliteracy, 1999; Education Development Centre, 2000; Gamson Danks, 2000; Harvey, 1989a; Lieberman & Hoody, 1998; R.C. Moore & Wong, 1997) and the United Kingdom (Adams, 1990; Hunter, Layzell, & Rogers, 1998; Kenny, 1996; Stine, 1997; Titman, 1994), with other recent contributions from Australia (Evans, 1997, 2001; Malone & Tranter, 2003b), Sweden (Kylin, 2003), Norway (Fjortoft & Sageie, 2000), and South Africa (Taylor, 1997). In Canada, some in-depth research has been conducted on individual schools (Bell, 2001a; Cheskey, 1994) and at the school board level (Simone, 2002). As well, several layperson documents have recently been published in Canada (Bell, 2001b; Evergreen, 2000a, 2000b, 2002; Grant & Littlejohn, 2001b; Toronto District School Board, 2000) that review the benefits of greening initiatives, showcase successful projects, and

provide instructions for implementing school ground greening projects (Dyment, 2001). A number of documents produced by not-for-profit organizations have summarized some of the key literature on the impacts of green school grounds (e.g., Education Development Centre, 2000; Evergreen, 2000b). Surprisingly, though, there has been no published academic review of the literature of green school grounds.

While this emerging research from within and outside of Canada points to the potential of green school grounds, much research remains to be done, particularly in Canadian contexts. As yet, there is little research on administrator / teacher / parent perceptions of school ground greening nor is there much data which would indicate what, if any, the “keys” to a successful greening project might be, particularly in a Canadian context.

My research addressed these gaps in the current literature by investigating the scope and potential of school ground learning in the TDSB. My research is unique for a variety of reasons, including the following:

Canadian focus: As mentioned, until very recently, research related to school ground greening initiatives was conducted in the Australia, England, Norway, South Africa, Sweden and the United States. It is only within the last several years that academic research has been initiated in Canada. My research will contribute to this growing body of Canadian research.

Large sample size: Much of the research that explores the concept of school ground greening has been gained through anecdotal observations or qualitative research. Given the research approaches used, the sample sizes for their research have often been quite small (e.g., case study of one school). 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. Thus, what this particular study offers is to fill, at least partially, this knowledge gap. While some quantitative data has been collected from a large sample of green schools by organizations in the United States (e.g., Education Development Centre, 2000; Lieberman & Hoody, 1998) and the United Kingdom (Learning Through Landscapes, 2003), the questionnaires gathered general information (e.g., descriptions of school ground, how often they are used, etc.), the results were reported via descriptive statistics (e.g., means, frequencies), and many of the results of these studies have not been reported in academic venues (e.g., refereed publications). My research is thus unique in the school ground greening field in that both quantitative and qualitative research tools were used with both large and small samples: questionnaires were completed by principals, teachers, and parents and at schools in the

Board with a green school ground (distributed to 100 schools; returned from 45 schools) while detailed follow-up interviews were held with principals, teachers, and parents involved with greening projects at five schools in the Board. While the questionnaires generated a considerable amount of empirical information related to a large number of school grounds, the follow-up interviews with teachers, principals, and parents at selected schools generated rich descriptive insights.

Researching involved and uninvolved teachers: It appears that many researchers who have investigated school ground greening programs have sought input from individuals who are interested in and committed to the process of greening. My research included both involved and uninvolved teachers, with a view to having a greater diversity of people report their perceptions of green school grounds.

In summary, my research generated empirical data and descriptive observations with a view to describing and interpreting administrator, teacher, and parent perceptions of green school grounds. The findings should be of interest to educators and community developers who are interested in understanding the current status and potential of school ground greening initiatives in the board selected for this study.

Limitations and Delimitations

Numerous limitations and delimitations influenced the results of my research. The following constitute the limitations of the study:

1. The validity of the measurement of respondents' answers to the questionnaire was dependent upon their willingness to respond honestly to the questions on the questionnaire.
2. The validity of the knowledge related to understanding the effects of the school grounds on students and teachers depended on the willingness of interviewees to respond honestly to the questions posed during the interviews.
3. The questionnaires were mailed to the principals of the schools and they were asked to distribute them to teachers who have been 'involved' and 'uninvolved' in the greening project at the school, as well as parents. While definitions were provided to guide the principals in their selection of the respondents, ultimately, the decisions were theirs alone and could not be controlled in this study.
4. Uninvolved teachers might have been less interested in completing the questionnaire due to their lack of involvement in the project, which may have influenced their response rates for the questionnaire.
5. Some questionnaire respondents who were invited to be involved in a follow-up interview were unable to participate (because they had been relocated to a new school, or they were not interested). I thus attempted to find a 'replacement'

interviewee who would represent a similar profile to the individual who was not able to participate.

The following constituted the delimitations for the study:

1. The questionnaires and interviews were the only instruments used to collect data on respondents' perceptions of the green school grounds.
2. The sample for distribution of the surveys was limited to 100 schools within the selected school board.
3. The sample for the interviews was limited to 5 schools within the selected school board.
4. The case study included only one school board.

Implications of the Study

By investigating school grounds in the TDSB, this research represents the first attempt to understand the scope, implications, and potential of school ground learning at a board level in Canada. This board-wide project generated empirical data and descriptive observations that describe the current state of green school grounds in the TDSB. This research project also generated detailed accounts of five school grounds in the school board. This project also makes an important contribution to the environmental education field by presenting a thorough literature review that brings together a series of qualitative and quantitative studies that explore the impacts of nature on children and adults.

The findings will, hopefully, be of both scholarly and practical interest to researchers and practitioners who are interested in creating more effective school environments in Canada. On a scholarly level, this study provides insight into the theory and practice of school ground greening and its potential as a form of critical environmental education. On a practical level, administrators, teachers, and parents interested or involved with school ground greening projects will be able to learn about and from the school grounds sampled in the present study.

Organization of Remaining Chapters

The purpose of the study and a statement of the problem to be investigated have been discussed in the first chapter. In addition, the need for the study, the limitations and delimitations were also discussed. In the following chapters, I review the literature related to school ground greening (Chapter 2) and describe the methods for my research (Chapter 3). I then present and discuss the findings from my research (Chapter 4) and conclude with reflections, summary, and recommendations (Chapter 5).

CHAPTER 2: A REVIEW OF THE LITERATURE

Introduction

The purposes of the review of the literature in this chapter are twofold. First, the review provides background for the areas related to the proposed study, namely: a) an examination of the current status of research on the impacts of green school grounds; b) a review of how the theory and practice of critical environmental education relates to school ground greening; and, c) a description of the state of school ground greening in Canada. The second purpose of the review of the literature is to identify gaps in the literature with a view to highlighting the importance and significance of my research.

School Ground Greening: A Review of the Research

A number of documents produced by not-for-profit organizations have summarized some of the key literature on the impacts of green school grounds (e.g., Education Development Centre, 2000; Evergreen, 2000b). Surprisingly, though, there has been no published academic review of the literature of green school grounds. Given the growing interest in green school grounds in Canada and around the world, it is, to my mind, vital that the current and historical literature be summarized and reviewed to provide insight into our current understanding of the impacts of green school grounds, to justify the present research, and to identify priority areas for research.

The purpose of this section of this chapter, then, is to examine the current status of research on the impact of green school grounds on students. I review if and how green school grounds influence student: 1) academic achievement; 2) social and behavioural development; 3) play; 4) environmental awareness; 5) health; and, 6) safety.³ While some of the research that will be described relates directly to school ground greening initiatives, much of the research discussed herein has not been performed on green school grounds. This latter research has, instead, been conducted in other settings such as hospitals, communities, housing developments, or remote wild spaces, and the potential connections between these settings and school grounds will be postulated and explored. This report also draws on research from a wide variety of disciplines, including architecture, sociology, psychology and education. While not exhaustive, hopefully

³ Of course there are other thematic impact areas that could have been explored, such as impacts on community development (e.g., sense of belonging, cohesion, satisfaction) or cultural factors (e.g., school spirit, school mission statement). These six areas were selected because they represent the most common themes emerging from my review of the literature.

this review will help bring together a wide range of research strands and provide an overview necessary for understanding the full ramifications of school ground greening and this dissertation.

Green School Grounds and Learning

When students have the opportunity to use their green school ground as an outdoor classroom, both the process of learning and the outcomes of learning are very different than in an indoor classroom (Rickinson et al., 2004). As many researchers have noted (Centre for Ecoliteracy, 1999; Lieberman & Hoody, 1998; R.C. Moore & Wong, 1997), when students learn outside on a green school ground, many aspects of student learning, such as enthusiasm, engagement, and creativity, are positively influenced. Evidence from the literature also suggests a positive correlation between academic achievement and outdoor learning (Lieberman & Hoody, 1998; Simone, 2002).

It is important to clarify that the terms student learning and student academic achievement are not synonymous. Student learning is used in a broad and inclusive sense here (similar to Scott & Gough, 2003, p. xiv), and refers to all dimensions of life long learning: confidence, self esteem, enthusiasm, social skills, and moral development are all part of the makeup. A seed of learning may be planted, sowed, and tended through a greening project, but a measurable or direct product might never emerge (Bell, 2001c). Student academic achievement, on the other hand, is a subset of learning, and describes the specific outcomes that are established through a curriculum and measured through tests (Lieberman & Hoody, 1998).

I begin this section of Chapter 2 by presenting the qualitative evidence of the links between school ground greening and learning and then turn to a review of the quantitative evidence. I then explore the links between nature and cognition for both children and adults in settings other than green school grounds.

Qualitative Evidence

Greening projects around the world are supporting formal curriculum in significant ways. These 'outdoor classrooms' are providing inspirational settings and subject matter for programs across the curriculum. Indeed, a wide array of subjects can be taught on green school grounds, including reading, writing, mathematics, science, art, environmental education, health, drama and social studies (Adams, 1990; Bell, 2001c; Centre for Ecoliteracy, 1999; Cronin-Jones, 2000; Engel, 1991; Gamson Danks, 2000; Grant & Littlejohn, 2001b; Hansen-Moller & Taylor, 1991; Lieberman & Hoody, 1998; Malone & Tranter, 2003b; Olwig, 1991; Rhydden-Evans, 1993; G. Thomson & Arlidge, 2000). Other researchers point to the informal learning that can occur on a

green school ground (Adams, 1993; R.C. Moore & Wong, 1997; Titman, 1994). Informal learning is intrinsically motivated learning that happens without teacher intervention. It occurs when students have unstructured time on the green school ground and they learn social and behavioural skills (Adams, 1993).

In addition to noting the formal and informal learning that occur on a green school ground, many authors have discussed other opportunities that emerge when young people have direct contact with the natural world (on green school grounds and other nature dominated environments) (Fisher, 2001; Nundy, 1999, 2001; Rickinson, 2001). That natural environments can provide a venue for developing cognitive skills related to critical thinking, creative inquiry, problem solving and creative development is relatively undisputed (Abram, 1996; Bell, 2001a; R. Hart, 1987; Kellert, 2002; R. C. Moore, 1986a; R.C. Moore & Wong, 1997; Nabhan & Trimble, 1994; Rickinson et al., 2004; Sobel, 1993; Susa & Benedict, 1994). Kellert (2002) notes the learning that can be afforded through nature experiences, asserting that “[a] process of intellectual competence spirals upward through a matrix of...experiences of nature, strengthening the cognitive muscle we call mind and developing and reinforcing the child’s capacities for empirical observation, analytical examination, and evidentiary demonstration” (p. 125).

While a green school ground might provide a venue for teaching and learning both formally and informally, it appears that other factors, such as a school’s educational philosophy, influence the potential of a school ground as a teaching site. To illustrate, in a recent exploratory study in Australia, Malone and Tranter (2003b) examined if and how school grounds could be used as sites for teaching and learning. They found that a school’s philosophical commitment to school grounds, embodied in mission statements, curriculum guidelines and educational policies, was as vital as the school ground design to ensuring learning opportunities were maximized. They note, “It is not sufficient to have child-friendly grounds. Having a philosophical commitment to the value of school grounds for developing children’s environmental cognition is a vital ingredient” (p. 300).

Quantitative Evidence

The reports of renewed enthusiasm with and engagement for learning suggest that green school grounds have a strong influence on student learning. Unfortunately, however, many of these important lifelong learnings that are fostered through the green school ground are seen as being ‘outside’ of what is recognized as traditional academic achievement, and more often than not, they do not count when students are evaluated. Emphasis is often placed solely on grades. Do green school grounds have an impact on student academic achievement, as measured by tests

and represented by grades? While many researchers have speculated that a positive relationship exists, very little rigorous research has been performed that explores this relationship. Two important exceptions do, however, exist (Lieberman & Hoody, 1998; Simone, 2002) that point to a positive relationship between outdoor learning and academic achievement.

The first study, *Closing the Achievement Gap*, by Lieberman and Hoody (1998) is an American report sponsored by the State Education and Environment Roundtable (SEER). The researchers studied the effects of using the Environment as an Integrating Context for Learning (EIC). EIC-based learning differs from traditional environmental education in that the focus is not directed towards learning about the environment. Instead, EIC learning involves using a school's surroundings and community as a medium for students to construct their own learning. Examples of environments that could be used include the following: classroom settings or other in-house facilities (e.g., laboratories); developed or undeveloped areas of school grounds (e.g., playgrounds, fields, or woodlands); and off-school study areas (e.g., community parks, conservation areas). Through an examination of standardized test, samples of curricular material, and interviews with teachers and administrators, Lieberman and Hoody documented a significant improvement in student performance in language arts, mathematics, science and social science.

Since its publication, it has become a highly cited and respected report for people who practice and research environmental education. The report is compelling for a number of reasons. First, before this report, the majority of the research in this field focused on how environmental education promotes the development of environmental skills, knowledge and behaviour. The Lieberman and Hoody report represents the first attempt to understand the effects of using the environment as an integrated context for learning across a variety of disciplines. Second, unlike many studies in environmental education that investigate the experiences of one or two initiatives or schools, the researchers used a large sample size for their study. The report is based on the experiences of 40 schools across the United States that have adopted the principles of environment-based learning. The results reflect the experiences of more than 400 students and 250 teachers and principals. Finally, unlike some research in environmental education that generates qualitative data (often from a case study approach), the Lieberman and Hoody report generated large amounts of quantitative results that are seen to be "convincing," "striking," and "comprehensive" (Evergreen, 2000b, p. 5-6).

In a second study, Simone (2002) explored the relationship between school ground greening and academic performance at 16 elementary schools in an urban school district in Ontario, Canada. She found that students in Grades 3 and 6 attending schools with green grounds performed better on province-wide standardized tests than students who did not. When Simone

controlled for socio-economic status, she found that the relationship between academic performance and school ground greening persisted. Interestingly, the greening initiatives had a stronger effect on achievement for students from poorer neighbourhoods as compared to wealthier neighbourhoods.

Evidence From Other Settings: Children

Several other studies, conducted in settings other than school grounds, have explored the impact of natural settings on various aspects of young peoples' cognition. For example, Grahn and his co-researchers (1997) compared the attention capacity of children attending two different day care facilities in Sweden. The first day care facility was in an urban setting (in Malmo), with the day care surrounded by a tall building. The second day care facility (in Kipplan) has an "outdoors in all weather" philosophy, and is surrounded by orchards, pastures, and wooded areas. They found that children attending the latter day care had better motor coordination and greater attention capacity than the children attending the urban day care.

Researchers from the Human Environment Research Laboratory at the University of Illinois have also explored the impact of nature on aspects of cognition in children. In an initial study, Taylor, Kuo and Sullivan (2001) explored if and how the attentional functioning of 96 children (7 to 12 years old) who have Attention Deficit Disorder (ADD) is influenced by spending leisure time in green settings (e.g., fishing, soccer) as compared with non-green settings (e.g., TV, video games). Results of this study indicated that children with ADD had fewer attention deficit symptoms after spending leisure time in green settings. In another study, Faber-Taylor and her coauthors (2002) explored the impact of nature located near homes on three aspects of 169 children's (7 to 12 years old) self discipline: capacities for concentration, impulse inhibition, and delay of gratification. They found that girls (n=78) showed significant, positive relationships between near-home nature and each of the self-discipline measures. In other words, girls who have green space immediately outside their home were leading more effective and self-disciplined lives (i.e., able to concentrate more, etc.) than girls whose residences were surrounded by barren settings.⁴ Faber-Taylor, Kuo and Sullivan conclude both papers by discussing the

⁴ While I find the gender differences described here (i.e., relationship with girls found, but not boys) quite intriguing, they also raise many additional questions for me. For example, I would suspect that girls are generally more self-disciplined in our society; how does this socialization effect influence the findings of Faber-Taylor et al. (2002)? Furthermore, who decided that self-discipline is equated with effectiveness? Is this true for girls and boys? Or just girls? Other researchers have explored the different ways that boys and girls interact with and perceive green spaces such a school grounds (e.g., Harvey, 1989a; R. C. Moore,

implications for the design of school grounds. They argue that since natural settings seem to help to promote increased attentional functioning (Faber-Taylor et al., 2001) as well as self-discipline (Faber-Taylor et al., 2002) - which are both important components of succeeding in academic pursuits - then “perhaps after spending breaks in green schoolyards, children return to their classrooms better prepared to pay attention, to suppress disruptive impulses and to wait patiently for future breaks” (Faber-Taylor et al., 2002, p.61).⁵ They explicitly state that “green schoolyards could play an important role in children’s academic pursuits” (Faber-Taylor et al., 2001, p. 74).

Two other studies, by Wells (2000) and Wells and Evans (2003), have contributed greatly to our understanding of the relationship between children’s cognitive functioning and green environments. In an initial study, Wells (2000) implemented a premove-postmove longitudinal design to explore if and how the cognitive functioning of children (7 to 12 years old) changed when they moved from “poor” housing with few natural settings to “better” housing with more natural settings. In comparing cognitive functioning (as measured by their ability to focus their attention) of 17 children from premove to postmove, she found that children who experienced the largest increase in natural elements (premove vs. postmove) had higher levels of cognitive functioning than children who had less of an increase in the amount of nearby nature. In a second more recent study, Wells and Evans (2003) explored if nearby natural elements would help to moderate the stress levels of 337 rural American children, in Grades 3 –5 (mean age = 9.2). They found that the presence of nearby nature ‘buffered’ the impact of stressful life events, such as moving, bullying, and peer pressure, for the children in her study. If stressful events are indeed moderated by ‘nature,’ Wells and Evans propose that their findings have powerful implications

1986b; Susa & Benedict, 1994; Weinstein, 1979), but future work is clearly warranted to fully understand these complex gender relationships.

⁵ Statements such as this one (and others) that are included in Faber-Taylor et al. (2001, 2002) are somewhat troubling to me. Notions that school grounds are spaces that should allow students to “let off steam” so they can be better prepared to “pay attention” and “suppress disruptive impulses” reinforces the notion of school being a prison or preparation for factory work. Like others, I reject the “surplus energy theory” of play (see Evans, 1995). The goal of school, in my mind and that of many environmental educators, should not be to produce docile, repressed students. Further, I believe that school grounds should not be seen as spaces that have such a different philosophy to the inside of schools. Such a dualism (inside vs. outside) seems unnecessary and potentially detrimental. The findings of this study, however, do shed some light on the relationship between green spaces and learning environments and it seemed important to include it in this paper.

for policy and design of schools. They suggest that schools surrounded by natural areas might help children develop resilience and promote their performance in schools.⁶

When considered together, the work of Grahn et al. (1997), Faber-Taylor, Sullivan and Kuo (2001; 2002), Wells (2000), and Wells and Evans (2003) helps to clarify the potential relationship between exposure to green spaces and cognition of young people. Given that these studies were done across a range of:

- *socio-economic statuses* (lower class (Faber-Taylor et al., 2002; Wells, 2000) and upper class (Faber-Taylor et al., 2001)),
- *races* (primarily African American (Faber-Taylor et al., 2002) and primarily European American (Faber-Taylor et al., 2001)),
- *ages* (preschool (Grahn et al., 1997) and middle childhood (Wells & Evans, 2003))
- *children with differing cognitive abilities* (children with extreme ADD (Faber-Taylor et al., 2001) and children with no known attentional disorders (Wells & Evans, 2003)),
- *geographical locations* (North America (Wells, 2000) and Sweden (Grahn et al., 1997)),
- *levels of urbanization* (urban (Grahn et al., 1997) and rural (Wells & Evans, 2003)), and,
- *green environments* (barren high rise apartments (Faber-Taylor et al., 2002) and lush suburban homes (Faber-Taylor et al., 2001)),

it appears these findings are potentially generalizable. Even though these studies were not done in the context of green school grounds, they lend some support to the notion that green school grounds might positively influence the cognitive abilities of students.

Evidence From Other Settings: Adults

The relationship between nature and learning has been explored not only for young people, but also for adults. Much of the research on adults suggests that exposure to natural settings, such as trees, flowers, and parks, helps to maintain or restore the capacity to direct one's attention, that is to focus, or concentrate. S. Kaplan and R. Kaplan have been particularly involved in advancing our understanding of mentally restorative experiences (Kaplan, 1984,

⁶ The work of Wells (2000) as well as Wells and Evans (2003) explores the impacts of *amount* of nature, with little attention being focussed on the *quality* of the nature. I think there are important distinctions to be made between amount and quality of nature, especially when one considers the social constructions embedded within the term "nature."

2001; Kaplan & Kaplan, 1989). Other researchers have built on their work, by performing several studies that have explored the relationship between adults, nature, and cognition.

California researchers Hartig, Mang, and Evans (1991) explored the impacts of nature experiences on the cognitive performance of experienced adult backpackers. Using a quasi-experimental field study, they compared the cognitive functioning, as measured by a standardized proof-reading task, of the backpackers who went on a wilderness experience (n=25), those that went on an urban vacation (n=18), and those that had no vacation (n= 25). They found that those who went on the wilderness trip demonstrated improved proofreading performance as compared with the other two groups. In a second experiment, the researchers compared rates of recovery of cognitive fatigue among participants who took a walk in a natural setting, with participants who took an urban walk, and with participants who were involved in quiet relaxation (N=34 randomly assigned to the 3 groups). They found that the group who participated in the nature walk had the highest rates of recovery from mental fatigue.

In another study, Tennessen and Cimprich (1995) evaluated and compared attention capabilities of university students living in residences with different amounts of nature visible from their windows. Across the view categories, from all built to all natural, there was a trend of improved rating of the various measures with increased natural elements in view. Students with all natural views scored significantly higher on several of the tests. In addition to performing significantly better, students with the most natural views rated their own attentional functioning, that is planning, deciding, concentrating on details, as more effective than those in all other view categories. This study demonstrates the positive effect of nature viewed from a residence hall window on student's intellectual functioning. Is the same benefit happening for students at schools who not only get to look out of their classroom windows, but also get to be in green spaces during recess and lunch?

The research team from the Human Environment Research Laboratory at the University of Illinois has also explored the impact of nature on cognitive functioning of adults. Kuo (2001) compared attention capabilities of 145 adults living in inner city urban housing complexes with varying degrees of vegetation. She found that adults who lived in greener settings demonstrated greater attention capabilities than adults living in more barren settings. In another study, Kuo and Sullivan (2001a) explored the relationships among attentional functioning, mental fatigue, and crime rates of 145 residents in inner-city urban public housing units with varying degrees of vegetation. They found that residents living in greener settings had higher measures of attentional function and lower levels of mental fatigue than their neighbours who lived in more barren conditions. In another study, Kaplan (2001) explored the relationship between residential

vegetation and measures of attention by studying residents of apartment buildings. She found that residents whose windows faced natural settings evaluated themselves as performing better on several health and well being indices that are related to attention restoration.

Summary

In this section of the review, I explored if and how natural settings, such as green school grounds, influence an individual's cognitive functioning. The research exploring this relationship points to a relationship between cognition and exposure to green spaces. The evidence comes from a wide variety of settings (on green school grounds and other natural settings) and a range of ages (children and adults). Future research to allow for a greater understanding of the underlying mechanisms of this relationship is warranted.

Green School Grounds and Social/Behavioural Development

In the first section of this Chapter, the role green school grounds could assume in facilitating the formal curriculum was explored. The evidence suggests that when students are learning with the green school ground as their classroom that there is positive impact on both the process of their learning, as noted by factors such as increased enthusiasm and creativity, and the final product of their learning, as represented by grades.

But research suggests that green school grounds play important roles that extend well beyond delivering the formal curriculum. An array of evidence suggests that they assume an important role in delivering an informal curriculum as well. Informal learning is intrinsically motivated learning that happens without teacher intervention. It occurs when students spend unstructured time on the green school ground and they learn about social and behavioural skills.

So, are students demonstrating more prosocial behaviours on the green school ground? Are they being more cooperative? Are they less aggressive? Do they have more friends? Are they being nicer? Many researchers have studied the relationship between natural settings and the social interactions and behaviours of children and adults. Some of these investigations have been done on school grounds, while others have been done in other settings, such as childcare centres, public housing developments, and community playgrounds. There is general agreement in the literature that there is a link between natural environments, such as green school grounds, and positive social behaviours. With a view to exploring these possible relationships, in the following section, selected studies that shed insight into this environment-behaviour relationship for pre-school children, school age children, and adults are presented.

Pre-School Children

Two studies with pre-school children by G.T. Moore (1986) and Huttenmoser (1995) examined the relationship between young children's behaviours and the design of their play environments. G.T. Moore (1986) explored if and how the spatial definition of a setting influenced children's behaviours (aged 2.5 to 6 years) in 14 childcare centres in Milwaukee, Illinois, USA. In this study, spatial definition was measured by 10 variables, including the degree of enclosure and degree of visual separation from other settings, etc. Examples of 'spatially defined behaviour settings' include activity pockets with partially surrounding walls, changes in floor coverings as well as wall hangings. After making 1,061 observations, Moore found that children in well-defined childcare settings were engaged in more social interactions, were being more cooperative, and were being less competitive, than their counterparts in less-defined settings. While this study was done inside a childcare setting, the implications have been extended to school ground design where many planners stress the importance of having spatially well-defined school grounds (e.g., R.C. Moore, 1996; Toronto District School Board, 2000).

In a study with pre-school children in Switzerland, Huttenmoser (1995) compared social behaviours between two groups of 5-year-old children (N=20). The first group of children were allowed to play in outside spaces without traffic without adults (n=10); the second group could not leave their homes unaccompanied by adults (n=10). He found that the children who lived in places that allowed unaccompanied outdoor access reported having twice as many friends than did those living in places with restricted outdoor access.

School-Aged Children

Several studies have pointed to the influence of natural settings, such as green school grounds, on the social behaviour of school-aged children (Alexander, Wales North, & Hendren, 1995; Cheskey, 1994, 2001; Lieberman & Hoody, 1998; R.C. Moore & Wong, 1997; Titman, 1994; Weinstein & Pinciotti, 1988). Several of these studies these will now be briefly discussed.

In what is generally considered to be a seminal work, Titman (1994) worked with the UK-based organization, Learning Through Landscapes, to conduct a qualitative research study using semiotics to assess how children's behaviours and social interactions are influenced by the design of a school ground. Titman (1994) explains that semiotics "is a theoretical approach for the study of communication and interpretation. The semiotic enterprise aims to unravel the web of shared cultural meanings that encode an expected social response to all design and its signs and symbolism" (p. 16). To gather information related to student perceptions of the school ground,

Titman invented a technique in which students chose images from themed collages to describe and build their ideal environment. As a starting point, qualitative in-depth group interviews were conducted with children using the collage boards. The group of students then took the researcher on an 'expedition' on the grounds during which the interview continued. A total of 25 small groups (8 to 10 children) were interviewed involving a total of 216 children (ages 5 to 12).

One of the key findings is that the young people in Titman's study believed school grounds should provide an opportunity to be a place for:

- *Doing* activities that involve adventure and risk taking;
- *Thinking* through exploration and discovery;
- *Feeling* a sense of ownership and safety; and,
- *Being* an individual, a child, and a private person.

Titman also found that school grounds, in themselves, are a 'hidden curriculum,' a " form of mass communication – they are as much 'texts' as the books in the library, the songs at assembly and TV programmes...The environment is a language with its own vocabulary and grammar" (pp. 16-17). She found that a positive correlation exists between the conditions of the school ground and behaviours and attitudes of children. For example, children believed that the school grounds are inextricably connected to the school buildings and that those who were responsible for the design of the school ground "made it like that" for a reason (p. 57). Titman asserted that when school grounds failed to meet the needs of its users, thereby making time in the school ground unenjoyable, the children believed that this was a conscious decision by people in positions of authority who did not care. Titman asserts that:

- School grounds, by their design and the way they are managed, convey messages and meanings to children that influence their attitude and behaviour in a variety of ways.
- Children read these messages and meanings from a range of signifiers which frames the cultural context of the environment. This constitutes the hidden curriculum of school grounds.
- The hidden curriculum has considerable influence, in a range of subtle but different ways, on the operations of all schools.
- It is within the power of those who manage schools to determine the nature of the hidden curriculum of their school grounds (Titman, 1994, p. 63).

Stine (1997) also investigated the hidden curriculum of school grounds and found that students "connect this evidence of lack of care for space as a symbol that the place and, perhaps, the people are not cared for" (p. 193). Stine also found that students who attend a poorly designed school are sent messages that the school is not a safe place, that teachers and the community do not care about the surroundings of their youth, and that the school is not 'a place of love.'

Moore is another researcher that has been involved in a longterm research project that investigated, among other things, the how social relations and behaviours are influenced through changes in the outdoor school design. Moore, working in conjunction with Wong, the principal at Washington School, documented the transformation of a 1.5 acre school ground in Berkley, California between 1972 and 1979. Moore and Wong used a variety of research techniques, ranging from anecdotal observations to behavioural mapping to interviews, to gather data about the effects of the transformed school ground on students, parents, teachers and the community. Moore and Wong's findings have been reported in a variety of forums, including books (R. C. Moore, 1986a; R.C. Moore & Wong, 1997), chapters in edited books (R. C. Moore, 1986b; R.C. Moore, 1989), as well as academic journals (R. C. Moore, 1989b). Through researching the transformation on the Environmental Yard – or the “Yard” – they concluded that a well-designed school ground will provide opportunities for young people to socialize with each other. More specifically, they suggested that the green school ground could help facilitate positive interpersonal relations:

As far as we could observe, the diverse nature of the Yard...fostered peaceful coexistence. The most obvious indication was the lack of boredom among the children, who rarely found themselves in negative, antisocial situations where teasing was used to add interest to their lives. (p. 120)

Moore and Wong (1997) observed that children in the green school ground developed their own culture that incorporated many pro-social behaviours that had not been witnessed prior to the school ground transformation. Children were seen demonstrating positive, cooperative attitudes and children from a wide variety of ethnic backgrounds, ages, abilities, and personalities played together more. The green yard engaged young children “as a community...in orienting their values in a prosocial direction deeply enough to resist the negative influences of the broader culture” (R.C. Moore & Wong, 1997, p. 120).

Finally, Lieberman and Hoody (1998), in their *Closing the Achievement Gap* study, found that when students are learning in and with the natural environment, an atmosphere of collaboration emerges among students and teachers. The large majority of teachers and administrators surveyed in their study reported that students improved in their abilities to collaborate (98% of respondents), function democratically (88%), practice civility (93%) and communicate (94%). They conclude that “as students work together, mentor their peers and younger students, and observe teachers working in teams, they have the opportunity to develop interpersonal skills that will serve them throughout their lives” (p. 65).

Adults

It appears that natural settings help to promote social interactions of adults as well. As noted above, Huttenmoser (1995) found that the children who could play outside alone had more friends than their counterparts. This relationship persisted for the *parents* of the children who could play outside: they reported having twice as many acquaintances than the parents of children who had to accompany their children outside.

Two other studies by Kweon, Sullivan and Wiley (1998) and Kuo, Sullivan, Coley and Brunson (1998) established positive links between exposure to green common outdoor spaces around housing developments and social opportunities, sense of community, and neighbourhood social ties for adults. In the first study, Coley and her co-researchers (1997) investigated how natural elements influenced the use patterns of outdoor public spaces in the public housing developments in Chicago, Illinois. The researchers used a technique called “observational walk-bys” in which the observers walked through the housing developments with varying levels of vegetation and recorded information on the presence of trees and vegetation as well as the presence and characteristics of the residents using the spaces. A combined total of 96 observations were made in the housing developments during the sampling period. Two results are of interest here. First, by analyzing a presence/absence coding for trees and people in the housing developments, the researchers found a statistically significant relationship between the presence of trees and the presence of people. People were much more likely to be present in outdoor areas with trees than in spaces without trees. This relationship was maintained for both adults and youth. Second, when the researchers explored the relationship between the presence of trees and the number of people, they found a statistically greater number of people in treed areas than non-treed areas. Treed areas attracted larger groups of people than areas without nature.

In another study, Kweon et al. (1998) explored if and how natural environments influence older adults’ social interactions. The researchers performed structured interviews with a total of 91 older adults (ages 64-91) from 11 identical apartments in a housing development in Chicago, Illinois. Each of the apartments had varying levels of vegetation in its surrounding common space. Kweon et al. (1998) found significant correlations between exposure to green common spaces and social relationships as well as sense of local community. In other words, older adults in the housing development whose apartments were surrounded by green space experienced greater involvement in neighbourly activities and reported stronger social relationships with friends and neighbours. Furthermore, older adults in the housing development who had more exposure to green common space reported a stronger sense of unity and experienced a stronger sense of belonging.

These studies provide additional support to the contention that exposure to green spaces promotes more social contact as well as more prosocial behaviours.

Restoration and Behaviour

While the above studies have pointed to the social and behavioural benefits that emerge for pre-school children, school-aged children, and adults who are simply *exposed* to natural settings, other studies have explored the social benefits that emerge for people who are involved in the *active process* of restoring a landscape.

In one study, Alexander, Wales-North and Hendren (1995) evaluated the social benefits of participating in a Master Gardener Classroom Garden Project for 52 Grades 2 and 3 (7 to 8 years old) students in San Antonio, Texas, USA. In analyzing interviews conducted with students, teachers, and parents, the researchers found that students in the Project had opportunities to learn “valuable lessons about life” (p. 259), such as cooperation, motivation, and delayed gratification. The students also had increased opportunities for social exchanges with adults and community members.

Other studies have also elucidated the social opportunities that emerge from community restoration projects (I. Miles, Sullivan, & Kuo, 1998, 2000; Shapiro, 1995). For example, Miles, Sullivan and Kuo’s (1998) investigated the benefits that emerged for 263 ecological restoration volunteers in Illinois, USA. In analysis of their questionnaires, they found that the volunteers felt numerous interpersonal benefits of their work, such as enjoyment of working with different age groups, accomplishing something as a group, and meeting friendly and interesting people. They also reported opportunities for intrapersonal growth, such as a boost in self-esteem, a sense of humbleness and a feeling of being part of something profound. In his reflective essay, Shapiro (1995) has also noted the intrapersonal growth that emerges from restoration projects, suggesting that this kind of work “can spontaneously engender deep and lasting changes in people, including a sense of dignity and belonging, a tolerance for diversity, and a sustainable ecological sensibility” (p. 225).

A modest body of research has also explored the participatory benefits/skills/behaviours that emerge for young people during the process of greening (Dyment, 2004; R. Hart, 1997; Hunter et al., 1998; Kenny, 1996; R.C. Moore & Wong, 1997; Titman, 1994) and numerous “how to books” exist that detail how students can participate in the process of greening (e.g., Driskell, 2002; Evergreen, 2000a; R. Hart, 1997; Hunter et al., 1998; Kenny, 1996; R.C. Moore & Wong, 1997; Stine, 1997). The exploration of student participation extends, of course, beyond school ground greening initiatives: other researchers have examined this issue in the context of

community development, health education, sustainable development, as well as other environmental education initiatives (e.g., Breiting, 2000; Chawla, 2002b; P. Hart, 2000; Jensen & Schnack, 1997; Simovska, 2000).

Researchers have developed many terms (e.g., ‘action competence’ (Jensen & Schnack, 1997); ‘genuine participation’ (Simovska, 2000); ‘environmental praxis’ (Fawcett et al., 2002), ‘participatory democracy’ (Wals & Jickling, 2000)), and frameworks (e.g., ‘Ladder of Participation’ (R. Hart, 1992, 1997)) to discuss the importance of meaningful youth participation in initiatives such as school ground greening projects. While these researchers differ somewhat in their interpretation and uptake of the notion of participation, they generally agree that a critical component of school ground greening (and other initiatives) is to ensure that young people’s voices and concerns are considered during the greening process. They problematize and resist ‘token’ approaches to including students in greening initiatives, whereby they are, for example, including only in tree planting events. Some researchers place particular emphasis on the notion that students should be involved in the problem identification phase of greening projects (e.g., R. Hart, 1997). Many argue that young people have a right to participate in decisions that relate to their quality of life and contend that students, when given the opportunity, will be able to critically evaluate their spaces, identify alternatives, and evaluate the outcomes. All these researchers agree that one of, if not the, biggest outcomes of school ground greening is allowing young people to acquire skills related to democracy, participation, and citizenship during the process of greening. And finally, they assert that young people will carry these skills into adulthood, allowing them to become political, engaged, and reflexive adults who know their rights and responsibilities as members of a community.⁷

In looking for additional support for child and youth participation, many point to international documents that recognize and support the notion that young people can and should be involved in decisions related to civic life. For example, the 1989 United Nations Convention of the Rights of the Child (CRC) is a set of universal standards for the protection and development of children (UNICEF, 1990). The CRC contains a series of ‘participation articles’ that articulate that young people are independent, thinking individuals who are capable of being

⁷ It is important to note that many researchers (including some of those listed above) have taken more critical approaches in exploring the issue of ‘participation.’ For example, some have argued that participation has become such a widely used term that it has become a part of modern jargon, and its ambiguity has resulted in it being used in many sectors (e.g., development and education) without close and critical evaluation (see Cooke & Kothari, 2001; Cornwall, 2002; Rahnema, 1992).

involved in decisions that affect them (e.g., see Articles 12-15, 17).⁸ Other international conferences have built on the foundations laid in the CRC and have sought to clarify and strengthen the nature of children's participation (e.g., Agenda 21, Local Agenda 21) (UNCED, 1992; WCED, 1993).

Summary

In this section of the review, I presented some literature that explores the relationships between nature and social behaviours for children and adults in a variety of settings. It appears as though natural settings, such as green school grounds, can help to encourage positive social behaviours, such as cooperation, communication, collaboration, democratization, and political empowerment/efficacy.

Green School Grounds and Play

A modest body of research has investigated how natural settings influence the play behaviour of young people. In this section of the chapter, I review some of this research by exploring children, adolescent and adult preferences for 'playing/being' in natural settings. I then present several studies that have examined if and how play behaviours are influenced by natural settings, such as green school grounds.

Preference for Natural Settings

A central theme that emerges from the research on nature and play behaviours is that young people, when given a choice, prefer to play in natural settings (Cunningham & Jones, 1996; R. C. Moore, 1986a; Raymund, 1995; Sobel, 1993). In one study, Moore (1986a) asked urban youth (ages 9-12) to draw their favourite place and 96% of the illustrations were of outdoor places. In another study in an isolated Australian city, Cunningham and Jones (1996) gave disposable cameras to 24 children (8 to 12 years old) and asked them to record their after-school play environments. The majority of the children's images were taken in natural areas that were dominated by trees, greenery, and leafiness. Sobel (1993) asked children (ages 5-15) in England (N=90) and Carriacou, Grenada (N=101) to draw maps of the areas around their house that included the spaces that are important to them. He found that 60% of the children drew some

⁸ Interestingly, the CRC also contains an article closely related to the issue of school ground greening. Article 31 addresses children's right to play, rest, and leisure.

sort of fort, den, or bush house located in a somewhat natural setting. Sobel asserts that these natural spaces are “almost a universal experience of childhood” (p. 6).

Adults remember these childhood ‘special places’ as well. Several researchers have asked adults to reminisce about their favourite places as a child, and it appears that many adults fondly recall natural settings. Sebba (1991), for example, found that almost all the adults in her study identified the most significant place in their childhood with the outdoors (N=198). In another retrospective study, Raymund (1995) found that 78% of the adults in her study preferred to play outside as children (N=40). Sobel (1990) also found that many adults, when asked to describe their favourite places in middle childhood, recalled special natural places, such as forts, dens, and bush-houses (N=100).

Some researchers have also explored the relationship between adolescents and nature (Kaplan & Kaplan, 2002; Owens, 1988, 1994; C. Thomashow, 2002; Wals, 1992, 1994b). As Owens’ (1994) research reveals, many adolescents’ favourite places are not natural spaces; instead, they prefer more developed spaces where they can be with their friends. The Kaplan’s (2002) propose that there appears to be a ‘time out’ in the adolescent relationship with nature. They also discuss the importance of recognizing the unique needs of teenagers and discuss how properly facilitated nature experiences can help to meet their needs. C. Thomashow (2002) builds on the work of the Kaplans’ and describes several successful approaches that have been taken to help attend to the “essential wild nature of adolescent development” (p. 263). Adolescents’ relationship with nature appears somewhat more complex than the relationship between children and nature and perhaps this is because they are craving excitement, autonomy and peer acceptance (C. Thomashow, 2002).

Play Behaviour in Natural Settings

Clearly, young people “prefer” to play in natural settings. But are play behaviours actually different in natural settings? Do different play opportunities become available through natural settings, as compared with manufactured settings? Are more play activities possible on green school grounds? Unsurprisingly, many studies have shown that the type, quality and diversity of children’s school grounds directly affect the type, quality, and diversity of children’s play.

In one study, Kirkby (1989) investigated the use of ‘refuges’ (i.e., enclosed spaces or places to hide) by pre-school aged children (N=26, mean age 4 years, 8 months) on a school playground, in Mercer Island, Washington, USA. Using a behavioural mapping technique, she recorded children’s use of the areas during the play period. Kirkby found that children spent 47%

of their playtime in the refuges that occurred in less than 10% of the play area. She also investigated types of play that occur in natural refuges and found that children playing in the natural refuges engaged in more dramatic play (i.e., domestic and adventure play) than gross-motor or passive play (for similar studies, see Lindholm, 1995; Weinstein & Pinciotti, 1988).

US researcher Barbour (1999) expands our understanding of the relationship between play behaviours and design on school grounds, by bringing in issues of social interactions into her investigation. She compared play behaviours between two school grounds: one that provided primarily opportunities for physical play; another that provided for a diversity of play opportunities. At schools that only provided opportunities for active and physical play, social hierarchies were established through these means, and children with low physical competence (or desires) were often social excluded. Conversely, at schools where a diversity of play opportunities were afforded, students who were less physically competent could still engage in the social hierarchy and participate in a type of play that was more in line with their abilities/interests.

In another study, Moore and Wong (1997) found that the green school ground (i.e., the Yard) in Berkeley, California allowed young people to “expand the play repertoire” (p. 91) by engaging them in less organized play and more unorganized ‘free’ play. In the green school ground, they observed an increase in active play, creative play, pretend play, exploratory play, constructive play and social play as compared with the original school ground. They noted,

This was a far cry from the old school ground, where girls hung around admiring the boys’ prowess at playing ball or felt excluded because they were not attracted by the crowded play equipment; and where nonathletic children were ridiculed for not participating in the unchanging routines of ball courts, game lines, and metal bars. (p. 91)

Malone and Tranter (2003a; 2003b) have very recently advanced our understanding of the relationship between the designs of school grounds and play behaviours of students. They used a wide range of data collection techniques at 5 elementary schools in Australia (Canberra and Melbourne), including behavioural observations and interviews with 10 children at each school (8 to 10 years old). They found important differences between the play behaviours of students across the five schools. At one of the schools in their study, many students were engaged in play behaviours that had them interacting with and exploring in the environment; while at other schools, no students were engaged in these play behaviours. While Malone and Tranter suspect that some of these differences emerged because of the different designs of the school grounds, they also found that an equally important influence on children’s play was a school’s philosophical commitment to facilitating diverse play. They argue that “school design, although instrumental in the potential for extending the curricula, is not as vital as having a view

of learning that does not distinguish between indoor-outdoor environment” (Malone & Tranter, 2003b, p. 299). Variables such as staff attitudes, curriculum content, and school policies, were as often as important as the design in facilitating and encouraging diverse play behaviours.

Natural settings influence play behaviours in outdoor settings other than green schools grounds, such as daycare centres and in inner-city housing developments (Faber-Taylor, Wiley, Kuo, & Sullivan, 1998; Freeman, 1995; Herrington, 1997; Susa & Benedict, 1994). In one long-term experimental study performed on childcare playgrounds in the US, Herrington and Studtmann (1998) studied if differences in play behaviours emerged as a result of children (2 to 6 years old) being allowed to play with/in natural elements (such as plants and bushes), as opposed to manufactured play structures. They found important differences in children’s play behaviours after more natural elements replaced asphalt and manicured grass. Before the ‘greening,’ the environment encouraged physical activities, and social hierarchies were established primarily through physical proficiency. After the ‘greening,’ a diversity of play spaces was created, allowing children to develop social, emotional and cognitive skills (instead of just physical). Clearly the ways in which children play are strongly influenced by the design of the environment.

Play outside inner city housing developments is also influenced positively by more natural elements. Faber-Taylor, Wiley, Kuo and Sullivan (1998) compared the amount and type of children’s play between low and high-vegetated spaces (N=262 children, 3 to 12 years old). They found that significantly more play occurred in high vegetation spaces than in low vegetation spaces. Furthermore, when the researchers coded types of play into several categories, the incidence of creative types of play was significantly higher than other types of play in higher vegetation spaces. When they examined the relationship between levels of vegetation and children’s access to adults, they found that groups of children in higher vegetation spaces had greater access to adults than groups in lower vegetated areas.

Our understanding of the relationship between play and environment has been recently advanced by the work of Fjortoft and Sageie (2000). Using methods from landscape ecology and geomorphology, they analyzed, using GIS, a 7.7 hectare ‘playscape’ in Norway with a view to determining the natural environment’s suitability as a playground for children. They evaluated and mapped, at a landscape level, a number of characteristics of the area, including vegetation, topography, and the play habitats. From their analysis, they were able to evaluate how effective the landscape was in providing a viable, safe, and diverse playscape for the children. Such a rigorous and analytical analysis of children’s play environments has not, to my knowledge, been done before and the full ramifications of such an approach to evaluation and planning remains to be fully explored.

The Importance of Cubbies, Dens, Forts, and Special Places

Some researchers have focussed their energies on understanding the importance of allowing young people to make meaning in, with, and through their play environments, by moving objects and creating 'special' places (Cobb, 1977; Kylin, 2003; Sobel, 1993). They assert that this is particularly important for children in middle childhood – ages 7 to 12.

Sobel (1990; 1993), for example, examined the importance of forts, dens, and 'special places' in the lives of children, particularly middle-aged children (ages 5-6 to 11-12). Sobel interviewed children in England (N=90) and Carriacou, Grenada (N=101) and performed extensive interviews with adults (N=100) in New England and Carriacou. From his research, Sobel (1990) concluded that:

Children need the opportunity to create and manipulate, within prescribed limits, small worlds. The creation of these worlds from plastic materials (shapeable, open-ended material like dirt, wood, clay or Lego's) gives children the opportunity to organize a world and then find places within it in which to become themselves. (p. 8)

Sobel argues that this is particularly important in middle childhood, which is a "critical period in the development of self and in the individual's relationship to the natural world...Children leave the security of home behind and set out...to discover the world" (1993, p. 159). During middle childhood children are involved in place-making activities, such as fort building, role playing, and constructive play and are developing a key relationship with the natural world. Sobel (1990) found that 'special places' have common attributes. More specifically, special places are: 1) found or constructed by children on their own; 2) secret; 3) owned by their creators; 4) safe; 5) organized worlds; and, 6) empowering to their builders (p. 10) Sobel's findings are useful in considering transformed school grounds. Do school grounds provide young people with an opportunity to create forts, dens, and other special places? Indeed, they can.

Sobel's (1990) work on middle childhood expands upon the work of Cobb (1977). In "The Ecology of Imagination in Childhood," Cobb (1977) asserted that middle childhood is a critical period in which young people develop a relationship with the natural world. She stresses that children need the opportunity to participate in 'world-making' or 'world-shaping' activities. A natural setting (or transformed school ground) that has elements of complexity, plasticity, and manipulability allow children to engage in a variety of significant 'world-making' play behaviours such as fort building, role playing, cause-effect actions, as well as constructive play. Although Cobb's contention that children feel these experiences 'universally' has been questioned (Chawla, 1986), her work provides relevant guidance for people interested in understanding the scope and potential transforming school grounds.

Summary

The studies described in this section of the review reveal that young people, when given a choice, prefer to play in natural settings. They also suggest a positive link between play behaviours and natural settings. These findings suggest that green school grounds might have an important role to assume in providing children with preferred venues for play and for encouraging the development of positive play behaviours.

Green School Grounds and Environmental Awareness and Stewardship

A significant number of authors and researchers have asserted that contact with the natural world helps young people develop environmental awareness and stewardship skills. The exploration of the relationship between nature and environmental values formation in young people has been done in the context of both school grounds (Adams, 1991; Bell, 2001a; Centre for Ecoliteracy, 1999; Harvey, 1989a, 1989b; R.C. Moore & Wong, 1997; Pivnick, 2001) and other natural settings (Abram, 1996; Cobb, 1977; R. Hart, 1987; House, 1996; Hutchison, 1998; Nabhan & Trimble, 1994; Sheppard, 1982; Sobel, 1993). I begin by reviewing the literature that explores the relationship between green school grounds and environmental awareness and environmental stewardship. I then discuss how an individual's relationship with the natural world changes during different developmental stages and conclude with a brief summary of the challenges of creating conditions for exploring environmental values.

Green School Grounds and Environmental Awareness

Several researchers have postulated that green school grounds assume important roles in fostering environmental awareness. 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 knowledgeable about the natural world.

In a classic study on school ground greening, Harvey (1989a) examined the relationship between children's experiences with vegetation on school grounds and their environmental attitudes. Harvey hypothesized that students who had more extensive experience with vegetation at school (as well as home) would have more positive environmental attitudes as well as a greater knowledge of botany. To test her hypothesis, she examined the experiences of 845 schoolchildren from 21 schools in England. She compared students' attitudes and knowledge with four particular aspects of their school landscape. She found that students from highly vegetated school grounds had more positive environmental attitudes and had higher scores for

botanical knowledge than students from schools without vegetation. Harvey's quantitative, large-sample study is widely cited in the literature related to school ground greening as providing concrete evidence that green school grounds can be a medium for enhancing environmental knowledge and attitudes.

Environmental awareness is also developed on green school grounds through initiatives and infrastructure that address issues related to waste production (compost programs), energy use (shade trees planted on appropriate aspect to cool schools in summer), and water consumption (roof run off catchments that store water for school gardens). When students are surrounded by school infrastructure and systems that are environmentally responsible, then students are able to learn through living and interacting with these systems. They are also sent powerful messages that these technologies and approaches are viable and workable in mainstream society.

Green School Grounds and Environmental Stewardship

The underlying hope, of course, is that when students spend time on, interact with, and learn from the green school ground, that they will develop a sense of stewardship that translates into a deep environmental commitment that extends well beyond the school grounds themselves.

Canadian researcher Bell (2000; 2001a) explored the relationship between green school grounds and environmental stewardship. She conducted a 10-month case study in a selected school board in southern Ontario that had restored a wetland adjacent to the school property. Through interviews with teachers, principals, parents, and students and 72 days of direct observations of students in grades 1,5,6,7, and 8, Bell explored, amongst other things, how the green school ground provided students with opportunities to engage with the natural world on an "intimate and embodied level" (p. 210). This connection, she argues, allowed students the opportunity to learn to identify plants, animals, and changes in seasons as well as understand the interdependence among the individual entities. They learned to develop a 'sense of place' in which they felt a connection to the environment that surrounds them. These experiences, Bell suggests, "added a depth of feeling and commitment not accessible through indoor, print-centred approaches to learning which so often cast relationships within the more-than-human world in terms of distance, detachment, abstraction, and control" (2001a, p. 223).

Through these intimate connections, it is hoped that the students who attend a green school will develop an environmental ethic that will influence their actions and behaviour as adults. Moore (1986a), for example, asserts that "first hand experience of the natural environment will prepare children to make informed, responsible judgements about the wise use of our environment as adult voters and taxpayers" (p. 76). Several researchers using the

'significant life experience' framework for research have also noted how contact with natural settings as a child assists in formulating environmental values that extend into adulthood (Chawla, 1992; Cobb, 1977; Corcoran, 1999; Hsu & Roth, 1998; Palmer, Suggate, Bajd, Hart et al., 1998; Palmer, Suggate, Bajd, & Tsalaki, 1998; Palmer, Suggate, Robottom, & Hart, 1999).⁹

Developmental Stages of Environmental Connections

Some researchers have documented how an individual's relationship with nature changes during different developmental phases, such as prenatal development, infancy and early childhood, middle childhood, adolescence (e.g., see Hutchison, 1998; Kahn Jr. & Kellert, 2002). While contact with nature is important during all stages of development, some researchers and theorists including Cobb (1977), Hart (1987), Hutchison (1998), Sheppard (1982), Sobel (1993), and Nabhan and Trimble (1994) stress that contact with natural settings is especially important during middle childhood (ages 9-12). As an example, Sobel (1993) performed empirical studies of children's interactions with nature and concluded that "middle childhood is a critical period in the development of self and in the individual's relationship to the natural world...Children leave the security of home behind and set out...to discover the world" (p. 159). During this time children are involved in place-making activities, such as fort building, role playing, and constructive play and are developing a key relationship with the natural world. Other researchers have explored the relationships among nature, environmental education, and values formation for both adolescents (Kaplan & Kaplan, 2002; C. Thomashow, 2002; Wals, 1992, 1994a) as well as university students (M. Thomashow, 1995). In light of this research, it is important to recognize the ways that green grounds in pre-schools, elementary schools, secondary schools and even universities can support the evolving and changing relationships between developing individuals and nature.

How to Best "Do" Environmental Education

There has been much discussion in the literature about how environmental programs, such as school ground greening initiatives, influence young people's environmental attitudes and values. Some contend that environmental education happens when teaching and learning occurs *in* remote nature based settings (e.g., J. Miles, 1991) while others advocate teaching young people environmental values by teaching *about* the environment (e.g., Armstrong & Impara, 1992;

⁹ Of course the 'significant life experience' framework has been criticized by some researchers who problematize the notions of 'experience' and 'memory.' (e.g., A. Gough, 1999a; N. Gough, 2002).

Smith-Sebasto, 1995). The contention that nature experiences alone will help people to care about the environment and in turn become committed environmentalists has been challenged by some writers. Russell (1999), for example, doubts that nature experiences are “some sort of panacea” which will lead to a “linear progression of nature experience leading to caring leading to commitment leading to action” (p.124).

Some researchers contend that more affect-driven approaches to education are necessary to evoke an emotional response to environmental issues that will in turn influence environmental values (Adams, 1991; Alerby, 2000; Engel, 1991; Hansen-Moller & Taylor, 1991; Pooley & O'Connor, 2000; Schneekloth, 1989). Still others insist that a political approach to teaching environmental values is necessary to avoid “liberal environmentalism,” which Lousley (1999) describes as “inherently depoliticised environmentalism, claiming to ‘save the earth’ while maintaining the social, political, and economic status quo” (p.295). And some assert that environmental education is a pedagogical endeavour that should focus on developing reflective, active citizens who understand issues of democracy, citizenship, and how to act individually and together (i.e., action competence) (Breiting, 2000; Jensen & Schnack, 1997).

The debate about the best way to ‘do’ environmental education is certainly complex (see Gurevitz, 2000) and is likely to continue. Understanding if and how green school grounds can assume a role in facilitating environmental education is imperative.

Summary

Knowing if young people can develop environmental values on a green school ground is becoming increasingly important given the growing number of challenges facing educators trying to offer nature experiences in more remote wilderness based settings (Simmons, 1998). Furthermore, given that some studies have found that direct contact with wild nature does not necessarily promote interest in the environment or action on its behalf (see Bogner, 1998; Eagles & Demare, 1999; Haluza-Delay, 1999; Russell, 1999), the importance of understanding the potential of urban natural spaces, such as green school grounds, to influence young people’s environmental values should not be underestimated.

Green School Grounds and Health

A large number of researchers have explored the links between nature and health. While some have investigated if and how nature helps people *recover* from illness more quickly, others have examined if nature helps *prevent* illnesses and/or *promote* wellness. In this section of the

review, I present some of this literature and explore the connections between nature on green school grounds and health recovery, prevention and promotion.

Nature and Health Recovery

There is reason to believe that contact with a green school grounds might help sick students to recover more quickly than contact with a barren school ground. Although no research has been done that explicitly explores the relationship between greening initiatives and recovery rates of unwell students and staff, research in other settings, such as hospitals, suggests that nature might indeed be, as Anita Olds suggests, a “healer” (Olds, 1989). Two studies in hospital settings indicate that patients whose windows faced natural settings had faster recovery rates and took fewer pain killers than patients whose windows overlooked unnatural settings, such as brown brick walls (Ulrich, 1984; Verderber, 1986). Given these findings, it is interesting to ponder if green school grounds might help “heal” the illnesses of students, teachers and administrators. For example, it would be interesting to compare absentee rates between schools with and without greening programs to explore if such a correlational relationship exists.¹⁰

Nature, Illness Prevention and Health Promotion

In addition to helping people recover from illnesses more speedily, there is a large body of evidence that suggests that natural settings, such as green school grounds, might also help prevent illnesses. Prevention of illness in schools can manifest itself in many ways, including the reduction of exposure to midday sun and avoidance of pesticide use, both which are seen as threats that compromise children’s health (Wigle, 2003) (Bell, 2004; Toronto Public Health, 2002).

Many conventional school grounds are hot places, and as they are presently designed, they are heat islands within cities. When school grounds don’t have trees or shade structures, students are exposed to direct sun during the highest risk period of the day – between 10 am and 4 pm.¹¹ They spend a significant amount of this time outdoors (1 – 3 hours per day) partaking in a variety of activities, including morning and afternoon recess, lunchtime, physical education

¹⁰ It is, of course, somewhat of a “leap of faith” to ponder such relationships, but if similar results have emerged as a function of green spaces around hospitals/prisons, then it seems reasonable that they might exist as a function of green school grounds. More research is clearly warranted.

¹¹ I acknowledge and thank Anne Bell, from Evergreen, for providing me with information about shade issues on school grounds (see Bell, 2004).

classes, and other field trips or extra-curricular activities. In most cases, as Bell (2004) notes, “they have little choice about exposure to the sun” (p.1). To illustrate how hot conventional school grounds can be, Moogk-Soulis (Evergreen, 2003) recorded surface temperatures of school grounds at 15 schools in Waterloo, Ontario, Canada (September 1999) that had not transformed their school ground. She found that they were, on average, 5.2 degrees Celsius hotter than temperatures in surrounding areas. She contends that if shade trees were introduced into the school ground, the surface temperatures would decrease by as much as 25 degrees Celsius, thereby reducing exposure to and the effects of the midday sun. Indeed, proper tree placement can help to reduce solar radiation, wind speed, and air temperature (Bolund & Hunhammar, 1999; Heisler, Grant, Grimmond, & Souch, 1995).

Childhood exposure to UVR is a major factor in the development of skin cancer (Toronto Public Health, 2002). The Toronto Public Health (2002) suggests that children who are subject to one blistering sunburn during childhood have doubled their risk of getting skin cancer. Children are considered to be particularly vulnerable because they have thinner skin and are more sensitive to UVR. Their long life expectancy means that they have a high risk of cumulative exposures, more time to develop diseases associated with UVR, and more years of life to be lost. Green school grounds can help to educate students about the dangers of UVR and to protect them from UVR by providing shade on the school grounds (see Greenwood, Soulos, & Thomas, 1998; Queensland Health, 2002). When students are invited to participate in tree planting efforts, Bell (2004) notes that “education and protection go hand in hand” (p.1).

Contact with nature also appears to assume a role in health prevention by actually promoting positive health. At some schools, for example, the school ground is transformed into a food garden and becomes a venue for teaching young people about how their food is grown, produced, and transported. An excellent example of health promotion occurring via a school ground garden is at the Edible Schoolyard in Berkeley, California where students are involved in caring for a 1 hectare garden (Centre for Ecoliteracy, 1999). Students also have formal school lessons in the Edible Kitchen, where they learn how to make healthy meals from the food they have helped to grow in the garden (See also Canaris, 1995; Dillon, Rickinson, Sanders, Teamey, & Benefield, 2003; Morris, Briggs, & Zidenberg-Cherr, 2002).

It is plausible that exposure to and contact with natural settings on green school grounds might even reduce absentee rates at schools. This line of reasoning emerges from the work of E.O. Moore (1981) who compared the incidents of medical calls between prisoners whose windows looked out to nearby nature with those whose windows faced unnatural or built settings. He found that the prisoners with a view of natural settings made significantly fewer visits to the

medical facilities than their counterparts. Research by Swedish researcher Grahn and his co-researchers (1997) adds to this line of reasoning. They found that children attending an “outdoors in all weather” day care facility took fewer sick days from their program than their peers who attended an urban day care facility surrounded by tall buildings.

Advances in the field of environmental health have pointed to the positive health outcomes of exposure to natural environments. Frumkin (2001) reviews how contact with animals, plants, landscapes, and wilderness contribute to human health and concludes that “...contact with the natural world may be directly beneficial to health” (p. 234). Several studies have shown that contact with the natural elements in urban settings can contribute to enhanced interpersonal, physical, emotional, and community well being (Han, 2003; Hartig et al., 1991; Honeyman, 1992; Kaplan, 1984, 1985, 2001; Lewis, 1992, 1994; Shapiro, 1995; Sorte, 1995; Ulrich & Parsons, 1992; van Kamp, Leidelmeijer, Marsman, & de Hollander, 2003). Several researchers who have examined school ground greening initiatives have also pointed to the positive social and behavioural impacts of these projects (R.C. Moore & Wong, 1997; Stine, 1997; Titman, 1994), but further exploration of the relationship between the natural environment and health prevention in school settings is warranted.

For those who take a sociobiological perspective, a positive relationship between contact with nature and health comes as no surprise. For much of human existence, survival depended on relationships with natural environments. In light of this historical relationship with the natural world as well as gene and culture co-evolution, Wilson (1983) hypothesized the existence of *biophilia*, suggesting that humans have an innate need for wild spaces and natural environments. He argues that humans are dependent on nature, and the human tendency to be interested in life and natural processes is actually an expression of biological and genetic need. From this perspective, then, it would not be surprising that exposure to natural settings would be associated with positive health.

Summary

The literature presented in this section of the review points to the positive relationships among nature, children, health prevention, and promotion. While little is understood about the role of green school grounds acting as agents of health prevention or promotion, it seems plausible that such a relationship might exist. Future studies are warranted to explore these relationships.

Green School Grounds and Safety

Could green school grounds help to increase the sense of safety at schools? Decrease crime rates? Reduce vandalism? Minimize bullying? I now examine the literature that explores the links between nature and safety. While much of this literature is from settings other than green school grounds, the findings might be applicable to school settings.

Safety at Schools?

Over the last few decades, numerous researchers have examined the issue of school crimes, such as bullying, violence, thievery, and vandalism, in both elementary and secondary schools (e.g., Baker & Mednich, 1990; Blyth, Smith-Thiel, Mitsch-Bush, & Simmons, 1980; Boulton, 1999; Craig, Pepler, & Atlas, 2000). These studies shed insight into why many students perceive schools to be, as Baker and Mednick note, “unsafe place[s]” (1990, p. 37). While school violence takes place both inside and outside of schools, there is evidence that suggests that some offences, such as bullying, may be more common on school grounds than in classrooms (Craig et al., 2000). Furthermore, some school ground greening initiatives have been targets for vandalism (Stout, 2001). In response to the increase in such negative behaviours on school grounds, schools are using a number management strategies, such as increasing the number of teachers on duty, enforcing stricter rules, having segregated playgrounds, enforcing anti-bullying policies, reducing the length of recess, or even totally eliminating recess (Evans, 1997, 2001).

Other schools, however, have proposed less confrontational approaches to managing aggressive behaviour. These schools acknowledge the relationship between the design of a school ground and behaviours (Evans, 2001; R. C. Moore, 1986b; Rivkin, 1995; Titman, 1994), noting that dull playgrounds are very boring, which in turn can lead to its users becoming frustrated, annoyed, and even aggressive. By offering young people a diversity of play spaces, these researchers note that playgrounds become much more peaceful and harmonious. Researchers like Titman (1994) and Moore and Wong (1997) note that the changes in behaviour can be even more dramatic if the young people are involved in the process of greening (Hynes, 1996; Lewis, 1992; Trust for Public Land, 1995).

Green school grounds do, of course, present some *new* 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 (e.g., Gamson Danks, 2001). 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, as Gamson Danks (2001) notes, many of the ‘new’ hazards can be readily

addressed and mitigated through proper design and management. For example, compost bins can be properly placed to reduce the risk of bee stings, and trees can be planted to ensure that sight lines are not compromised.

Other researchers have also noted that the design of an environment has an effect on crime rates. The research team from the Human-Environment Research Laboratory at the University of Illinois have performed three studies that explore violence, crime, and sense of safety in Chicago inner city urban public housing complexes with varying degrees of vegetation. In their initial study, Kuo, Bacaicoa and Sullivan (1998) used computer-based photo simulations to explore the relationship between tree density, grass maintenance and sense of safety. In their study with 100 residents in the housing units, they found that certain natural elements, such as densely planted trees and maintained grass, increased residents' sense of safety. In a second study, Kuo and Sullivan (2001b) found that residents whose apartments were surrounded by more natural elements reported lower levels of fear, fewer incivilities, and less aggressive behaviour than residents whose apartments had less natural exposure. They also examined police crime reports to compare the relationship between vegetation and crime in 98 apartment buildings. They found that residents who lived in buildings surrounded by natural elements reported fewer property and violent crimes. In a third study, Kuo and Sullivan (2001a) compared levels of aggression among 145 residents who lived in buildings surrounded with varying degrees of vegetation. They found that residents who lived in buildings surrounded by a barren landscape reported more aggression and violence than their neighbours living in buildings surrounded by natural elements.

In sum, there is a variety of evidence suggesting that naturally designed outdoor spaces may be linked to lower levels of crime and aggressive behaviour. Vegetation has been linked to greater sense of safety, less aggressive and violent behaviour.

Summary

In light of these studies, it is plausible that green school grounds might help increase a school community's sense of safety and decrease rates of violence. How these studies fit in with the contention that green school grounds have been targets of vandalism remains unexplored. Thus, exploration of the relationship between school ground greening initiatives and crime rates is encouraged in order to understand to full potential of greening initiatives.

Summary of Review of Impacts

There appear to be some benefits that emerge for a school community when a school ground has been greened. It is important to note, however, that some of the studies that describe the benefits, while compelling and fairly convincing at first glance, should not be embraced unequivocally. For example, it is difficult to entirely accept some of the findings from studies that have adopted a more quantitative framework, because the complexities of issues often remain unexplored. In addition, it is difficult to know how far to extend the findings of the qualitative studies that provide rich insights into the experiences of a specific program or initiative. How generalizable are the findings of these studies? Should the effects be expected at other schools with naturalized yards? Furthermore, some of the evidence presented on school grounds has been generated through anecdotal observation and it is difficult to know if and how to apply these findings.

As such, a considerable amount of room exists to further our understanding of school ground greening in order to have a greater insight into the impacts on students, the community and the environment. Future studies that used both quantitative and qualitative methods in a variety of settings, working with a variety of populations will enhance this understanding.

School Ground Greening and Critical Environmental Education

Having reviewed the primary literature related to school ground greening, I now explore this concept in light of the theories of critical environmental education. It is important to recognize from the outset that I could approach the proposed research on school ground greening from numerous disciplines, such as educational studies, environmental studies, and urban planning. It is an obvious choice, given the focus of this doctoral program, for me to approach this review of the literature from an 'educational studies' perspective. That said, however, I would like the reader to be aware that several perspectives will not necessarily be represented in the following review. Even within the discipline of educational studies, there are countless lenses through which I could approach this review of the literature. For example, I could frame the topic of school ground greening in a variety of educational concepts, such as critical pedagogy, curriculum development, child development, school effectiveness, school-community relationship, and environmental education. I have, however, chosen to frame much of this research within a critical environmental education perspective because it best reflects my theoretical and ideological perspectives.

Within the last century, North America has become a predominantly urbanized continent. The resource-based economy that once characterized this country and influenced human-nature relationships has less influence on the lives of most Canadians. Intimate contact and associations with wild environments are becoming far less common for many North Americans living in both urban and rural settings (Orr, 2002; Pyle, 2002).

In the late 1960's, in response to the evidence of environmental degradation and the rise of environmental consciousness through seminal books such as Rachel Carson's *Silent Spring*, formal educators began to agitate for an "educational approach that effectively educates man [sic] regarding his relationship to the total environment" (Stapp, 1998, p. 34). Termed 'environmental education,' this early approach "aimed at producing a citizenry that is knowledgeable concerning the biophysical environment and its associated problems, aware of how to help solve these problems, and motivated to work toward their solution" (Stapp, 1998, p. 34).

Like all educational reform movements, environmental education has undergone numerous changes since its inception. As such, the theories and practices of environmental education have been, and continue to be, highly contested (Bak, 1995; Huckle, 2000; Russell, Bell, & Fawcett, 2000; Sauve, 2000). What exactly is environmental education? Debates have occurred within the environmental education community over the philosophies, policies and practices that guide the movement. While the conceptual and methodological frameworks of *mainstream* environmental education have emerged through documents created from a number of international conventions, including the Belgrade Charter (UNESCO/UNEP, 1976), Tbilisi conference (The Intergovernmental Conference on Environmental Education, 1977), the Moscow congress (UNESCO/UNEP, 1987), and Agenda 21 (in particular Chapter 36) from the Rio conference (UNCED, 1992), in fact, there is no international consensus on what constitutes environmental education (see Scott & Gough, 2003).

A welcome addition to the international landscape is the Treaty on Environmental Education for Sustainable Societies that was created at the Rio World Conference on the Environment held in 1992 (World NGO Forum, 1993). The Treaty, often referred to as the Alternative Treaty, is written in four languages and was created by members of non-governmental organization and educators from five continents. The Alternative Treaty has 16 principles and is thought, by some, to be the most "inclusive, democratic, and comprehensive definition of environmental education to date" (Russell et al., 2000, p. 198). Some of the principles that are relevant to my research on green school grounds include:

Principle 2. Environmental education, whether formal, non-formal or informal, should be grounded in critical and innovative thinking in any place or time, promoting the transformation and construction of society.

Principle 4. Environmental education is not neutral but ideological. It is a political act.

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

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

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

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

Principle 15. Environmental education must stimulate dialogue and cooperation among individuals and institutions in order to create new lifestyles which are based on meeting everyone's basic needs, regardless of ethnic, gender, age, religious, class, physical or mental needs.

Principle 16. Education must help develop and ethical awareness of all forms of life with which humans share this planet, respect all life cycles and impose limits on humans' exploitation of other forms of life (World NGO Forum, 1993).

While laudable, most environmental education initiatives (especially in formal educational settings) seem to fall short of achieving these lofty goals. Barriers to delivering environmental education include lack of time, resources, and funding (Ham & Sewing, 1988). Furthermore, we are living in a society known for its consumerism, anthropocentrism, and resourceism, and systemic change is challenging (Fawcett et al., 2002).

Within the environmental education community, academics and practitioners have struggled to resolve numerous dilemmas found within and between the theory and practice of environmental education. Some of the tensions are related to issues such as: standardizing curriculum and programs (P. Hart & Kool, 2000; McClaren, 1997; Roth, 1997); advocacy (Chapman, 1999; Flogaitis, 2000; Jickling, 2001; Jickling & Spork, 1998; Lousley, 1999); the role of wild nature (Haluza-Delay, 1999; P. Hart, 1990; Russell, 1999); as well as inclusivity of

diverse voices in environmental education (A. Gough, 1999b; Ruffin, 1996; Running-Grass, 1996).

With a view to addressing some of these issues, environmental educators have been exploring if and how concepts such as sustainability (Huckle & Sterling, 1997; Lefebvre, 2000), social justice (Fawcett et al., 2002; Lousley, 1999), quantum physics (Selby, 2001), ecojustice pedagogy (Bowers, 2002), critical pedagogy (Bell & Russell, 2000), postmodernism, (Huckle, 2000; Sauve, 2000) and ecofeminism (A. Gough, 1999b; Russell & Bell, 1996) can inform and strengthen the theory and practice of environmental education. As a result of these explorations, ‘critical environmental education’ has emerged.

Not surprisingly, given the diversity of ideas and voices contributing to the theory and practice of critical environmental education, there is no accepted universal definition of critical environmental education. For the purposes of the present research on green school grounds, however, I have chosen to use the five criteria for critical environmental education proposed by Fawcett, Bell and Russell (2002) in their paper “Guiding our Environmental Praxis: Teaching and Learning for Social and Environmental Justice.” In this paper, the authors illustrate their efforts to achieve the theory and practice of critical environmental education in their own teaching at post secondary institutions. More specifically, they describe how they incorporate the following five criterion in their own teaching: 1) resisting anthropocentrism, 2) grounding teaching and learning in students’ lives, 3) paying attention to place and bioregionalism, 4) encouraging action, and 5) welcoming a diversity of voices. I have also included an additional sixth criterion called “environmental education in the city” that I think would be a vital element of critical environmental education as it relates to school ground greening.

I have chosen to frame the following section of the literature review with these six criteria because they seem to encompass many of the ideas found in the literature on critical environmental education. In the following section of this review, I briefly explore each criterion and postulate if and how it might be facilitated through a school ground greening project. This section is very speculative because, aside from Bell (2001a), no other researchers have approached school ground greening from this framework. I also explore how the theoretical foundations could inform and strengthen the school ground greening movement.

Resisting Anthropocentrism

Mainstream education systems promote, either implicitly or explicitly, powerful messages regarding the relationship between humans and nature. Many young people grow up estranged from the natural world and come to believe that they are superior to and in control of

nature. Anthropocentrism is the term used to describe this phenomenon and it refers to the “belief in the primacy of the human enterprise and hence in the inherent superiority of humans over all other species and thereby the right to dominance” (Bell & Russell, 1999, p. 70).

Critical environmental education efforts help to disrupt anthropocentrism and the dichotomous relationship between humans and nature by encouraging students to explore and develop their relationship with the natural world. Students are provided with opportunities for seeing themselves as part of nature and are encouraged to “reawaken” their “connections with the natural world” (Pivnick, 1994, p. 58). Many authors have explored how contact with the natural world (not necessarily on school grounds) can help to heal the relationship that exists between so many humans and the natural world (Abram, 1996; Bell, 2001a; Bowers, 1996; Nabhan & Trimble, 1994; Pivnick, 1994).

Some research has been done on green school grounds that supports the idea that restored and naturalized landscapes can provide a venue for disrupting anthropocentrism by allowing students to connect with the natural world. Bell (2001a) performed a 10-month case study in a selected school board in southern Ontario that had restored a wetland adjacent to the school property. Through interviews with teachers, principals, parents, and students and 72 days of direct observations of students in grades 1,5,6,7, and 8, Bell explored the benefits that emerge when students were allowed the time and space to engage with the natural world on an “intimate and embodied level” (p. 210). She found that students and adults who were involved with the restoration project were provided with opportunities for reconnecting with the natural world. These experiences, Bell suggests, “added a depth of feeling and commitment not accessible through indoor, print-centred approaches to learning which so often cast relationships within the more-than-human world in terms of distance, detachment, abstraction, and control” (2001a, p. 223). Bell’s study provides insight into the experiences of students, teachers, principals and parents at one school. Given the small sample size of this study, it is difficult to determine if Bell’s findings apply at other schools with green yards. In my proposed study, involved and uninvolved teachers as well as administrators will be asked to describe if and how young people are provided with opportunities for connecting with the natural world on green school grounds.

Grounding Teaching and Learning in Students’ Lives

Environmental educators working within a critical framework assert that teaching and learning should be grounded in the lives of students (Bell & Russell, 1999). Mainstream education systems often separate students from their learning through curriculum standardization, textbooks, and through power structures that exist in school systems (see for example,

Hargreaves, 2003; Hargreaves, Earl, Moore, & Manning, 2001). As Hargreaves (2003) observes, “Improving standards in the form of subject-based targets, or putting excessive emphases on literacy and numeracy, marginalizes the attention to personal and social development that is the foundation of community, and eliminates interdisciplinary attention to global education that is at the heart of cosmopolitan identity.” Resisting this separation, critical environmental educators advocate that educational practices and content should reflect the cultures and communities of the students and they “question the individualistic and universalistic narratives which shape curriculum and schooling generally” (Fawcett et al., 2002, p. 4).

School grounds appear to be a venue through which teaching and learning could be grounded in the lives of students, due to the involvement of students in aspects of the planning and maintenance of school grounds and the schools are usually in the same neighbourhood as most students’ homes.

Attention to Place/Bioregionalism

An important component of critical environmental education is helping students gain an understanding of their bioregion or homeplace (Fawcett et al., 2002; Orr, 1992). In some traditional environmental education programs, young people are taken far away from their homes in the city to ‘wild nature.’ As a result, many students can easily end up believing that nature is something that is separate from their everyday lives and certainly not present in the city. They also miss the opportunity to learn about the natural spaces that exist near their homes in the city.

Critical environmental educators try to reduce the separation between city and wild nature by encouraging students to experience natural spaces within the urban landscape that is their home (Martil-de Castro, 1999). Numerous urban spaces, such as city parks, backyard gardens, and green schools, can be used to allow students to learn about their bioregion. These spaces can be used to help students learn about local flora and fauna that co-exist in their homeplace.

School grounds could be a suitable venue for allowing students to learn about their bioregion on a daily basis through both formal and informal learning. Research conducted by Bell (2001a) and Moore (1997) suggests that green school grounds can be a venue for helping students learn about, and in turn care for, their homeplace.

Action

Many traditional environmental education programs fail to provide a forum for students to act upon the knowledge they have gained (Haluzá-Delay, 1999). And those programs that do

have an action component often only attempt to tackle safe and non-controversial issues such as recycling, without addressing the broader social issues that have led to the current situation (Lousley, 1999). Lousley (1999) found that “the liberal environmentalism taken up within schools is an inherently depoliticized environmentalism, claiming to ‘save the earth’ while maintaining the social, political, economic status quo” (p. 295).

Environmental educators working within a critical framework insist that a key component of environmental education is ensuring that students are able to translate their knowledge of environmental issues into action that addresses the interrelationships between social, economic, and ecological issues (Fawcett et al., 2002; Lousley, 1999). This need for action is similarly recognized in Principle 15 of the Alternative Treaty on Environmental Education (World NGO Forum, 1993).

School grounds might provide a forum for allowing students to learn in, with, and for the environment while simultaneously encouraging them to recognize the underlying societal values that cause environmental degradation. Through the literature on school grounds, I found examples of ‘student activism’ that was occurring on school grounds (Centre for Ecoliteracy, 1999; Martil-de Castro, 1999; R.C. Moore & Wong, 1997). These activities, in my mind, extended beyond simple and convenient actions, such as recycling, and instead addressed some of the systemic causes that are linked to environmental problems, such as racism, classism, and sexism.

Diverse Voices and Resistance

Many critical environmental educators from around the world contest the early definition of environmental education offered by Stapp and the concepts and theories that have emerged from the UNESCO and UNCED documents because of the limited number of voices that contributed to their creation. Australian researcher Gough (1999b), for example, has critiqued the mainstream ‘universal’ definitions of environmental education offered via UNESCO documents, arguing that the majority of discourse related to environmental education in these documents has been made by Western English-speaking males. She argues that “by making universal statements, the [UNESCO] International Environmental Program could be seen as saying there is only one problem and one solution, thereby masking any differences that may exist” (A. Gough, 1999b, p. 144). She continues that the “documents are based on worldviews, and written in languages, that are quite alien to non-Western, non-English-speaking, and non-male people” (p. 157). South African researcher Bak (1995) also critiques the ‘universal’ definitions of environmental education and argues that some of the assumptions guiding mainstream

environmental education are not applicable or relevant in a country like South Africa, which has a history of apartheid and numerous other social and political challenges. Canadian researchers Russell, Bell and Fawcett (2000) also note that “environmental education needs to come to terms with the ‘monoculturalism’ that pervades it” and to “recognize that different cultures may value different bodies of knowledge and different ways of knowing” (p. 207).

Critical environmental educators challenge the homogenization of mainstream environmental education and recognize that a diversity of voices must contribute to the theory and practice of environmental education. Furthermore, the ingrained power structures that support inequitable relations that exist amongst humans and between humans and the natural world must be challenged.

Could school grounds be a venue for challenging the traditions of a homogenous environmental education community? Could school grounds provide a space for addressing the systematic roots of social and environmental problems, such as racism, sexism, heterosexism, and classism? As many have noted, inextricable links exist between environmental movements and social justice movements (Ruffin, 1996; Running-Grass, 1996; Russell & Bell, 1996; Russell et al., 2000). In school ground greening projects, opportunities may readily exist to address the interrelationships between these linked oppressions. Given that school ground restoration projects often happen in urban settings made up of diverse populations and are often driven by community members, issues such as sexism, classism and racism, and their relationships with and to environmental issues, may be more easily identified.

In my mind, one way in which environmental education becomes critical environmental education is when the interrelationships between these subjects become explicit. Environmental education then becomes accessible to people other than the already privileged – namely, white, middle-upper class, heterosexual Canadians - who are fortunate enough to be able to call themselves environmental educators. It seems to me that school ground greening initiatives provide a possible venue for critical environmental educators to explore the full possibilities of socially just environmental education.

Environmental Education in the City

Academics and practitioners have explored what kinds of natural spaces are perceived as being appropriate venues for delivering environmental education (Martil-de Castro, 1999; Simmons, 1996). For example, Simmons (1998) investigated what motivates teachers to use various settings for teaching environmental education. She showed 59 urban elementary school teachers a set of black and white photographs with four different natural settings (deep woods;

county park; urban nature; aquatic areas such as rivers, ponds and marshes) and asked them to judge each setting using questionnaire items that described the potential benefits and barriers to taking students to the setting for environmental education. Simmons found that teachers viewed the four natural settings quite distinctly. Deep woods and aquatic systems were seen as being significantly more appropriate for teaching environmental education than urban nature. The teachers also reported that urban nature was a significantly more difficult place to teach environmental education than any of the other settings and that they were significantly more worried about taking their students to urban natural settings as compared to any of the other settings. It thus appears the teachers in Simmons study were not overly enthusiastic about using urban nature as a venue for delivering environmental education.

I suspect that Simmons' results are not atypical; many mainstream environmental educators maintain that environmental education is best taught in large natural areas away from human influences. These environmental educators insist that a deep connection with the natural world can only be gained through direct contact with wild nature in remote settings (J. Miles, 1991) and argue that nature experiences lead people to care about nature and become committed to and active for conservation.

This contention has been challenged by several writers working within a critical environmental education framework, including Russell (1999) who doubts that nature experiences are "some sort of panacea" which will result in a "linear progression of nature experience leading to caring leading to commitment leading to action" (p. 124). Indeed, some studies have found that direct contact with wild nature does not necessarily promote interest in the environment or action on its behalf (see Bogner, 1998; Eagles & Demare, 1999; Haluza-Delay, 1999).

Despite her critique, Russell (1999) is not arguing 'against' the importance of nature experience, but insists that more attention and care needs to be given to the structuring and 'hidden curriculum' of such experiences. I share this commitment to providing nature experience, while heeding Russell's warnings, and worry that for many teachers who work in the public education system in urban settings, having access to wild nature is becoming less and less of a possibility. Resources, in terms of time and money, which may have previously been dedicated towards facilitating these experiences, are becoming less available (see Fisher, 2001). For example, across Ontario, many outdoor education centres and programs have been eliminated as a cost-cutting measure. Furthermore, organizing and managing a field trip away from the school is challenging. As Simmons (1998) notes, teachers "must schedule the trip and may need to arrange transportation, permissions, and additional supervision. They are responsible for the

students' education as well as their safety...Each of these extra responsibilities could form a barrier that blocks teachers' inclinations to provide nature experiences" (p. 23).

Given this context, critical environmental educators are exploring alternative ways that students can have contact with wild nature. One way that students can readily access natural environments is on restored school grounds where asphalt and manicured grass have been replaced with natural features, such as trees, ponds, and gardens (Bell, 2001a; Martil-de Castro, 1999). School grounds are becoming an important resource for environmental educators who are interested in facilitating students' interest in, connections to, and desire to participate in action on behalf of the natural world. Readily accessible on a daily basis, students are provided with opportunities to learn, play, and socialize in a natural setting several times during the day (e.g., before and after school, recess, lunch hour).

Recognizing the power of the restored urban landscape has required many environmental educators to radically reconsider their definitions of 'environmental education' and 'nature.' Some early environmental educators believed that environmental education could only happen in wild spaces. Considering offering environmental education in urban landscapes with small restored spaces is radically challenging some of the foundations of mainstream environmental education theory and practice.

School Ground Greening in Canada

A Canadian Perspective

Having reviewed the primary literature related to school ground greening and contextualized this topic within a critical environmental education framework, I conclude this chapter by summarizing the current state of school ground greening in Canada. I begin by reviewing the estimated number of schools that have been greened in Canada. I then review the not-for-profit organizations that have been involved in this movement. I conclude this section by reviewing the academic research and other publications that have been produced in a Canadian context in the last few years.

Estimated number of schools.

It is estimated that approximately 1,200 school grounds in Canada have been 'greened' (Evergreen, 2000b).¹² It is important to note that this number includes a wide diversity of projects (e.g., those with a small garden as well as those that have been radically naturalized).

Not-for-profit organizations.

An emerging movement in Canada is recognizing the importance and potential of school ground transformation. At the centre of the movement is a national organization called Evergreen that is helping schools naturalize their yards. The organization offers a variety of services to interested schools including: funding, access to native plants, step-by-step manuals, and links with other schools. They also produce a newsletter called "The Outdoor Classroom" that provides support to interested teachers and administrators.

Funding agencies.

In terms of funding, a variety of corporations are showing their support for school ground greening as indicated through the creation of grants and bursaries (e.g., Toronto Atmospheric Fund, Tree Canada, Shell Environment Fund, TD Canada Trust Friends of the Environment).

Academic research.

Although limited, a small amount of academic research related to school ground greening is being produced in Canada. Anne Bell recently completed her doctorate at York University. Her dissertation, *Storied Experiences of School-Based Habitat Restoration* (Bell, 2000), has been discussed in this literature review and makes an important contribution to understanding the eco-pedagogical potential of school ground restoration initiatives. She has since published a number of articles based on her research (Bell, 2001a, 2001c, 2003). Simone (2002) recently completed a master's research thesis that investigating whether a relationship exists between student achievement and school ground greening in public elementary schools in a small Ontario city, while controlling for differences in socio-economic status. These research initiatives add to a growing body of academic literature investigating school grounds in Canada.

¹² I do not know how many of these (if any at all) have been turned back to concrete (Unfortunately, this does happen. See R.C. Moore & Wong, 1997).

Publications.

Several other Canadian publications related to school ground greening have been released recently. *Greening School Grounds: Creating Habitats for Learning* (Grant & Littlejohn, 2001b) is a comprehensive reference that helps transform the ‘idea’ of school ground greening into a ‘reality.’ The book, compiled by the Canadian editors of *Green Teacher* magazine, is a compilation of approximately 40 articles that guides readers through the phases of school ground transformation. The book is organized into sections that allow readers to focus on the specific areas they feel are most relevant. The first section summarizes the numerous benefits associated with school ground greening. In the next section of the book, the operational steps for beginning the process of school ground greening are presented, including how to develop a vision, secure funding, create plans, as well as involve parents and the community. The subsequent sections provide examples of specific projects and ideas that can be used in school ground transformation, such as roof top gardens, native plant restoration, and school ground ponds. The writers conclude with a section describing curricular options that emerge via a green school ground. The majority of the authors are practitioners and researchers from across North America, many from Canada, who are actively involved in school ground greening projects. As such, they are writing from experience and their suggestions are very practical.

In terms of other publications, Evergreen has recently developed a number of resources in their “Learning Grounds Tool Shed” series. In *Nature Nurtures* (Evergreen, 2000b), the historical and current literature related to school ground greening is reviewed with a view to describing the positive outcomes that emerge for students, teachers, and the school community when a school ground is transformed. In *Grounds for Learning* (Bell, 2001b), school ground greening projects from six schools from across Canada are profiled. In *School Ground Greening: A Policy and Planning Guidebook*, the importance of longterm planning and policy development is stressed (Evergreen, 2002).

The Toronto District School Board has been involved in creating two documents related to school ground greening. The first document, entitled *Transforming the Schoolyard: How Local Communities Design and Build their Playground Learning Environments* (2000) reflects the voices of the ‘design committee’ that was composed of individuals with diverse interests, disciplines, and areas of expertise. The book offers a refreshing perspective on play environments and contains specific design recommendations for meeting the needs of the whole child. Many specific examples of green school grounds in the Toronto District School Board are found throughout this book. The Toronto District School Board recently released a second

document called *A Breath of Fresh Air* (Houghton, 2003) that describes school ground greening initiatives across the board.

As I have noted elsewhere (Dyment, 2001), I believe that these Canadian documents will become flagship contributions that add to a growing body of international literature related to school ground greening. It is conceivable they will join the ranks of seminal references (R. C. Moore, 1986a; R.C. Moore & Wong, 1997; Stine, 1997; Titman, 1994) currently used by practitioners and researchers interested in school ground greening.

Conclusion of Literature Review

It is clear to me that many school grounds in Canada currently fall short of providing their primary users (i.e., the students) with the optimum experiences. Further, I assume that most students are so entrenched in believing that the current state of school grounds is 'normal' that they probably do not question the existing situation. This does not mean, however, that they are unable to imagine that alternatives exist. The works of Moore and Wong (1997), Stine (1997) and Titman (1994) suggest that young people, when given the opportunity, are able to imagine that alternative structures for their school grounds are possible. They are able to dream about a school ground with trees, shade, creeks, boulders, and gardens.

In reviewing the literature with a view to understanding the impacts of school ground greening, I found many potential benefits that emerge for the school community. Nevertheless, there are still many gaps in our knowledge of the impacts of school ground greening programs. To begin, many of the seminal research publications are written in an anecdotal genre making it difficult to fully understand the effects of the school grounds described in these studies (R.C. Moore & Wong, 1997; Stine, 1997; Titman, 1994). Furthermore, most of the research has been performed in the United States (Centre for Ecoliteracy, 1999; Harvey, 1989a; Lieberman & Hoody, 1998; R.C. Moore & Wong, 1997) and England (Adams, 1990; Hunter et al., 1998; Kenny, 1996; Stine, 1997). While several documents have recently been published in Canada (e.g., Bell, 2001b; Evergreen, 2000b; Grant & Littlejohn, 2001b; Toronto District School Board, 2000), their focus remains broad in scope and practical in nature in that they review the international literature related to school ground greening and provide a 'how-to' manual for implementing a school ground transformation project (Dyment, 2001). Some qualitative research has been conducted in Canada, but the focus has been on individual schools (Bell, 2001a; Cheskey, 1994). Very little thus is understood about the general trends or overall effects of Canadian school grounds.

Chapter Summary

In Chapter 2, I presented a review of the literature with the intention of identifying key concepts that will be relevant for this dissertation and I identified gaps in the literature to justify the need for my research. Literature on reported impacts, critical environmental education, and Canadian school ground greening initiatives has been discussed in this chapter. In the next chapter, the design of the research, data collection procedures, and data analysis will be discussed.

CHAPTER 3: RESEARCH METHODOLOGY & METHODS

Introduction

In Chapter 2, the academic literature related to the topic of school ground greening was explored, summarized and critiqued. I concluded Chapter 2 with an assertion that many gaps still exist in our knowledge of the impacts of school ground greening programs and a call for a range of existing and emerging genres of research to be employed to better understand school ground greening from a Canadian context. Several research priorities were identified, and some of these are addressed in the present study.

In this chapter, I describe my methodological leanings and the actual methods used. I begin with my personal reflections in which the theoretical and philosophical foundations that guided and informed my practices are described. Then, the specific elements of the research project are presented, including the research instruments, the research site, and the procedures that were used for the collection and analysis of the data.

Researching Change: Doing Transformative Research

Many doctoral students embark upon a research journey that has some ‘change’ element within it. School ground greening is an example of a change which has occurred in some schools and it is easy to foresee that a series of recommendations will emerge out of the present research upon completion of the dissertation. Changes within the educational system are complex, dynamic, and multivariate and they are occurring at the individual, organizational, and system level (Hall & Hord, 2001). In an educational system that is full of so much change and uncertainty, full of so many ‘reforms,’ ‘mandates,’ and ‘improvements,’ how do we ensure that ‘good’ change happens? How do we ensure that change is continuous, yet enduring, and is not overwhelming? In speaking with many American educators, Hall and Hord (2001) note that a common concern is that some educators feel as though the educational system “swings back and forth like a pendulum” (p. 20) as educational “fads” (p. 20) are presented that are intended to cure the problems faced by educators at all levels of the system.

While this is certainly an understandable perspective of change given the numerous pressures faced by educators today, it is usually not the intention of researchers to investigate an innovation (i.e., school ground greening) and generate recommendations that will result in burdening people who work in the educational system. The main reason for researching innovations and suggesting change is to serve the best interests of the children in the educational system. Hall and Hord (2001) support this contention by noting that “this never-ending quest to

improve schools is supported by theoreticians, researchers, policy-makers, practitioners, parents, and the business community, all of whom have a stake in educating our children” (p. 21).

If researchers who study innovations have the interests of children in mind, it should come as no surprise then that they bring a considerable amount of baggage with them to their research programs. Inside this baggage are the assumptions, agendas and beliefs that guide their research programs. This baggage, when explicitly named and considered, ultimately will make their research programs more interesting, relevant, and meaningful to the educational system. Lather (1991) agrees that it is important for researchers to place themselves within their research and notes that “research approaches inherently reflect our beliefs about the world we live in and want to live in” (p. 51). As such, she encourages researchers to investigate subjects that are of personal and political interest to them. Indeed, Lather supports researchers who choose to investigate socially-just change innovations that they believe in, as she convincingly argues for an “emancipatory approach to research” and understands “research as praxis” (Lather, 1991, p. 52).

While the concept of emancipatory research is inspiring and worthwhile, it does not quite capture the type of research that was performed in the present dissertation, because of the focus and design of this study. Administrator, teacher, and parent perceptions of school grounds were collected via questionnaires and in-depth interviews. Due to the large number of people responding to the questionnaires and the short amount of personal contact that I had with interviewees, I was unable to perform ‘emancipatory’ research in which the participants gain skills, knowledge, and power to contribute to social change, at least based on my research alone. The participants in the present research benefited from participating in the research in that they were provided with an opportunity to reflect upon their school ground greening project.

While the participants in the present study may have remained relatively ‘unchanged,’ it is quite possible that the school ground greening movement might change as a result of this research. As I note later on in this chapter, this research was indeed political, and I imagine that some of findings might help the movement evolve. As such, I would thus like to use the term ‘transformative’ research (Deschler & Selener, 1991) for the remainder of this chapter when referring to the type of research that I was undertaking. Deschler and Selener (1991) assert that transformative research should be (1) ethical--with attention to human rights and social justice; (2) emancipatory--contributing to reduction of oppression; (3) empowering--serving marginalized and disadvantaged groups; and (4) holistic--identifying relationships between parts and the whole, micro and macro contexts, local and global issues. I believe that my research methods were transformative and did touch, to varying degrees, on the categories identified by Deschler and Selener (1991).

Transformative researchers who study change not only have to come to terms with the baggage they bring to their research programs, they also have to determine *how* to research that change (Deschler & Selener, 1991). What part(s) of the change innovation should they research? How do they document the influence of the change innovation? If they really believe in the change innovation that they are researching, how do they ensure that they are doing ‘valid’ and ‘reliable’ research? And, are ‘validity’ and ‘reliability’ even possibilities if one gives up the notion of objectivity and admits a personal interest in the outcome of the research (Denzin & Lincoln, 2000; Guba & Lincoln, 1994; Heshusius, 1994; Lather, 1991, 1993)? How does one balance the desire to be a rigorous researcher *and* a useful activist (i.e., in my case, an environmentalist)?

Other researchers in the field of environmental education have also struggled to find a balance between being an environmentalist *and* a researcher (Malone, 1999; Russell, 2003). In her article entitled “Environmental Education Researchers as Environmental Activists,” Malone (1999) reflects upon her own journey as a doctoral student where she was forced to confront this issue. Drawing from critical and feminist research (e.g., Carr & Kemmis, 1983; Lather, 1991), Malone describes the similarities between feminist education research and environmental education research and argues for an activist approach to environmental education research. Malone (1999) contends that “as researchers in environmental education we are engaging in a political act...if environmental education emerges from environmentalism and if environmentalism is a social movement, we are in essence generating knowledge to advance a social movement” (p. 175). Ultimately, Malone (1999) describes how she assumed the dual roles of both critical researcher and participant/environmental activist during her doctoral work. Malone confronts some of the basic assumptions surrounding ‘traditional’ research like it being neutral, unbiased, and apolitical, and concludes by presenting “a challenge to environmental education researchers and all critical researchers to move outside the ‘academy’ and develop partnerships with schools and communities and become directly involved in environmental activism” (p. 176).

Like Malone (1999), Russell (2003) acknowledges that finding the balance between being a researcher and an activist can be challenging for young researchers. In reflecting upon her own research, she writes “balancing desires to attend to one’s position as a researcher...and produce useful, reliable, and ‘trust-worthy’ research is a delicate and difficult matter, one which many researchers, such as myself, could find paralyzing” (p. 126). My challenge in the present research was not to be, as Russell suggests, ‘paralyzed’ but to attempt to balance the dual roles of researcher and environmentalist.

Personal Ground: My Methodological Leanings

Having acknowledged the challenges and complications inherent in working on research that involves ‘change’ in the education system, and having reflected upon the ideas about the environmental education research of Malone and Russell, it becomes appropriate at this point to acknowledge my methodological leanings before describing in detail the specific methods of my research.

My Identities

As many critical theorists and feminists have noted (Harding, 1986; Kirby & McKenna, 1989; Lather, 1991), it is important to acknowledge the role of the researcher within the research. Eschewing the traditional notion that the researcher should be an impartial observer of events, I readily acknowledged the role and influence I had upon the design, analysis, and dissemination of information in this study.

My assorted identities (e.g., white, middle class, able, human, female, environmentalist, activist, resident of Ontario) influenced all phases of this research project. For example, they have influenced *what* I have chosen to study (e.g., school ground greening projects), the *design* of the study (e.g., qualitative and quantitative), *where* I study (e.g., Ontario vs. other provinces; Canada vs. United States), as well as *whom* I study (e.g., teachers vs. students vs. community members vs. non-human entities). These identities influenced my analysis of the data, interpretation of the findings, and dissemination of results. Throughout the research process, I strived to explicitly acknowledge how my various identities might influence the study.

Recognition of Multiple Truths and Limits of Generalizing

As a researcher coming from a background in the natural sciences, I have a firm grasp on the positivist notions of rationality, objectivity and truth. My previous research experiences had been conducted from a rational, scientific perspective and I was forced to detach myself from the project in order to maintain an ‘unbiased’ perspective. When I entered the field of educational studies, I welcomed the opportunity to shed these confines.

In shifting research perspectives, I have thus accepted the limits of objectivity, recognizing that there are multiple constructions of reality and a variety of perspectives present in any study, including this one (Denzin & Lincoln, 2000; Guba & Lincoln, 1994; Lather, 1991). I also have realized that while the findings of my research will be somewhat ‘generalizable’ to a broader population beyond the school board used in this study, I also recognize that there will be

limits to the applicability of my findings. In recognizing that young researchers can feel pressure to find the ‘answer’ to ‘big problems,’ Russell (2003) urges researchers not to feel discouraged by this aspect of their research. She also acknowledges that “any work is always a smaller part of a larger picture and always ‘in progress.’ The pressure to produce one true story...is lifted” (p. 126).

The Politics of School Grounds

I find tremendous solace in Malone’s (1999) contention that research in environmental education can indeed be a political act. In reflecting upon her own research, she notes that “by exposing my political intentions I was able to realize my potential as a researcher and environmental activist and utilize these multiple roles to support the community I researched” (Malone, 1999, p. 176). Other researchers in environmental education share this philosophy. Indeed Russell (2003) said,

I cannot be satisfied with knowledge for knowledge’s sake...when I ask myself ‘why am I doing this research,’ I know it is not merely to fulfill the requirements of a Ph.D. The impetus of the research is my concern for and commitment to biological conservation. Ultimately, I hope that my research can be of practical use...(p. 128).

I share Malone’s and Russell’s views: I chose to research this topic because ultimately I believe in the potential of school grounds in Canada. I believe that green school grounds do have positive effects on students, teachers, parents, administrators, and the natural world. I believe that there should be more school grounds (and other public urban spaces) that are greened in Canada. I hope that my research will provide insights and information that will eventually help to encourage resources to be allocated towards school ground greening in Canada.

In discussing the politics of research in environmental education, it is appropriate to mention the struggle that many transformative researchers might feel given that many researchers interested in change are also probably more inclined to use postpositivist methodologies. How then might they incorporate tools more commonly associated with a ‘traditional’ positivist research paradigm while remaining true to their political positions? I have struggled with this dilemma during the design phases of this study, wondering if I could possibly be a ‘transformative’ researcher embracing post-positivist research philosophies and simultaneously administer a mailed quantitative survey and do single interviews? My choice of methods was fairly traditional and certainly contains strong elements of a positivist tradition. However, my political leanings in support of school grounds have influenced the design of my study in that I have strategically chosen a research approach that I hope would generate meaningful and useful

information that will help other researchers and practitioners involved in school ground greening projects in Canada and elsewhere.

That being said, I am not looking for only positive success stories. Quite to the contrary, I believe that the study was designed to allow for an exploration of the multiple perspectives occurring on school grounds in the board selected in this study. Through a mixed method approach using both questionnaires and follow-up interviews, I gathered systematic and broad based information related to a range of green school grounds: those that are perceived to be successful as well as those that are unsuccessful; those that are used by all teachers as well as those that are never used; those that have full support of teachers and parents as well as those that have no support. Throughout all phases of this dissertation research - designing my methods, collecting my data, and analyzing the results – I strived to maintain an open perspective to be able to see the ‘unexpected’ and tried not to be blinded into seeing only what I was expecting. *All* information on school grounds in the school board was important – the expected *and* the unexpected, the positive *and* the not-so-positive – because so little is understood about their effects at present.

Methods

Research from both quantitative and qualitative traditions was performed in this research to achieve the following objectives:

1. To describe the status of the 100 green school grounds in the TDSB by:
 - a. Generating a profile of the individuals who are involved in greening projects (e.g., age, gender, years of experience) *and* a profile of the schools where greening projects are taking place (e.g., number of students, socio-economic status of neighbourhood (SES)); and,
 - b. Generating a profile of the actual greening project (e.g., elements found on school ground, sources and amounts of funding; importance/adequacy of different space types); and,
 - c. Generating an understanding of the process of greening (e.g., who provided leadership and motivation, reasons for greening, who was involved in initial/ongoing planning and maintenance)
2. To determine if and how administrators, teachers, and parents perceive their green school ground as providing spaces that influence a) curriculum delivery, b) teaching practices, c) student learning, d) student behaviour and social development, e) student play, f) environmental awareness and stewardship, g) student health, h) school safety, and i) inclusivity; and,
3. To report the factors that have limited or enabled the success of school ground greening projects.

The specifics of the chosen research methods will now be described.

Case Study: Theoretical Foundations

The case study approach was employed as it best fits my methodological leanings and specific research purpose (Creswell, 1998; Denzin & Lincoln, 1994; Merriam, 1998; Walker, Corcoran, & Wals, 2004; Walker, Corcoran, Wals, Scott, & Gough, 2003, April 23-25; Yin, 1989). More specifically, an evaluative multi-site case study was completed that allowed for “an exploration of a ‘bounded system’ or case (or multiple cases) over time through detailed data collection involving multiple sources of information rich in context” (Creswell, 1998, p. 61). The multi-site case study in the present research was performed in the Toronto District School Board (TDSB). Individual schools were the ‘sites’ of investigation.

Description of the Site for the Study

The study site for this case study was the Toronto District School Board (TDSB) located in southern Ontario, Canada. The Board has 451 elementary schools and 102 high schools. The school board is located in Canada’s largest city, Toronto, and is diverse in terms of ethnic composition and socio-economic status of students attending these schools. The Board has assigned each school a ‘learning opportunities index’ (a number between 0 and 1) that reflects the socio-economic status of the school community (0 = highest SES; 1 = lowest SES). It is estimated that 100 schools have begun or have completed the process of greening. The majority of the schools that have been greened are elementary schools.

Rationale for Selection of Samples

The school board, schools, questionnaire respondents, and interviewees in the present study were purposefully selected with a view to achieving the purposes and objectives of the research. In the following sections of this Chapter, I discuss why each were selected.

Selection of School Board: Rationale¹³

This research was performed in the Toronto District School Board (TDSB). I purposefully selected this board as a site to conduct my research because of the large number of schools that had begun the process of greening their schools. Entering into this research, I was

¹³ In presenting this section of Chapter 3 that describes my rationale for the selection of the school board, I include several quotes that were gathered during my research. I do recognize that findings are usually not incorporated into Chapter 3, but they do help to explain my rationale for including the school board.

aware how TDSB support for school ground greening was in a process of change: historical relations between individual schools and the school board were often confrontational with both parties feeling a lack of support from the other. More recently, however, the TDSB has been seeking to support and endorse greening initiatives. I now present a short history that explains some of their renewed involvement and provides further justification as to why I selected this Board as the site of my study.

History of Playground Structure Removal

In 1998, under the Progressive Conservative Provincial Government, seven former legacy boards were amalgamated to form the Toronto District School Board (TDSB) (former boards = Scarborough, North York, Etobicoke, York, East York, Toronto and Metro). This new board currently houses 565 schools. Pre-amalgamation, a small number of schools in the boards had begun the process of greening their school grounds. Most of these initiatives were, by and large, bottom-up initiatives, with the individual school providing the large majority of the momentum and energy to facilitate the greening project. In the late 1990's, an event occurred that significantly changed the face of school board involvement in school ground greening in the board.

In the late 1990's, the Children Services Division (of the City of Toronto) under the *Day Nurseries Act* made full compliance to the Canadian Standards Association (CSA) a requirement for licensing a child care centre. Given that many of the school facilities in the TDSB house child care centres, the TDSB was faced with a situation in which non-compliant playground equipment that was off-limits to children on sites while they were in day care became available to those same children when they crossed that daycare line and became school students. Evidently, the standards were intended to be applied to the purchase of *new* equipment (existing equipment did not have to meet the new standards), but nonetheless, there was concern that much existing playground equipment on the school grounds would not meet CSA standards.

In 2000, the Facilities Services Department of the TDSB decided to act conservatively and commissioned an external evaluation of all equipment in light of the CSA standards. The results revealed that much of the existing play equipment on the TDSB school grounds failed to meet the CSA standards.

In light of these findings, the school board decided to remove all play equipment in the TDSB that failed to meet the CSA standards. Approximately 20% of all equipment in the TDSB was removed during the summer with almost no consultation with or education of the public.

One TDSB employee recalls that it was a “public relations nightmare for the Board.” He explains:

Even though the Facilities Services [Department] was legally aware that they were not required to do anything about the old equipment, they felt they were being responsible and they knew it was unsafe compared to the standards. They thought they were doing the right thing, but they probably didn’t consult as much as they should have. They should have consulted and raised the awareness and got people prepared...but they moved too quickly and they took the equipment out and people were shocked and stunned. (TDSB Employee)

Despite the public relations ‘nightmare,’ the upper level TDSB personnel responded quickly and evidently well. A board employee remembers, “the leaders of the Board really came through...basically they said that this is like the burning down of Chicago...it’s a tragedy, it’s a terrible thing, but let’s use this as an opportunity to create something amazing.”

Shortly after the equipment was removed, the TDSB assembled a ‘team’ to come up with a strategy for redesigning the school grounds. Their timeline was short and the task before them was immense: to develop a plan to get play equipment returned to the schools in the Board. At the first meeting of the ‘team,’ Richard Christie, the District-wide coordinator of Environmental Education for the TDSB, suggested that James Raffan, lead researcher and author of *Nature Nurtures* (Evergreen, 2000b) (a literature review on school ground greening commissioned by Evergreen), be invited to make a presentation to the TDSB team. Raffan came to the second meeting and spoke about his review of the literature and made a convincing argument for school ground greening to be embraced at by the TDSB. His presentation seemed to have worked. Cam Collyer, Learning Grounds Manager at Evergreen, recalls that “a major shift happened when Jim [Raffan] spoke. Everyone went into the meeting asking ‘*How do we replace school ground play equipment?*’ and they left the meeting asking ‘*how do we make exemplary school grounds?*’”

Emerging from these discussions was a document called *Transforming the Schoolyard: How Local Communities Design and Build their Playground Learning Environments* (Toronto District School Board, 2000). This was an important shift within the TDSB that signalled more explicit support of and endorsement for school ground greening at a board level.

TDSB Support for School Ground Greening

Within the TDSB, three departments assume important roles in facilitating school ground greening initiatives: the Department of Environmental Education (School Services), the Design and Construction Department (Facilities Services) as well as the Grounds and Maintenance Department (Facilities Services).

The most recent addition to this group of departments has been the Department of Environmental Education, which was initially formed in 1998 at the time of amalgamation. The Department is situated within the School Service's 'Central Curriculum Group,' which houses departments for other traditional subject areas, such as English Literacy and Mathematics. The decision to place Environmental Education within the Curriculum Group is somewhat problematic, in that there is, in fact, no formally recognized curriculum for environmental education at the provincial level (Puk & Behm, 2003).

The TDSB's commitment to greening school grounds is reflected through the three departments in a variety of ways, which I will now briefly discuss.¹⁴ These initiatives are particularly noteworthy given that the TDSB has faced significant budget restraints in recent years. Unsurprisingly, there is fierce competition within the TDSB for the remaining funds. The challenge of allocating extensive funding to school grounds projects is further complicated by the fact that many school buildings are in need of retrofitting and repair (e.g. new roofs, new plumbing systems). Despite these financial constraints, since about 2000, the board has implemented the following programmes and initiatives, sending a clear signal of its commitment to environmental education generally and to school ground greening specifically.

Environmental Policy

First, the Department of Environmental Education created a short, one-page policy (Toronto District School Board, 2003b). In brief, the process-oriented policy describes the TDSB's commitment to: 1) improving the environmental literacy of students, and, 2) developing environmentally sound operational practices. The District-wide Coordinator of the Environmental Education Department, Richard Christie, describes the rationale for the policy:

The emphasis is on process...it is not prescriptive. We don't want to say that 'we are committed to recycling paper.' We felt that is just isn't acceptable for teachers to be teaching students about environmental concerns, what we would call 'environmental or ecological literacy,' and then doing so within the context of the school that is not in any way reflecting what the teacher is talking about in the class. So we felt that when that occurs, and it occurs a lot, it just sends the wrong signal to students...it undermines the teaching...it teaches kids to be cynical really about this whole area.

Annual Environmental Report

Second, the Environmental Education Department is also exploring the possibility of undertaking annual environmental reporting. Drawing from the experience of organizations in an

¹⁴ Many of these TDSB 'commitments' were still under construction at the time of writing this dissertation. Undoubtedly, they may change slightly (or even significantly) as they grow and evolve.

array of private and public sectors that produce annual environmental and sustainability reports, the Department is arguing that an *Annual Environmental Report* would help to achieve the Board's policy commitment to "achieving continual, measurable improvements by developing a focused, results-oriented framework for setting and reviewing environmental objectives, targets, and implementation effectiveness" (Toronto District School Board, 2003b). The proposed annual report would focus on aspects being targeted through the Ecoschools program (waste, energy, school design, and ecological literacy) and would help the Board to identify priorities, set achievable objectives, targets and indicators, develop action plans, and monitor ongoing efforts to become more sustainable. It is anticipated that school ground greening would be part of the school environment that is 'audited' and reported via the proposed Annual Environmental Report.

The Sustainable Blueprint for Schools

Third, the Department of Environmental Education and Facilities Services are working together to develop *The Sustainable Blueprint for Schools*. This document outlines how funding that becomes available for investment in school infrastructure should be directed towards creating and maintaining 'sustainable schools.' This means that when funds are reinvested in maintaining or repairing schools, it should ultimately help make the school more sustaining in terms of energy utilization, waste production, water management, etc. In other words, instead of just investing in fixing schools to be the same as they already are, efforts should be directed towards improving school's energy, waste, and water systems. School ground greening assumes an important role in the Blueprint because many elements of greening initiatives can assume multiple functions, such as trees creating shade that helps keep buildings cool, compost systems that reduce waste production, etc.

Additional Publications

Fourth, the Department of Environmental Education has been involved in the creation of two key publications that have been utilized both within and outside 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* (Houghton, 2003).

Partnership with Evergreen

Fifth, The TDSB Department of Environmental Education, in conjunction with Facilities Services, funds a shared TDSB/Evergreen School Ground Design Consultant position. The role of the Consultant is to represent Evergreen within the TDSB by assisting schools in designing,

planning and implementing green school grounds. This full time position is currently filled by Heidi Campbell, whose role is to represent Evergreen within the TDSB by assisting schools in designing, planning and implementing green school grounds. Heidi offers a series of workshops to teachers, parents, and principals who are interested in learning more about school ground greening (e.g., Getting Started, Fundraising, Design, Teaching in an Outdoor Classroom, Volunteer Management, Maintenance of your Project, etc.). In her workshops, she emphasizes the importance of long- term planning, sustainable designs, and student involvement in all aspects of greening. She works very closely with individuals from Evergreen, the Department of Environmental Education and Facilities Services. These partnerships are unique in that they bring together people with interests in design *and* curriculum. Too often, it seems, these interests are considered separately.

Design Support

The TDSB has made significant personnel commitments to support schools in the planning and design phases of their projects. The District-wide Grounds Team Leader, working in conjunction with TDSB/Evergreen School Ground Design Consultant, are involved in creating, reviewing, and implementing schools' Master Plans for their grounds. They ensure that Plans incorporate meaningful, practical and sustainable design elements that require minimal maintenance over the long-term.

Ecoschools

Finally, with a view to meeting the second part of the Environmental Policy (i.e., develop environmentally sound operational practices), the Department of Environmental Education has developed a strong and innovative partnership with Facilities Services, which is responsible for the maintenance and upkeep of school buildings and grounds. This unlikely partnership (until a few years ago) appears to be mutually beneficial for both Departments. Facilities Services has been struggling with increased energy costs (increased over \$21 million dollars in three years), and new fees for waste disposal (from zero cost to approximately \$3 million per year). As a result, funds normally available for custodial staff, school board grounds staff as well as building and ground maintenance costs were spent on utilities and waste. The Department of Environmental Education capitalized on the Facilities Services struggling financial situation and offered to work with them and support them. Richard Christie explains, "We said, 'Let's work together because we want to reduce energy and reduce waste for environmental reasons, and you want to do it for economic reasons...so let's pool our resources and work together.'"

Emerging from the partnership of these two Departments is the new board-wide EcoSchools Program (Toronto District School Board, 2003b). This Program, launched in 2003, currently has two main components that address *waste minimization* and *energy conservation*. The EcoSchools Program Guides outlines TDSB board-wide standards for minimizing waste and conserving energy (Toronto District School Board, 2003a, 2003c). In terms of school ground greening, one EcoSchools Guide has been produced by the TDSB in partnership with Evergreen: *School Ground Greening: Designing for Shade and Energy Conservation* (Toronto District School Board, 2004). This guide's emphasis is on illustrating the ways that green school grounds can be sites for shade and energy conservation and will be targeted towards schools that are just beginning the process of greening. There will, however, still be room for those schools that want to take greening to another level. For those schools that want to have 'exemplary' designs, they will be directed to a second guidebook (still under development).

Many individuals with whom I spoke at the TDSB are delighted to be a part of these exciting changes within the school board. They feel, in a way, that by being involved at the front end of planning, they can help to make the school ground greening program the best it can possibly be. For too long, Bruce Day (Grounds Team Leader for the TDSB) explained, the TDSB has been at the "back end of the school ground greening train...the caboose." He'd hear about the projects when an urgent request came in for a tree planting and it would "be the first I'd ever heard of it!" As Bruce Day asserted, "You would never consider going into the boiler room and start tinkering with the boiler room, or making changes or going up on the roof and doing anything like that... but when it comes to grounds everybody is an expert. And they all have their own ideas." By being at the "front end of the train," it is hoped that the proper support can be in place to ensure a successful greening project.

The emerging and evolving support from the TDSB for school ground greening, as illustrated by the above examples, made this school board an ideal location to conduct my research.

Selection of Schools, Questionnaire Respondents and Interviewees: Rationale

A combination of random sampling and purposeful sampling was used to select the schools, questionnaire respondents, and interviewees that were involved in my research. In order to have statistical relevance and to understand trends across a large number of schools, it was important to have a large sample of greening initiatives. The 100 schools used in the present study were randomly selected from a list of schools that had identified themselves as having a

green school ground in the year previous to my study when data was being collected for the book *A Breath of Fresh Air* (Houghton, 2003). From personal observations, in discussion with colleagues, and in reviewing the literature, I have found that a large amount of variability exists with respect to the state of the green school grounds: in some schools, a single teacher and her class of students may have planted a single tree and identify their school as having greened the school ground; other schools, with community support, may have completely transformed their entire school ground, incorporating most of the design elements identified by the Toronto District School Board (2000). As such, I anticipated that my random selection of schools would ensure that a diversity of greening projects was profiled in my research.

Purposeful sampling was used to select questionnaire and interview respondents that would allow this research project to be as representative as possible. In having the questionnaires at each school completed by a principal, a teacher who is taking a leadership role, a teacher who is not involved in the school ground project, as well as a parent, it was hoped that a diversity of perspectives related to each school ground greening project would be gathered. While two of the questionnaire respondents and interviewees (involved teacher and parent) were mostly likely to have an interest in the greening initiative, it is plausible that the other two respondents (principal and uninvolved teacher) would have varying degrees of personal and professional interest in the greening project. This diversity of perspectives from each school allowed for a fuller understanding of the status and influence of the school ground and a wide range of perspectives.

The questionnaires and interview questions were not intended to gather only positive and supportive information. As mentioned earlier, the present study was designed to gather information about *all* types of greening projects in the board: those that are perceived to be successful, those that are perceived to be unsuccessful; those that are used by every teacher in the school, those that are never used; those that are well maintained and those that are overgrown.

When preparing for this research, I had anticipated that purposeful sampling would also be used to identify the 'exemplary' schools where follow-up interviews were held. In an effort to pre-determine the qualities of 'exemplary' school grounds in the proposal phase of this research, I had identified the following criteria that would assist me in selecting the schools that would be included in the study. 'Exemplary' school grounds would:

- Have been in place for at least 5 years (question 3.1a from questionnaire);
- Have been developed and maintained by a broad spectrum of stakeholders, including students, teachers, administrators, and parents (question 3.5)
- Be used for teaching a variety of formal subjects (from section 4);
- Be used by a large number of teachers at the school (question 2i);

- Incorporate many of the design features identified by the Toronto District School Board (2000);
- Provide numerous services to students and teachers (section 4); and,
- Be perceived as positively enhancing the school community (question 5a).

In my proposal, I had also anticipated that preliminary analyses of the questionnaires would assist in identifying the schools where interviews would occur. Cam Collyer, the Director of Learning Grounds at Evergreen, and Richard Christie, the District-wide coordinator of Environmental Education for the TDSB, were both willing to help identify these schools. Members of my dissertation committee had also agreed to assist in selecting the schools. If several schools within one inner city rating index were possible candidates for interview sites, then I had decided that one would be randomly selected.

While the above criteria are laudable and the process of creating them was worthwhile, upon completing analysis of the questionnaires, it became obvious that the above criteria alone would not be sufficient in selecting the schools for interview sites. I thus reconsidered and reworked the above criteria with a view to selecting the follow-up schools. I will now describe the process that was actually used.

Given that I was still very interested in knowing if and how socio-economic status influenced greening initiatives, I wanted the schools involved in the follow-up case studies to represent a diversity of socio-economic statuses (upper class/middle class/working class). I thus began my process of selection by dividing the schools that had responded to the questionnaires into 'categories' of socio-economic status. To do this, I used the school board's "Learning Opportunities Index," which assigns each school a number from 0 (highest index) to 1 (lowest index) that describes the social and economic characteristics of the school populations. My five categories were 'very high' (0 - 0.20); 'high' (0.21 - 0.4); 'medium' (0.41 - 0.6); 'low' (0.61 - 0.80); and 'very low' (0.81 - 1). The Learning Opportunities Index combines information from the following factors:

- Average and median income of families with school aged children;
- Parental education;
- Proportion of single-parent families;
- Recent immigration;
- Housing type (apartment, single detached house); and,
- Student mobility.

The school board recognizes that there is no ideal measure for determining the index, but these factors were selected because they reflect the literature related to 'at-risk' students (income, parental education, single-parent families), or they represent socio-geographical characteristics of

Toronto (housing type), or they are thought to be important challenges facing Toronto schools (recent immigration, mobility).

There were between eight and eleven schools in each of the five categories of the Learning Opportunity Index. For the next round of selection, I considered the following three criteria: 1) the number of surveys that were returned (minimum=1, maximum=4); 2) the principal's willingness to participate in the follow-up interviews (yes or no); and 3) the length of time that the project had been in place (I chose a minimum of 2 years). I identified these criteria as I felt they would direct me towards schools: 1) where teachers, parents and administrators were interested in the greening initiative and my research (as indicated by their willingness to return all four surveys); 2) where the principal would welcome a researcher into their school environment (as indicated by a willingness to administer the surveys in their school and show an interest in being part of a follow-up study); and 3) where the greening initiative was somewhat established so that impacts could be better ascertained. These additional criteria helped to identify a single school in three of the Learning Opportunity Index categories. In the remaining two Index categories, where more than one school met the above criteria, I randomly selected from the possible schools to determine which school would participate in the follow-up case studies.

In altering my selection criteria between the proposed and actual research, I was aware that I would no longer, necessarily, be performing interviews at schools with 'exemplary' green grounds. Indeed, a review of the questionnaires as well as initial site visits told me that I had selected a *range* of school ground greening programs to profile in the follow-up case study. The revised criteria did, however, direct me towards schools that had definite interest in the greening initiative (as indicated by the return of four surveys and the principal's willingness to be involved in follow-up research). While the greening projects ranged in terms of their 'looks' (e.g., a well maintained innovative green school ground with new elements being continuously added vs. a rarely used, overgrown, unmaintained green school ground), I do believe that this selection provided me with richer insights into the real struggles, challenges, and opportunities for schools across the board. Undeniably, I gained very different information than I would have attained if I had maintained my original criteria that would have directed me towards 'exemplary' grounds. In hindsight, though, I am delighted to report that I am pleased with my selection of follow-up schools and believe that their varied, rich, and textured stories are far more representative of schools across the board than had I chosen to profile only 'exemplary' school grounds.

The intention was that follow-up interviews were to be conducted with three respondents who completed the questionnaires: the involved teacher, the principal, and the parent. At each school, I thus contacted the principal, the involved teacher, as well as the parent that completed

the questionnaire to invite them to participate in the follow-up interviews. The large majority of individuals were interested in participating in the follow-up interviews. Some respondents, however, were no longer involved at the school (e.g., teacher relocated to a different school, parent no longer involved because child had graduated) and I thus was put into contact with individuals who had not completed the questionnaire.

Snowball sampling also occurred, whereby interview respondents suggested other individuals with whom I “must” be in contact. Although I had not originally planned to investigate the role of the TDSB in school ground greening as part of my dissertation, as my research unfolded over the last several years, I became aware that it would be prudent to explore the school board’s evolving role, from board employees’ perspectives. Such an investigation would, I hoped, allow me to investigate the potential role that the TDSB was (and was not) assuming in facilitating and endorsing school ground greening within the school board. To that end, I interviewed several TDSB employees throughout my research. I also was directed towards an additional principal (who had completed questionnaires in first part of the study) with whom I “must” speak because the greening project was very new and had experienced many of the new TDSB initiatives. This principal’s school had not been selected to participate in Phase 2 of the study but I did decide to interview this principal, as she offered an important perspective on the greening initiatives.

To summarize, it was the variation within the school board that was of interest to me. This variation allowed me to gather data on school grounds within the board that have been greened. This research was not an exhaustive exploration into all the school grounds in the board. It merely provided me with perspectives from principals, teachers, and parents who are associated with a green school ground. As such, the research did not seek to determine the perceptions of teachers, principals, and parents at schools that *do not* have a green school ground. Such an investigation, while interesting, was beyond the scope of the present study

Access

I was fortunate to gain access to the selected school board through my connections with Cam Collyer, the Director of the Learning Grounds Project at Evergreen. I have worked closely with Cam since I first identified school grounds as a potential research topic. Recently, Evergreen established a formal working relationship with the school board as indicated by the new ‘shared’ position (one employee works half time for Evergreen and half time for TDSB). Heidi Campbell has assumed this position and has been extremely helpful in providing a link between the school board and Evergreen. Richard Christie, the District-wide coordinator of

Environmental Education for the TDSB, has also been invaluable in providing access to the board.

Procedures

Within the case study, data collection methods from within both qualitative and quantitative traditions were employed (Yin, 1989). Each type of data collection was targeted at different samples within the school board and gathered different types of information about school ground greening. In the first phase of the research project, quantitative data was collected via questionnaires that were distributed to administrators, teachers, and parents at schools (n=100) in the school board that have green school grounds (referred to as 'Phase 1' in this dissertation). To support and query the findings that emerged via the questionnaires, follow-up research was done using a qualitative genre of inquiry. This second phase data took the form of interviews that were conducted with administrators, teachers, and parents at five schools selected from the larger sample (referred to as 'Phase 2' in this dissertation). Each of these procedures will now be discussed in detail.

Questionnaires.

With a view to achieving the objectives of the present research, questionnaires were designed, in consultation with researchers and practitioners involved in school ground greening (Appendix A). Input on the content and design of the questionnaires was sought from a variety of individuals, including the following: 1) the Director of the Learning Grounds Project at Evergreen, Cam Collyer; 2) the TDSB Schoolyard Greening Design Facilitator, Heidi Campbell; 3) the District-wide coordinator of Environmental Education for the TDSB, Richard Christie; and 4) the Director of School Ground Naturalization at EcoSuperior, Lucie Lavoie.

The questionnaires were also reviewed by a jury of 6 professionals with expertise in a variety of fields including survey design, experiential education, school ground greening, and educational studies. The jury was asked to review the questionnaires for clarity of language. They were also asked to comment on the length and layout of the questionnaires. The recommendations of the pilot jury were incorporated into the revised questionnaires. These revised questionnaires were piloted two additional times with undergraduate students and in the School of Outdoor Recreation, Parks and Tourism (N=16) and the Faculty of Education (N=18) at Lakehead University with a view to testing the recommendations that emerged from the professional jury. Revisions were again made based on these pilots to ensure face validity.

Preliminary statistical analyses were performed to ensure that the original research objectives were being met through the questionnaires.

With board support, I mailed the principal of each of the 100 schools¹⁵ a research package, which contained four questionnaires. In addition to completing their own questionnaire, each principal was asked to distribute the remaining questionnaires to the following three respondents: 1) an involved teacher assuming a leadership role in maintaining or greening the school ground, 2) a teacher uninvolved in the process of greening the school ground; and 3) a parent involved in the greening project.¹⁶ Thus a total of 400 questionnaires were distributed (four questionnaires to 100 schools). In order to assist the principal in their selection of the additional respondents, I provided descriptive criteria for each. Each respondent returned their questionnaire in a sealed envelope to the principal who then returned the package of questionnaires to me.

It was possible to determine who completed each questionnaire given the request for the school name and respondent name on the questionnaire. This was important to assist with the process of identifying the 5 schools where interviews could occur. However, each respondent from the school was provided with an envelope for returning their questionnaires separately so that other individuals from the same school never saw their responses. All school names and respondents have been given pseudonyms in the final report.

The questionnaires varied in terms of length: the involved teacher's was the longest and most comprehensive whereas the uninvolved teacher's questionnaire was the shortest. (This is because involved teachers were asked additional questions regarding their project funding, project elements, project history, for example.). It is estimated that the completion times for the longest and the shortest surveys took about 40 minutes and 20 minutes, respectively.

Since all items found on each of the four questionnaires are found on the involved teacher's survey, I will now describe the involved teacher's questionnaire.

The involved teacher's questionnaire consisted of both open and closed questions and had five main sections:

¹⁵ This list of schools was generated when the Environmental Education Department was preparing *A Breath of Fresh Air* (Houghton, 2003). At that time, they asked *all* schools in the board to indicate if they had a greening project.

¹⁶ I am, of course, aware that there are other possible respondents who could have completed the questionnaires. For example, I could have sought perceptions of uninvolved parents, or I could have explicitly delineated between uninvolved and involved principals. For the purposes of this study, and in the interest of project scale, I chose the selected respondents.

1. Respondent profile (Objective 1 a)
2. School profile (Objective 1 a)
3. Greening project profile (Objective 1 b and c)
4. Impacts/effects on key stakeholders (Objective 2)
5. Enabling/limiting factors (Objectives 3)

The questionnaire began by asking participants for information related to their demographics (e.g., age, gender, education level, position, etc.) (Objective 1 a). Next, a profile of the school was generated (e.g., number of students, number of teachers, amount of time students spend on the school ground) (Objective 1 a).

In the next section of the questionnaire, I posed a series of questions to create a profile of the green school ground initiative (Objective 1 b and c). The questions addressed a variety of themes related to the green school ground, including the following: history; sources of funding; and involvement/support of parents, teachers, and administrators in various phases of the transformation; etc.

Next, I asked respondents a series of questions related to the effects of the green school ground on the teachers and students at the school (Objective 2). The specific themes in this section were: teaching practices; student learning and academic achievement; student behaviour and social development; environmental awareness and stewardship; safety; play; health; and inclusivity. The questionnaire concluded with a series of questions that investigated the respondent's *overall* perceptions of the school ground, as well as an examination of the factors that enabled and limited the project (Objective 3).

Many questions on the survey were closed-ended and participants were provided with directive options for their answers (e.g., 'Please select the top 2 individuals/groups that provided the initial motivation to start the process of school ground greening at your school'). In recognizing that respondents may have answers that are not found on the options provided in the questionnaire, several questions had an 'other' option in order to encourage respondents to write answers that may not appear on the standard list provided. Several other questions had accompanying Likert Scales for participants to rank their answers (e.g., strongly agree, agree, neutral, disagree, strongly disagree). With a view to encouraging additional ideas and inputs from the respondents, I included open-ended questions throughout the questionnaire (e.g., 'Briefly describe how you have been involved in the school ground greening project at your school'). It was hoped that the diversity of types of questions and responses would allow participants to respond in meaningful ways that would allow me to gain access to the desired information, while allowing them a sense of 'freedom' to describe their school ground initiative.

Additional Questionnaire Information: Selection of Space Categories and Types

With a view to achieving objective 1 b (school ground greening profile), on one section of questionnaire, respondents were asked to evaluate the importance and adequacy of 14 space types on school grounds (Table 1). The space types used in this portion of the questionnaire were identified by consulting the literature, as well as researchers and practitioners involved in school ground greening, notably Moore and Wong (1997), Adams (1993), Titman (1994), Stine (1997), as well as the work of the Toronto District School Board (2000). A preliminary list was reviewed by a variety of practitioners involved in school ground greening to confirm the choices. The 14 space types were then reviewed by a jury of six professionals with expertise in a variety of fields including leisure studies, experiential education, environmental education, and educational studies.

The 14 space types are grouped into four categories and reflect the key findings in the literature related to school ground greening and diversification (Table 1). The first category, 'Traditional Active Play Spaces,' reflects the spaces that are usually found on school grounds (R.C. Moore, 1996). These include open asphalt (Space #1) and turf spaces (Space #2) as well as manufactured equipment (Space #3). These spaces support mostly games with rules and active play, as well as games with understood rules and with little individualization (e.g., basketball, tag, hockey).

The second category of space, 'Specific Elements to Support Learning and Play,' contains four types of spaces that encourage different types of play than can occur in 'Traditional Active Play Spaces' (R.C. Moore, 1996). Loose elements (Space #4), such as balls and portable equipment, encourage object centred pretend play by allowing children to explore pretend themes by moving an object through actions and speaking through it. Loose elements also support constructive play, in which children manipulate objects to create something (e.g., building something with blocks). Spaces that support creative play (Space #5), such as theatrical stages, encourage fantasy pretend play (e.g., making a play) as well as dramatic pretend play (e.g., playing house). Built elements (Space #6), such as a weather station, as well as natural elements, such as a food garden (Space #7), are also important to diversifying the space on a school ground.

The third category of space reflects the contention that a school ground must accommodate different numbers of people, which in turn will allow for a variety of activities. Kylin (2003), Evergreen (2003), Sobel (1993), Olds (1989) and Hart (1987) contend that young

Table 1 Categories and Spaces Types on Green School Grounds

Category of Space	Space Types	Example
Traditional active play spaces		
	Open green space	Grass field/yard/pitch
	Hard surface play spaces for sports and games	Court/Rink
	Manufactured equipment and play structures	Jungle Gyms Tether Ball
Specific elements to support learning and play		
	Loose elements to support active play	Balls Portable equipment
	Built elements that support creative play	Musical installations Theatrical stages
	Built elements to support learning	Weather station Composter
	Natural elements to support learning	Food gardens Habitat areas
Different size spaces		
	Places for individuals/pairs to find refuge	Forts/Dens Bush houses
	Small group gathering spaces	2-10 students
	Class size gathering spaces	30 students
	Larger than one class group gathering areas	>30 students
Spaces that consider the weather		
	Areas that are shaded	Grove of trees Built shade shelters
	Areas that are sheltered from wind	Grove of trees Outdoor structure
	Areas that are sheltered from rain and snow	Outdoor structure

people should be able to find a place to be alone or with one other person in a private space (Space #8). In order to facilitate a variety of educational and play opportunities, a variety of other size spaces should also be included in a diverse school ground, including small groups (Space #9), class size groups (Space #10), as well as larger spaces that can accommodate more than a class (Space #11).

The final category considers how environmental factors influence opportunities on a school ground. Many traditional asphalt and turf school grounds offer little protection from the sun, wind, rain, and snow (Evergreen, 2003). The detrimental effects of exposure to the midday sun during (10:00 – 14:00, when most morning recess, lunch and afternoon recesses occur) are well understood (Evergreen, 2003). The final category thus includes spaces that are sheltered from the sun (Space #12), wind (Space #13), as well as the rain and snow (Space #14), to both protect users as well as prolong use during inclement weather.

Interviews.

With a view to complementing the information gained in the questionnaires, follow-up interviews were conducted with teachers, administrators and parents involved in five of the school ground programs in the school board. Interviews were also conducted with TDSB administrators and an Evergreen employee.

Individual interviews were conducted with three of the respondents who completed the questionnaires: the involved teacher, the principal, and the parent. Interviews were not conducted with the uninvolved teacher because I was primarily interested in knowing the experiences and stories of individuals that had some knowledge of the greening process. Whereas the questionnaires were designed to be completed by individuals who had a range of involvement with the greening project, the in-depth follow-up case studies were targeted towards those who did have more experience with the projects. The interviews were taped and lasted between 30 and 60 minutes depending on how much information the participant had to offer. The interviews occurred at the school, in the home of the respondent, or over the telephone.

The semi-structured interview consisted of a series of open and closed questions (Appendix B). Each interview began with a brief synopsis of the research project. With a view to considering ethical issues involved in this kind of data collection, participants were reminded that their participation in the interview was purely voluntary, that their responses would remain confidential, that they could refuse to answer any question, and that they could withdraw from the study at any point in time.

Analysis

Questionnaires.

The questionnaire responses were analyzed using SPSS.11. A summary of the analyses is found in Table 2.

Descriptive statistics (*means, standard deviations, frequencies, mode, median, variance, skewness, maximum, minimum, standard error*) related to each of the five sections of the questionnaire were performed with a view to gaining an understanding of the individuals (e.g., who is involved in transforming these school grounds?), schools (e.g., what kinds of schools are having these projects? How many teachers are the grounds for formal teaching?), site profile (e.g., what do they look like?), effects on stakeholders (e.g., what are the perceived effects of teaching and learning in a transformed school ground?), and overall perceptions (e.g., what are the limiting/enabling factors?) of school ground greening programs in the school board. Certain trends emerged through analysis of each section of the questionnaire that were interesting and relevant to understanding key issues related to the school ground greening movement in the school board.

In addition to describing the basic trends within each section of the questionnaire, I was also interested in performing statistics to analyze and compare the responses between sections of the questionnaire and between numerous independent variables (e.g., respondent's role, age, gender, length of greening program, etc.). These comparative investigations allowed me to explore the relationships that exist between particular aspects of the school ground and respondents. In the following paragraphs, the statistical tests that were performed are presented as well as some examples of how the tests were implemented.

With a view to understanding if differences exist between samples, *independent t-test samples* and *paired samples t-tests* (for 2 samples) and *one-way ANOVA's* (for 3 samples) were performed. As an example, independent t-test samples were done to explore if there was a difference between the perceptions of involved and uninvolved teachers. One-way ANOVA's were performed to assess if differences in perception exist between the principals, involved teachers, uninvolved teachers, and parents. If significance was found in the one-way ANOVA, post-hoc analyses (*Tukey, Scheffe, Bonferroni*) were performed to investigate where the differences were.

In analyzing the perception data (Section 4), I performed *reliability analyses* to measure internal consistency of the themes that were been used in this section (e.g., effects on teaching practices, effects on student behaviour). I also collapsed the questions into themes and performed additional reliability analyses.

Table 2 A Summary of Statistical Analysis by Objective Statement

Objective #	Objective Statement	Section of Questionnaire	Analysis
Objective 1	a) Generate a profile of the individuals who are involved in greening projects (e.g., age, gender, years of experience) <i>and</i> a profile of the schools where greening projects are taking place (e.g., number of students, socio-economic status of neighbourhood)	1, 2	<ul style="list-style-type: none"> • Average age (mean, SD) • Gender (frequencies) • Level of education (frequencies) • Area of studies (frequencies) • Ethnic background (frequency) • Number of years in education system (mean, SD) • Number of years at present school (mean, SD) • Level of involvement/Interest (mean, SD) • Size of school staff and student populations (mean, frequency) • Ethnic profile of student populations at schools (frequency) • Amount of time students are spending on the school ground throughout the day (mean, SD) • Amount of time that students are spending in formal classes on the naturalized school ground (mean, SD) • Average number of teachers that teach on the naturalized school ground (mean, SD) • Comparisons of selected factors above and independent variables (t-tests, ANOVA)
	b) Generate a profile of the actual greening project (e.g., what they look like, elements found on school ground, sources and amounts of funding; importance/adequacy of different space types)	3	<ul style="list-style-type: none"> • History of naturalization projects (mean, SD) • Elements found on naturalized schools (frequency) • Description of perception of importance of space types on exemplary ground (mean, SD) • Description of perceptions of adequacy of space types on home school ground (mean, SD) • Comparison between importance and adequacy (t-test) • Comparison of perceptions as a function of independent variables (t-tests, ANOVA)
	c) Generate an understanding of the process of greening (e.g., who provided leadership and motivation, reasons for greening, who was involved in initial/ongoing planning and maintenance)	3	<ul style="list-style-type: none"> • Primary individuals involved in initial motivation (frequency) • Reasons that individuals are motivated to transform (frequency) • Description of roles and responsibilities during the different phases of naturalization (means, SD) • Comparisons of selected questions with independent variables (t-tests, ANOVA with post hoc)

Objective 2	Explore if and how administrators, teachers, and parents perceive their green school ground as providing spaces that influence a) curriculum delivery, b) teaching practices, c) student learning and academic achievement, d) student behaviour and social development; e) environmental awareness and stewardship, f) student health and school safety, e) student play, and g) inclusivity; and,	4	<ul style="list-style-type: none"> • Description of perceptions of respondents (means, SD) • Comparisons of perceptions among independent variables (t-test, ANOVA with post hoc) • Reliability analysis of perception themes
Objective 3	Report the factors that have limited or enabled the success of school ground greening projects.	5	<ul style="list-style-type: none"> • Description of perceptions of respondents (means, SD)

Interviews.

I hired a transcriber to fully record all data from the interviews. I read through the transcriptions with a view to identifying potential themes and topics that were relevant to the research questions. I then coded the interview transcriptions and developed conceptual themes that allowed me to fully understand the experiences and perceptions of teachers, administrators, and parent. After each interview had been coded on paper, I then imported each interview into the program ATLAS.ti 4.1., Visual Qualitative Data Analysis, Management and Theory Building. I then recoded each interview (without looking at my paper codes) and then compared my coding efforts for internal consistency. A list of thematic codes is found in Appendix C.

Comparing Data

In summary, data for the present research initiative was gathered through two primary methods: questionnaires and interviews. It is important to recognize that each method provided distinct types of information. Whereas the questionnaires provided a large amount of broad-based empirical information from a large sample of schools, the interviews generated a large amount of specific information from a small sample of schools. Whereas the questionnaires were analyzed with descriptive and inferential statistics (described above) allowing limited generalizations to be made, the interviews provided rich descriptive insights into the experiences of the teachers and administrators at the specific schools included in this study. During my analysis and writing stages of my dissertation, I was continually comparing the findings between the two types of data.

Ethical Considerations

This research did undergo an ethical review by my home university (Lakehead University) as well as the school board's ethical review process. With a view to ensuring informed consent, all participants in this research understood the intent, scope and potential implications of this study. All participants were made aware that their participation was voluntary, that their responses would remain anonymous and confidential, that there were no benefits or risks associated with their participation and that the option for withdrawal from the study was possible at any point. I obtained a signed informed consent form. Participants who indicated that they would like to receive information related to the results of this study will receive a final copy of the report.

I am the only person who had access to the information on the questionnaires. It is important to recognize that it was possible for me to determine who completed each questionnaire

given the request for the school name on the questionnaire (this was important to identify the 5 schools whose teachers would be interviewed). All information from the questionnaires did, however, remain anonymous when the final report was written.

In hiring my transcriber for the interviews, I ensured that our professional agreement made certain that all tapes and transcriptions were returned to me and that they respected the confidentiality of participants.

The raw questionnaires, tapes and transcriptions will be stored for seven years in a locked file at Lakehead University. All documents emerging from this research (e.g., dissertation and refereed publications) will maintain the confidentiality of participants unless they agree otherwise.

Chapter Summary

In summary, this chapter focused on my research methodology and methods. Through questionnaires and interviews administered in the TDSB in southern Ontario, this research allowed me to begin to understand the scope, implications, and potential of school ground learning. This board-wide project generated empirical data and descriptive observations that illustrate the current state of transformed school grounds in the school board. This research also generated detailed accounts of five school grounds in this school board. The findings will, hopefully, be of both scholarly and practical interest, particularly to those researchers and practitioners who are interested in creating more effective school environments. Having presented the significance of this study (Chapter 1), the literature relevant to this topic (Chapter 2), as well as the methods (Chapter 3), I now turn to a presentation and discussion of the findings in the following chapter.

CHAPTER 4: RESULTS AND DISCUSSION

Introduction

In Chapter 4, I present and discuss the findings from the questionnaire respondents and interviewees. With a view to organizing this chapter, it is divided into five chapter 'sections' that reflect the original research objectives (see Chapter 1):

SECTION 1: School, Respondent, Interviewee and Project Profile

(Objective 1A and 1B)

SECTION 2: Profile of Space Types **(Objective 1B)**

SECTION 3: Process of Greening School Grounds **(Objective 1C)**

SECTION 4: Impacts of Green School Grounds **(Objective 2)**

SECTION 5: Limiting and Enabling Factors **(Objective 3)**

Throughout each section of Chapter 4, I have merged the results and discussion with a view to creating more of a 'flow' with my writing. I recognize that this is not the traditional format for writing a dissertation but do hope that my readers will understand the value of this alternative approach.

SCHOOL, RESPONDENT, INTERVIEWEE AND PROJECT PROFILES

(Objective 1A)

Questionnaires

Response Rates

Out of the 100 schools that were invited to participate in the research initiative, 45 returned at least one questionnaire (45% response rate at the school level). Just over half of these schools (51.1%) returned all four questionnaires, whereas 31.1%, 11.1%, and 6.7% of these returned three, two and one questionnaire(s) respectively (Table 3).

At the individual questionnaire level, 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.

School Demographics

As indicated in Table 4, 45 schools participated in this study and the majority were elementary (Kindergarten to Grade 6) (n=32). However, a moderate number of middle schools (Grade 6-8, n=6) and high schools (Grade 9-12, n=7) also participated. The majority of the schools had between 200 and 500 students (57%) and less than 40 staff members (66%). The schools were evenly distributed among the socioeconomic zones assigned by the school board.

The school ground greening projects had been in place at the schools for a wide number of years: 13% had been in place for less than 3 years; 62% had been in place between 3 and 10 years; and 13% had been in place more than 11 years. At 5 of the schools, respondents were unaware of the history of the school ground project.

Respondent Demographics

The majority of respondents were women (83%) (Table 3). Almost all respondents indicated that their first language was English (89%). Most of the respondents had completed an undergraduate degree (49%) or college diploma (15%), and an additional 25% had completed a post-graduate degree. The majority of respondents had studied social sciences (75%), with the remaining studying in the natural sciences.

The respondents working in the education field (i.e., administrators, involved teachers, uninvolved teachers) who took part in this study were, for the most part, quite experienced. Eighty-seven percent had taught for more than 5 years; 48% had taught for more than 20 years.

Table 3 Profile of Questionnaire Respondents (Phase 1)

Characteristic and Variable	Frequency	% ^a
Role		
Principal	41	27.5
Involved teacher	39	26.2
Uninvolved teacher	36	24.2
Parent	33	22.1
Gender		
Male	26	17.4
Female	123	82.6
Age		
20-29	7	4.7
30-39	40	26.8
40-49	56	37.6
50-65	46	30.9
Highest level of education completed		
College diploma	23	15.4
Undergraduate	73	49.0
Masters	36	24.2
Doctorate	2	1.3
Other	15	10.1
Area of study during post-secondary education		
Natural science	20	13.4
Social science	112	75.2
Other	17	11.4
First language		
English	133	89.3
Mandarin/Cantonese	4	2.7
Other	12	8.0
Years working in public/private education system^b		
0-2	4	3.4
3-5	8	6.9
6-10	12	10.3
11-20	36	31.1
More than 20	56	48.3
Years working at present school^b		
0-2	17	14.7
3-5	42	36.2
6-10	36	31.0
11-20	16	13.8
More than 20	5	4.3
Number of years involved with school ground greening projects		
0	31	20.8
1-2	20	13.4
3-5	54	36.2
6-10	32	21.5
11-20	11	7.4
More than 20	1	0.7

Level of involvement with school ground greening projects		
Not at all involved	24	16.1
Not very involved	27	18.1
Fairly involved	39	26.2
Very involved	59	39.6
Level of interest with school ground greening projects		
Not at all interested	3	2.0
Not very interested	9	6.0
Fairly interested	49	32.9
Very interested	88	59.1

Note. N=149 respondents.

^a I do not know how these percentages compare to the broader population (e.g., general Toronto demographics or TDSB employee demographics).

^b Responses from administrators, involved teachers and uninvolved teachers only (n=116).

Table 4 Profile of Schools from Questionnaires (Phase 1)

Characteristic and Variable	Frequency	%
Level of school		
Elementary (Kindergarten to Grade 5/6)	32	71.1
Middle (Grade 5/6 – Grade 8)	6	13.3
Secondary (Grade 9 – Grade 12)	7	15.6
Socioeconomic status of school catchment area ^a		
Very high	9	20.0
High	11	24.4
Medium	8	17.8
Low	9	20.0
Very low	8	17.8
Length of school ground greening project (years) ^b		
<2	6	13.3
3-5	14	31.1
6-10	14	31.1
>11	6	13.3
Unknown	5	11.2
Number of students		
<200	1	2.2
201-500	26	57.8
501-1000	11	24.4
>1000	7	15.6
Number of staff		
<20	11	24.4
21-40	20	44.4
41-60	7	15.6
>60	7	15.6

Note. N=45 schools.

^a The socio-economic status of the catchment area was provided by the school board. It is determined by evaluating communities as a function of: 1) average and median income of families with school aged children; 2) parental education; 3) proportion of lone-parent families; 4) recent immigration; 5) housing type (apartment, single detached house); and, 6) student mobility. For more information, see Chapter 3.

^b Data for this response were sought from the involved teacher. If the involved teacher did not respond, data were used from the parent questionnaire. If neither respondent indicated a response, 'unknown' was recorded.

Half of these respondents had been working at their current school for less than 5 years; the remaining half had been working there for more than 5 years.

The respondents had been involved in greening projects for a varying number of years: 20% had never been involved in a project; 50% had been involved between 1 and 5 years; and 30% had been involved for more than 5 years.

Respondents were asked to rank both their level of interest and involvement in their school's greening initiative on a four point Likert scale (1=not at all, 2=not very, 3=fairly, and 4=very). In terms of interest level in school ground greening initiatives, the majority of respondents indicated that they were 'fairly' or 'very interested' (93%). Levels of involvement were more varied: 66% of respondents indicated that they were 'fairly' or 'very involved,' the remaining 34% of respondents were 'not at all' or 'not very involved.'

Follow-Up Case Studies

Interviewee Profiles

I interviewed a total of 27 individuals during Phase 2 of the research project. More specifically, I interviewed 4 principals, 7 teachers, and 10 parents associated with the 5 greening projects profiled in the case studies (Table 5). I also interviewed 4 individuals from the TDSB, 1 individual from Evergreen, and 1 additional principal who completed the questionnaire during Phase 1, but who was not originally selected to participate in Phase 2 of the research (Table 6). This principal was contacted because several interview respondents from the TDSB and Evergreen indicated that she could provide insight on the potential role that the school board could play in facilitating greening initiatives.

A large majority of interview respondents were women (81%). The teachers and principals involved in the follow-up case study had been involved in the educational system for a minimum of 8 years and a maximum of 34 years. Teachers and principals that I interviewed had been working at their current schools between 2 and 15 years. The interviewees associated with the 5 schools had been involved in greening projects for a varied amount of time: 1 respondent had only been involved 1 year, while another had been involved for 12 years.

Table 5 Profile of Case Study Interviewees from Five Schools (Phase 2)

Name of School	Role	Age	Years Involved in Greening	Years in Education System (At Present School)
School A				
	Teacher*	40-50	2	12 (4)
	Parent	40-50	3	n/a
	Parent*	40-50	3	n/a
School B				
	Principal*	>50	5	29 (5)
	Teacher*	40-50	2	19 (2)
	Parent*	40-50	5	n/a
	Parent	40-50	5	n/a
	Parent	40-50	2	n/a
	Parent	40-50	5	n/a
	Grandparent	>50	5	n/a
School C				
	Principal*	40-50	3	30 (3)
	Teacher*	30-40	8	8 (8)
	Parent*	40-50	4	n/a
School D				
	Principal*	>50	7	34 (4)
	Teacher*	>50	12	22 (14)
	Parent*	40-50	2	n/a
	Landscape Architect involved in project 1992	40-50	15	n/a
	Teacher	>50	12	n/a
School E				
	Principal*	>50	1	30(4)
	Teacher*	40-50	7	11(9)
	Parent*	30-40	2	n/a

Note. * denotes involvement in Phase 1 of research

Table 6 Profile of Additional Interviewees (non school case study specific) (Phase 2)

Name of School Respondent	Role	Age	Years Involved in Greening	Years in Education System (At Present School)
Bruce Day	Grounds Team Leader (TDSB)	>50	n/a	n/a
Heidi Campbell	Joint Evergreen/TDSB position	30-40	n/a	n/a
Richard Christie	District-wide coordinator of Environmental Education for the TDSB	40-50	n/a	n/a
Cam Collyer	Director of Learning Grounds (Evergreen)	30-40	n/a	n/a
Sheila Penny	Executive Superintendent of Facilities Services (TDSB)	>50	n/a	n/a
Principal	School F	>50	n/a	n/a

Case Study School and School Ground Greening Profiles

Five elementary schools were involved in the case studies, each representing a range of socio-economic statuses (1 school in each 'category of status': very high, high, medium, low, very low) (Table 7).¹⁷ The schools ranged notably in terms of the size of their student body (280 – 950 students) as well as their staff team (13-48 staff).

In order to have a deeper understanding of the context of the school as well as the school ground greening projects studied in Phase 2 of the research, I asked case study interviewees a number of questions about their particular greening project. I gathered not only detailed descriptions of each school, but was also able to physically experience (through site tours) and take pictures of each school ground.¹⁸ I asked interviewees questions related to both the process (e.g., motivation for greening, dates of greening, who was involved, sources of funding) and product (e.g., elements, program spaces) of their greening projects. In the following section of the chapter, I briefly describe the 5 school ground greening initiatives.¹⁹

¹⁷ For description of how the categories of socioeconomic status were assigned, see Chapter 3, section entitled "Selection of Schools, Questionnaire Respondent and Interviewees: Rationale."

¹⁸ Unfortunately, for ethical reasons related to confidentiality, no pictures can be included in this dissertation. This is regretful - as they would certainly contribute to helping the reader develop an intimacy with these spaces.

¹⁹ Interestingly, respondents described the same greening project in very different ways. For example, in comparing the interview transcriptions of a principal, involved teacher, and parent associated with the same greening project, it was not uncommon for each to describe the greening initiative somewhat differently. This diversity made it difficult for me to ascertain the 'true' story of school ground greening for the schools in the case studies. The responsibility thus fell on me, as the researcher and writer, to 'piece together' the summaries of greening at each case study project. I did this by reading transcripts from the schools on several occasions to capture the multiple perspectives. I do recognize the limitations of such an endeavour and realize that if someone else were to review the transcripts, they might possibly come up with a different story. I also realize that if I were to write the stories again at a different time and in a different space (figuratively and metaphorically), I might well generate a slightly different story. To complicate matters even more, I realize that if I were to conduct the interviews again, I might well get very different answers.

Table 7 Profile of Case Study Schools (Phase 2)

School	Socio-economic Status ^a	Number of Students	Number of Staff (Teachers and Administration)
School A	Very high (0.00)	540	27
School B	High (0.32)	691	35
School C	Medium (0.41)	420	25
School D	Low (0.70)	280	13
School E	Very low (0.88)	950	48

^a The socio-economic status of the catchment area was provided by the school board. It is determined by evaluating communities as a function of: 1) average and median income of families with school aged children; 2) parental education; 3) proportion of lone-parent families; 4) recent immigration; 5) housing type (apartment, single detached house); and, 6) student mobility. See Chapter 3.

School A²⁰

A parent watched them tear down the playground and asked if she could have parts of it to try to take to other schools that might not have had the same... because it was beautiful... it wasn't an old piece of equipment. And she was told 'no'... that everything was going to be destroyed. And she was really angry that they weren't going to try and retrofit or do something to make use of this stuff. And so she went on to make it her project, and I think it was based on that summer afternoon when she passed through the yard. So she took it on to head it up. And I guess went for every grant and every single thing she could possibly get... and that's where she found the Evergreen people. She just went nuts looking through all kinds of magazines and ended up with a lot of extra financial support, just by getting kids to fill out things. It was a huge effort on her part and it worked wonderfully. (Parent)

School A is located in an upper-middle class community in north Toronto (SES index = 0.00). The school is fairly small, with only 540 students and 27 staff. The project is best known for its extremely active parent committee and its successful fundraising efforts.

The greening project at School A was initiated 2 years ago by a parent who saw the playground equipment being removed.²¹ Concerned about the play environment for her own children, she decided to become actively involved in recreating a better school ground. She had seen examples of other green school grounds in the United States and set about raising funds and gathering support.

Support eventually came; although there was a bit of resistance at the beginning, the principal, teachers, parents and students became keen to be involved in planning, designing, fundraising and creating a new green school ground. Fundraising (e.g., grant applications, school council fundraisers, donations from parents and community) was extremely successful and over \$250,000 was raised for the project. The grade 5 class, in particular, became heavily involved by giving presentations to corporations around the city. The class alone raised \$30,000!

There are two main phases to the project: Phase 1, which has been completed, included new playground equipment, a learning classroom in front of the school, and trees/rocks compilation near the playground equipment; Phase 2, which has not been completed, will include the creation of a community gathering spot and a new track. Support for Phase 2 of the project is not as strong as it was for Phase 1 as teachers, parents, and administrators struggle to balance their interest in and support of greening with the other school priorities (e.g.,

²⁰ The names of the schools and interviewees have been changed to protect their anonymity.

²¹ The full story of the TDSB and CSA playground equipment removal is described in Chapter 3, "Selection of School Board: Rationale."

purchasing computer facilities, completing repairs on a very old school building, purchasing curriculum materials, reducing class size, etc.).

One parent has essentially driven this entire initiative. She is, however, supported by an active parent committee. The parent body at School A is a reliably dedicated group: according to one parent “We actually have to draw lotteries for parents to go on school trips.” There is also an active School Council that has been very involved in the process of greening the school ground.

The principal has been very supportive of the initiative as well. He can often be found early in the mornings working in the garden in front of the school. He is, however, trying to balance the initiative with the other extra and co-curricular programs at the school, including music, swimming, theatre and sports.

Evidently, the majority of teachers have been involved in a minor way in the greening process (e.g., attending fundraisers, bringing classes to planting days) but none assumed a leadership role due to the active parent committee. Now that the first phase has been completed, teachers are somewhat less involved (it is entirely parent driven right now). In terms of teaching, a small number of teachers use the outdoor classroom, but it could certainly be used more. There is general agreement that as the space becomes more shaded, more teachers will be increasingly willing to use it.

The students were involved in the design, fundraising and planting of the green spaces. All students were asked to draw a map of their ‘ideal’ playground and these maps were used by the landscape architect to design the final plans. As mentioned earlier, some students were also involved in fundraising. On the planting days, the students were actively involved and each student was responsible for planting their own tree. Currently, there is little student involvement at School A. The maintenance appears to be done by the parents and there is no Garden Club to keep students actively involved at present.

School B

It was completely asphalt... really ugly, absolutely nothing. It was complete desolation. The new space 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... there are places to sit down, there are places to go that are quiet, where they can eat a snack with a friend. There are a variety of places to be now, whereas 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. They can hide behind the bush now when they're playing with a friend or seek some shade from some of our trees. (Involved parent)

School B is located in a middle-upper class neighbourhood in east Toronto (SES Index = 0.32). The school has 691 students and 35 staff. The School B greening project is perceived as being a model school ground greening initiative in the TDSB. They are best known for their very active parent community, their supportive principal, and their positive relationship with the school board.

The School B Millennium Learning Garden committee initiated the greening initiative at the school in 1999. The committee developed a well-defined four-part vision for their project that still guides them today. They wanted to transform part of their school grounds into a garden that featured: 1) a bio-diverse native species habitat and learning garden for the study and appreciation of their local ecosystem; 2) a school-wide composting program; 3) a meeting circle where classes and groups could meet and sit together; and, 4) an outdoor classroom setting that could support student learning across all curriculum areas.

The Committee capitalized on the playground equipment being removed for safety reasons. When the bulldozers arrived in Fall 2000 to remove the equipment and the surrounding asphalt, the committee requested that an additional section of asphalt be removed to break ground for the Millennium Garden.

Since the ground was broken 3 years ago, the committee has overseen the creation of several garden spaces: Native Garden; Learning Garden; Winter Garden; Moon Garden; Peace Garden; and, KinderGarden. School B also has a new outdoor classroom and an active composting program. Currently, the school is removing more pavement to create a tall grass prairie maze. Future plans include the development of 'green roof' project that will help to cool the school, assist storm water management issues, and provide another site for environmental education.

Funding was sought through TD/Canada Trust, Learnex, Evergreen and corporate organizations. Donations have come from Canada Bloom's (a horticultural organization), community members, a number of City Councillors, as well as local businesses. Committee

members estimate that approximately \$30,000 has been spent on the greening initiatives at School B.

The green school ground has helped to create an environmental philosophy that permeates the entire school. Since the school ground has been transformed, numerous other environmental initiatives have begun in the school. For example, garbage has been reduced by two-thirds as a result of a strong recycling and composting program. The importance of environmental education is reflected in School B's newly revised School Mission statement that now includes reference to environmental leadership.

School B has a very active parent community that has been integral in facilitating the greening, with approximately 15 adults part of the 'Garden Committee.' There is an elected position on the School Council called the Outdoor Environmental Representative, who is responsible for liaising between the parents and school community. Parents and students are part of an active 'Garden Club' that meets weekly for sessions in the garden (e.g., plantings, maintenance, designing). Parents also assume a vital role in maintaining the garden during the summer (e.g., weeding, watering, etc.)

Students have been involved in a variety of ways throughout the process. The ideas, opinions and concerns of students were sought formally through the Class Council (2 representatives per class for all grades above Grade 2). The representatives surveyed their own classes for ideas/drawings and reported back to the Council. Ultimately, these ideas were used to help make design decisions. All students at the school are encouraged to compost and they have been involved in various planting days. Students can also elect to join the Garden Club.

Teachers have not been overly involved in the planning, creating or maintaining of the green school ground at School B. The principal encourages the teachers to use the school ground for teaching on a regular basis and would like to see more teaching happening out there. Teachers currently use the spaces for instructing a variety of subjects, including art, science, language arts and gym, but much could be done. Some teachers at the school contribute in other ways to an environmental ethic that exists in the school: one teacher runs the in-school hours Garden Club (that operates during the school day), another teacher is in charge of indoor plants, while another teacher manages the compost.

The principal at School B has been extremely supportive of the greening initiative. While the principal is rarely outside 'digging in the garden,' she has assumed numerous key roles, including: facilitating a smooth, productive relationship with the TDSB; supporting the parent committee; encouraging teachers to use the space for teaching; honouring the educational value

of student participation in the greening process; and in endorsing an environmental philosophy that extends beyond the greening project into energy use, waste management, and learning.

Numerous awards and accolades have been received by School B. For example, the school was recognized as a Millennium Star (environmental category) by the Toronto Millennium Office, received the Toronto Atmospheric Fund “Cool Schools” award, received “Another Yard for the Don Ecological Garden Award” from Friends of the Don (an organization that is devoted to improving the watershed quality of the Don), was featured in a film for Earth Day, and was profiled in *A Breath of Fresh Air* (Houghton, 2003).

School C

Kids were not happy. They were discontent, running around, doing nothing, with no focus. Most of our schoolyard was asphalt or terribly hard packed ground. We did have a soccer field, but then they fought about who is going to play in the soccer field. There were always fights at recess. We thought we had to give them something to do. I love nature and gardening and it just seemed a good thing to start. (Involved teacher)

School C Public School is a Junior Kindergarten to Grade six French immersion school located in North Toronto in a middle class neighbourhood (SES index = 0.41). The school serves approximately 420 students and employs 19 teachers. The project at School C is not known around the school board for any specific reason. Unlike School A, it has not raised large amounts of money. Unlike School B, it does not have a tremendously active parent committee. Instead, it represents an ‘average’ greening initiative in the TDSB. It has a modest design. The committee struggles with limited and changing staff involvement. These are very real challenges for many other greening projects around the board.

The greening initiative was started in 1998 by a principal and a group of teachers and parents. According to the involved teacher who participated in this study and who was one of the original teachers that got the project off the ground, the motivation for transforming the school ground was to respond to challenges that were emerging in the school ground during recess. The principal at the time approached the teachers and parents to let them know that funding was available to support school ground greening initiatives. A “Greening Committee,” comprised of the principal, teachers and parents, was formed and they raised \$17,000 from a variety of organizations, including Evergreen, Shell Canada, Consumer Gas, and Canada Trust.

The garden has two main parts: a native garden and a non-native garden. The green school ground at School C is currently in a ‘maintenance phase,’ which means that no new plantings are occurring.

The impacts of the ephemeral nature of school communities are very evident at School C: the most involved parent has a child in grade 4 that will move to a new school soon; there is a high teacher turnover at School C which means that many of the teachers who were once involved have been moved to new schools; the involved teacher who participated in this study is currently on maternity leave; and, the new principal is feeling somewhat overwhelmed at the prospect of this “fairly unwieldy” garden.

Students were modestly involved during the planning stages of the greening initiative (e.g., visioning, fundraising). They were asked to complete surveys with their families that asked them to describe their ‘wishes’ for the new garden. Once the actual planting began, the students were very involved. Until this year (when they entered the maintenance phase), the students had been involved in yearly plantings and helping out with weeding. At various points in the project’s history, the school has had a Garden Club for students, teachers, and parents who help with the maintenance of the garden.

Throughout the past 6 years, there have been a small number of committed parents at School C that have helped with the greening project. Today, there are really only three parents who assist on a regular basis. They are willing to come to meetings, volunteer for watering, and perform specific tasks, but none of them assumes a real leadership position.

Throughout the years, many teachers have shown an interest in the greening project, but currently, the one involved teacher is on maternity leave. She has a tremendous amount of dedication to the garden, noting that “basically it is me that runs the garden...the school has changed so much in the last 3 years. We have lost a lot of people and new people have come. It is pretty much all up to me.”

The principal is very supportive of the greening initiative but struggles to balance it with many other initiatives that are occurring in the school. Challenges such as work-to-rule, school board cut-backs, teacher turnover, increasing numbers of ESL students, and no vice-principal make it difficult for the principal to devote as much time to the garden as she would like. She is often helping with maintenance (she’s often weeding the garden), organizing meetings, liaising with the school board about the project, and encouraging teachers to use the garden as a teaching tool if they feel comfortable.

In terms of teaching on the school ground, it appears that it is used “occasionally” (Principal) and that there is “less and less teaching happening in the garden” (Involved teacher). The parent agrees, noting that “I don’t think it is used nearly as much as it could be for an outdoor classroom.” When it is used, the teachers at School C instruct primarily science and art lessons. Efforts are made to incorporate the maintenance (e.g., weeding) into teaching opportunities. The

interviewees generally agreed that much room exists to increase the amount and type of teaching that happens in the garden.

School D

Parents initiated it about 10 years ago. And the parents were landscape architects who had businesses on the side, who did landscape architecture as a business... and they got together with a bunch of parents and they decided that the school ground was terrible. It was paved over from one end to the next and they wanted to transform it. But of course they were idealists and visionaries... I'm not sure about this, but I think the initial budget for the transformation of the school grounds was \$750,000. That was their initial plan... because they decided they would do a plan of all the things that they really wanted. They had an upland orchard with a path that wandered through the forest, upland forest. They had an apple orchard at the back, they would have butterfly bushes and trees all along down one side. They would have a prairie, they would have terrace gardens... and they would have an outdoor classroom with vines. And they had a huge plan... and they proceeded to have the principal behind them. And they were really excited about it.
(Teacher)

School D is located in a mixed community of middle and working class individuals (SES Index = 0.70). The school is well known around Toronto for its excellent arts programs and garden. Some parents outside the catchment of the school request that their children attend the school. There are 280 students and 13 staff associated with the school. The project is well known because it was one of the earliest greening projects in the school board.

The garden project began in 1992 and is the oldest project profiled in this research. Given the socio-economic profile of this community, the project's history is quite fascinating and according to some, really unexpected. In the early 1990's, a group of dedicated parents worked together to transform the school ground at School D. The parents had principal endorsement, backgrounds in landscape architecture and the arts, and a commitment to political activism, and they were very successful. Over the course of a few years, the asphalt at School D was replaced with an upland forest, an apple orchard, a terrace garden, a meadow, and an aviary.

It is estimated that approximately \$300,000 was raised by the parents for the initiative. A large amount of money was donated by the Eaton and Weston families (approximately \$50,000 in total).

The initial relationship between the parent committee and the former Toronto Board was very confrontational. It appears that school board officials were extremely reluctant to help with the initiative and indirectly made efforts to block the project. (More details of this relationship will be described later).

Despite the lack of board involvement or support, the parents persisted; the project at School D flourished for many years and became a model project. A 'teaching assistant' was

hired for 9 hours per week for approximately 5 years to deliver lessons on the green school ground. This individual also assisted with the maintenance and upkeep of the garden space.

The garden at School D suffered tremendously, however, when the original group of parents moved on and the supportive principal was transferred to another school. The new principal was, apparently, not very supportive of the greening initiative and new parents were uninterested in working with someone they considered difficult. New parents who arrived were also interested in different aspects of their children's education, and the arts became a new focus at School D. As a result, the greening project became less of a focus for parents, teacher, and the principal. The garden became somewhat overgrown and was used less and less for teaching. One of the teachers who assisted the original parent committee has been at the school since the project began and, by default, has become the resident expert on all aspects of the garden. She openly admits though that in the absence of an active parent committee and supportive principal, it is difficult to make the garden a priority.

There are, however, exciting prospects for the future of the School D garden. A new principal has recently arrived who has a strong commitment to reawakening the garden. Several parents of kindergarden students are showing an interest in becoming involved. It appears that this might be a shifting point for the garden space at School D.

School E

This is the most diverse neighbourhood community anywhere in Canada. We have 73 different languages that are spoken here at the school. I couldn't begin to say how many cultures exactly but well in excess of 73. We have children from Sri Lanka, mainland China, India, Afghanistan, Pakistan, Iraq, Eastern Europe, Rumania, Bulgaria, Russia, the former Yugoslavia...And we're increasingly getting children from Africa places like Zaire, and Somalia. One thing that's neat about this project that we were talking about... we feel that it's a bit of an introduction to the Canadian way of life. These kids are so keen, so enthusiastic, and so excited about having these opportunities. We're planting bulbs and for the kids once again that's an experience they don't have... it's probably not one that they would have done in their homelands, I'm not sure but I don't think so. So to actually get down on your hands and knees and turn the soil over and smell the soil, to see the worms and the bugs and not freak out, to pick them up. (Principal)

School E has 950 students from grades K-5 and is located in a very diverse community. There are 50 teachers. It is exciting to visit School E and see the diversity of students, staff and languages. The home country of the largest number of students is Sri Lanka, followed by mainland China. It is truly an ephemeral student population that ebbs and flows: some students are on a "pilgrimage" or "journey" and stay at the school for as briefly as one week. The socio-economic status of the school community is described as lower to middle class (SES Index =

0.88), but many assert that it would be higher if the new Canadian parents could get work in their traditional areas of expertise.

The greening project in the enclosed courtyard at School E has been a work in progress for the last 10 years, but a more directed effort has been in place for the last 2 years. The small courtyard space has several components: 1) forest edge (trees, shrubs, bird feeders, mulch); 2) butterfly garden; and 3) meteorological station. Future plans include the creation of an actual forest (two maple trees, native forest bed, two teaching areas with seating and shade) as well as a mural on the biggest wall within the courtyard. Several years ago there was a functioning pond, but it is no longer in existence. Interestingly, there are important sections of community greenspace near School E (e.g., bike paths, ravines, Ontario Science Centre grounds, etc.) and the greening project is trying to situate itself within these larger community greenspaces.

The courtyard project has been transformed with an extremely modest budget: approximately \$2,000 has been spent to date and an additional \$1,500 has been raised for additional projects. Funding has been sought through Cool Schools/Clean Air Fund in Toronto, Evergreen, TD Canada Trust, and the school bookfair.

A few dedicated teachers at School E are almost solely responsible for facilitating the greening project. They have been in charge of fundraising, visioning, planning, planting and maintaining the space. One of the most involved teachers is the librarian whose workspace (the library) has large windows that face the courtyard. He feels very responsible for and attached to the courtyard given his daily physical connections to the space.

The principal at School E is extremely supportive of the courtyard project and makes every effort to support it. He has helped with the plantings, mulch spreading and will help to water the space in the summer. He stresses the importance of contextualizing the project within the school's ultimate academic goals of literacy and numeracy. Despite his support, he is a very 'hands off' leader and has tremendous trust in the teachers at the School E who are involved in the courtyard project. He does not need to "know everything that is going on" and very much assumes that "no news is good news."

Parental support for the courtyard greening project at School E is very limited (although I did speak to one parent who has helped out with plantings). Many reasons were offered from the principal and teacher with whom I spoke about why parental support was so limited. They postulated that language might be a barrier and that many parents are working multiple jobs to support their transition into Canadian life. They also suggested that many new Canadian parents believe that they shouldn't "get involved in the school unless there's a problem." Efforts have

been made to invite more parents to participate, but due to the small size of the courtyard and the enthusiasm of teachers, there appears to be not a great need for additional parental support.

In terms of student involvement, some of the grade 3 and 4 classes were involved in map making where they contributed their ideas for courtyard design. There is an Environment Club that students can join if they are interested in helping with the planting and maintenance in the courtyard. There are also Biking and Hiking Clubs at the school which go on excursions twice a week after school during the fall and spring. Although this is not directly tied to the courtyard, the presence of these clubs does show support for 'environmental' issues at School E.

Teachers are encouraged to use the courtyard as an outdoor classroom but current use is somewhat limited. It is anticipated that when the actual outdoor classroom elements (e.g., rocks for seating, shade structure) are present, many more teachers will use the space. The principal is very supportive of using the outdoors (i.e. courtyard, ravines, trails, etc.) as a medium for teaching a range of subjects including mathematics, language arts, weather, as well as science.

Section Summary

The diversity found within and among the schools, school ground greening profiles, questionnaire respondents and interviewees provided me with different perspectives on school ground greening in the TDSB.

The schools that completed the questionnaires (N=45) and that were involved in the case study (N=5) represent a range of different student populations, communities and physical locations. Socio-economically, the schools are on a continuum, ranging from low to high SES. The sizes of the schools vary. The ethnic composition of the schools is different: while some are composed of almost entirely Caucasian, Anglo-Saxon, English-speaking students, other schools have a large majority of new Canadian students with more than 73 countries represented and 98 languages spoken.

Given how different the schools are, it should be no surprise that the green school grounds profiled in this study are also very different. Physically, the school ground greening initiatives are very diverse: while some schools have planted a few trees, others have complex multi-phase greening projects with gardens, ponds, composters, weather stations, and murals. The story of creating and maintaining the school ground differs among the projects profiled as well: while some schools have just begun the process of greening, others have been working on their project for over 12 years. The budgets for the projects vary considerably: some schools have spent \$2,000 while other schools have spent more than \$250,000.

The 149 questionnaire respondents and 27 interviewees also represent a diversity of perspectives. Most obviously, the individuals differ in terms of their age, gender, teaching experience, ethnic background, position, and experience in greening. While accessing and naming these differences is relatively easy (much of this demographic information was requested on the questionnaire), other differences among the respondents are much more difficult to identify, label, and understand. For example, individual differences in terms of personal background, educational philosophy, and environmental viewpoints are difficult to ascertain via a questionnaire, yet these factors necessarily influenced the respondents' perspectives.

While recognition of the diversity of voices that is represented in this sample is important, it is equally important to recognize the voices that are missing from this study. While I will never have a full understanding of all the voices that are not represented herein, I am aware of the following missing perspectives: the students attending these schools; the individuals associated with greening programs at schools that were not selected to participate in Phase 1; the voices of the principals, teachers and parents who received a questionnaire in Phase 1 of the research but did not complete it; the schools who were not selected to participate in Phase 2 of the research; as well as, the voices of individuals who were invited but unable to participate in the interviews.

Before concluding this section that summarizes the research 'subjects,' I must, of course, acknowledge as the principal investigator that I was a research 'subject' and that my own voice appears strongly throughout both Phase 1 and 2 of this study. Even though I am not listed in Table 3 or Table 5 as having completed a questionnaire or participated in an interview, I did assume multiple roles throughout this study and thus my voice will appear strongly in the following sections of the dissertation. My own social identity and values influenced all aspects of this research project from the problem identification stage, questionnaire construction, interview schedule, and dissertation writing. I am aware that as I formed relationships with schools and individuals, I necessarily was in a position both to influence others and to be influenced. I believe that I too am an integral 'subject' in this study.

I thus support Stanley and Wise's (1993) assertion that "who a researcher is, in terms of their sex, race, class and sexuality, affects what they 'find' in their research" (p. 228). Informed by the data, the literature, my own experience, and myself as a research tool, I created this dissertation. It goes without saying then, that someone with different knowledge(s) than I have, or someone from a different 'location,' would undoubtedly interpret the data in a different way: they would be drawn to different stories, see different patterns, connect more personally with aspects of the data.

Having introduced the questionnaire respondents, interviewees, schools, and greening projects, in the following section of my dissertation, I explore the design of the greening initiatives more fully.

PROFILE OF SPACE TYPES

(Objective 1B)

Questionnaires

With a view to having a greater understanding of aspects of design related to school ground greening projects, questionnaire respondents were asked to complete two questions about the specific design elements on their green school ground. First, they were asked to indicate what elements were found on their green school ground (e.g., coniferous trees, rocks, sand, etc.). Second, they were asked to evaluate a number of ‘spaces types’ (e.g., spaces that support creative play) in terms of their importance on an exemplary yard and their adequacy on their own school ground.

The Project Elements

Involved teachers were asked to indicate, from a list provided on the questionnaire, the elements that were found on their green school ground (e.g., presence/absence) (Table 8). The large majority of green school grounds had deciduous trees and coniferous trees. Approximately half of the green schools had rocks, butterfly gardens, wildflower meadows, seating for classes. Some of the schools have composting programs, with 44% having composting stations and 18% having vermicomposters. A very small percentage of schools had public art and none of the schools had green houses.

Importance and Adequacy of Elements

Respondents were asked to evaluate the importance and adequacy of 14 space types on a school green school ground (Table 1).²² In analyzing this section of the questionnaire, I was able to:

1. Investigate respondent perceptions of the *importance* of 14 space types on an *ideal* or *exemplary* school ground;
2. Investigate respondent perceptions of the *adequacy* of 14 space types on *their* school ground; and,

²² Rationale for selection of these ‘space types’ is found in Chapter 3, in the section called “Additional Questionnaire Information: Selection of Space Categories and Types.”

3. Explore if and how the perceptions differed as a function of independent variables related to the school (e.g., socio-economic status, length of greening projects) as well as the individual respondent (e.g., gender, role, level of involvement, as well as level of interest in the project).

Results of Importance/Adequacy

To understand basic trends in respondents' rankings, the means and standard deviations for the adequacy and importance of each of the space types were generated (Table 9). The respondents ranked all of spaces as being 'fairly' or 'very important' on an exemplary school ground. The mean ranking for the 14 space types was 3.49 ($SD = 0.39$), suggesting that all spaces are perceived as being 'fairly' to 'very important.' Respondents indicated that the most important spaces were open green spaces (Space #1) ($M = 3.88$), hard surface play spaces (Space #2) ($M = 3.76$), as well as shaded spaces (Space #12) ($M = 3.89$). The space that received the lowest ranking in terms of importance was elements to support creative play (Space #5) ($M = 2.79$).

In terms of adequacy of spaces on their *own* school ground, the mean ranking for the 14 space types was 2.28 ($SD = 0.49$), suggesting respondents perceived some inadequacies on their own school grounds. Nevertheless, the respondents did report that some spaces were more adequate than others on their own school grounds. The most adequately represented spaces were open green space (Space #1) ($M = 3.32$) as well as hard surface play spaces (Space #2) ($M = 3.17$). The four spaces that respondents indicated were the least adequate were as follows: a) elements that support creative play (Space #5) ($M = 1.32$); b) areas sheltered from the rain and snow (Space #14) ($M = 1.48$); c) built elements to support learning (Space #6) ($M = 1.73$); as well as, d) areas sheltered from the wind (Space #13) ($M = 1.87$).

Paired samples t-tests were conducted to evaluate if the mean for importance differed from the mean for adequacy for each space. The results indicated a significant difference between the importance and adequacy for all spaces, $p < .01$ (two-tailed). In all 14 pairs, the mean rankings were significantly higher for importance than adequacy (Table 9). In other words, respondents indicated that even though they felt that a specific space type was important, it was often not adequately represented in their own schools grounds.

The Effect of Independent Variables

With a view to understanding if perceptions of the importance and adequacy of spaces differed as a function of independent variables, such as respondent's role (e.g., principal, involved teacher, uninvolved teacher, parent), level of involvement, level of interest, and gender, a series

Table 8 Percentage of Green School Grounds Containing Elements

Element	% Present	% Absent
Deciduous trees	93	7
Coniferous trees	80	20
Rocks/boulders	56	44
Butterfly garden	53	47
Wildflower meadow	49	51
Seating for class (e.g., log circle, amphitheatre)	47	53
Composting stations	44	56
Sand	40	60
Nesting structures for birds	30	70
Vegetable garden	29	71
Bird feeders	27	73
Pond/wetland/water	22	78
Berm	22	78
Hedgerows	20	80
Vermicomposter	18	82
Woodland	18	82
Nature trail	13	87
Signage/Interpretive displays	11	89
Sand and water combined	4	96
Public art (e.g., murals, painting on walls/ground)	4	96
Greenhouse	0	100

Note. N=45 schools. These data are gathered from the involved teachers' questionnaires. If no involved teacher had returned the questionnaire, data from the principal were used.

Table 9 Importance and Adequacy of Space Types

Space Type	Importance			Adequacy			<i>t</i>	<i>df</i>	<i>p</i>
	N	M	SD	N	M	SD			
1. Open green space	139	3.88	0.389	136	3.32	0.767	7.819*	134	0.000
2. Hard surface play spaces for sports and games	138	3.76	0.520	135	3.17	0.778	8.322*	133	0.000
3. Manufactured equipment and play structures	136	3.41	0.890	133	2.66	1.058	8.393*	130	0.000
4. Loose elements to support active play	138	3.65	0.669	136	2.67	0.844	13.185*	133	0.000
5. Elements that support creative play	135	2.79	0.925	133	1.32	0.667	17.650*	128	0.000
6. Build elements to support learning	138	3.43	0.683	135	1.73	0.874	11.725*	132	0.000
7. Natural elements to support learning	138	3.60	0.677	135	2.26	1.007	13.633*	133	0.000
8. Places for individuals/pairs to find refuge	139	3.35	0.824	135	2.09	0.934	13.256*	132	0.000
9. Small group gathering spaces	138	3.43	0.786	135	2.27	1.047	9.680*	131	0.000
10. Class size gathering spaces	138	3.62	0.686	134	2.37	1.015	20.143*	132	0.000
11. Larger than one class group gathering areas	137	3.36	0.839	133	2.45	1.069	14.566*	133	0.000
12. Areas that are shaded	139	3.89	0.394	135	2.16	0.935	19.942*	133	0.000
13. Areas that are sheltered from wind	139	3.52	0.776	135	1.87	0.926	16.611*	132	0.000
14. Areas that are sheltered from rain and snow	138	3.24	0.892	135	1.48	0.700	18.870*	132	0.000

Note. Levels of importance and adequacy were based on a 4-point scale (1=not at all important/adequate, 2=not very important/adequate, 3=fairly important/adequate, 4=very important/adequate).

**p* < 0.01

of statistical tests were performed. Tests were also conducted to explore if and how perceptions differed among projects that had been in existence for differing amounts of time (i.e., <5 yrs vs. >5 yrs) as well as the socio-economic status of the community. For all of the independent variables except SES, few effects were found.

To determine if there were differences between how the four types of respondents perceived the importance and adequacy of the spaces, I calculated one-way ANOVAs. Differences in perception as a function of role were found in only one case. Significant differences in the means were found between perceptions of the adequacy of areas sheltered from the rain and snow (Space #14), $F(3,131) = 3.614$, $p = 0.015$. Follow-up tests were conducted to evaluate pairwise differences among the means of the four groups, controlling for Type 1 error across tests using the Tukey's test. The results of these tests indicated that the involved teacher ($M = 1.20$, $SD = 0.473$) ranked the adequacy of Space #14 significantly lower than the uninvolved teacher ($M = 1.67$, $SD = 0.736$) and parent ($M = 1.67$, $SD = 0.802$).

One-way ANOVA's were also performed to evaluate differences between respondents with varying levels of involvement and interest. When no differences were evident, the data for level of involvement and level of interest was recoded from four levels to two levels (not involved/involved and not interested/interested).²³ Independent samples t-tests to evaluate if differences between level of interest/involvement and perceptions of importance and adequacy revealed that no differences existed in terms of level of involvement. Four significant differences related to levels of interest were found however. Interested respondents ranked the importance of natural spaces to support learning (Space #7), the importance of areas sheltered from the wind (Space #13), the importance of the average of the 14 space types, as well as the adequacy of natural spaces to support learning (Space #7) significantly higher than uninterested respondents (Table 10).

In exploring the influence of gender, an independent samples t-test revealed that no differences existed between how men and women described the importance and adequacy of the 14 space types. In examining if the duration of the project would influence respondent perceptions of the importance and adequacy of the spaces, the analysis revealed no statistical

²³ The reorganization of data from four levels (very involved, fairly involved, not very involved, not at all involved) into two levels (involved, not involved) is entirely acceptable. This allows me to explore relationships using different statistical procedures. For example, with four levels of independent variables, I would use a one-way ANOVA; with two levels of independent variables, I would use an independent samples t-test (Green & Salkind, 2003).

Table 10 Importance and Adequacy by Interest Level

Source	<u>Interested</u>		<u>Uninterested</u>		<i>t</i>	<i>df</i>	<i>p</i>
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>			
Importance of natural spaces to support learning	3.67	0.592	2.82	1.079	-2.583*	10.527	0.026
Importance of areas sheltered from the wind	3.59	0.707	3.00	1.000	-2.548*	135	0.012
Average of the importance of the 14 spaces	3.52	0.035	3.27	0.042	-2.275*	136	0.024
Adequacy of natural spaces to support learning	2.31	0.999	1.64	0.924	-2.170*	133	0.032

Note. Degrees of freedom vary as assumptions of homogeneity of variance were not met.

**p* < 0.05

differences between perceptions of respondents associated with newer (<5 years) and older projects (>5 years).

For my final analysis, the socio-economic status (SES) of the school community was investigated to see if it might influence respondent perceptions of the importance and adequacy of the spaces. Independent sample t-tests exploring this relationship between schools in the extremes of the index (0 – 0.33 compared with 0.66 – 1) were performed. Several interesting patterns emerged and while not all of the findings are significant, they are worth noting.

In terms of importance, the analysis revealed that respondents associated with schools in the lower socio-economic ranked all spaces except one (Space #4: Loose elements to support active play) as being more important than their counterparts from higher socio-economic communities (Table 11). While only one of these differences is significant (Space #14: Areas sheltered from the rain and snow), there seems to be a trend given that individuals from lower SES schools felt that 13 of the 14 spaces were modestly more important than respondents from higher SES schools.

The relationship between the different space types and SES persisted when further analyses were performed to explore respondents' perceptions of the adequacy of the spaces. Respondents from higher SES schools reported higher means for adequacy for all but one (Space #2: Hard surface play spaces for sports and games) of the spaces than their counterparts from lower SES schools (Table 12). In other words, the respondents from higher SES schools felt as though the elements on their school ground were more adequate than the respondents from lower SES schools. Six of these differences are significant (Table 12).

Discussion

Researchers who have investigated the design of school grounds assert that a diversity of spaces must be found on school grounds if their play and learning potential is to be realized (R. C. Moore, 1989a; R.C. Moore & Wong, 1997; Stine, 1997; Titman, 1994). Further, they contend that no one type of space is more important than another. In order for a school ground to be fully effective, they suggest that all types of spaces must be found. Do adults associated with greening projects agree with the researchers?

When asked to evaluate the importance of the spaces on an exemplary green school ground, the respondents ranked the all of the spaces as being 'fairly' to 'very important' (Table 9). The perceptions of importance were only moderately influenced by the respondents' level of

interest (Table 10). Principals, teachers and parents felt that a diversity of spaces is important²⁴ and this belief was held not only by those who are actively involved with and invested in the greening project. Irrespective of their role, level of interest, level of involvement or gender, respondents agreed with researchers' suggestions that a diversity of spaces was important.

Respondents reported that many spaces on their own school grounds were inadequate (Table 9); indeed the only two spaces that were deemed adequate were open green space (Space #1) and hard surface play spaces (Space #2). It should not, upon reflection, come as a surprise that the one space that respondents from lower SES schools did rank slightly higher than their counterparts was Space #2 (hard surface play spaces for sports and games). These spaces are the conventional spaces that make up the majority of school grounds (regardless of SES) that were built with an emphasis on containment and security. These spaces are well represented in the majority of schools, and while they are important venues for facilitating certain activities, they fail to meet other needs, such as the need to be alone or in small groups, or the ability to make meaning with moveable objects (R.C. Moore, 1996). This perception did not really vary as a function of respondents' role, involvement, interest, or gender, or the length of the greening project.

These findings suggest that many of the TDSB school grounds, while having initiated greening initiatives, have not reached their potential. Irrespective of the length of time since the greening project began, respondents indicated that the majority of space types were still inadequate. This is interesting in that one might expect respondents to paint their own schools in an overly positive light because of their commitment to greening, yet most indicated there remained much room for improvement.

Perceptions of school grounds did differ in significant and arguably troubling ways between schools in different socio-economic regions. Consistently, respondents from lower SES schools ranked the importance of various spaces on an exemplary yard higher (Table 11) and the

²⁴ In asserting that the respondents in this study are aware of a *diversity* of spaces on green school grounds, I am aware of a potential flaw inherent in the design of this study. Given that all respondents answered all 14 questions positively, I am tentatively extrapolating that they are saying they want a diversity of spaces. But, if the questionnaire had only included, for example, 3 spaces, and the respondents had answered just these three questions positively, would that then mean they did not like a diversity of spaces? And, suppose the questionnaire had contained 100 space types, one could argue that they prefer even *greater* diversity. The value of such questions is certainly realized, but for the purpose of the present research, the findings are interpreted to mean that their positive responses indicate a support for diverse environments, particularly for the 14 space types profiled herein.

Table 11 Importance of Space Types by Socio-economic Status

Importance of Space Type	SES Extreme ^a					
	High			Low		
	N	M	SD	N	M	SD
1. Open green spaces	61	3.90	0.351	49	3.91	0.389
2. Hard surface play spaces for sports and games	60	3.70	0.591	49	3.82	0.441
3. Manufactured equipment and play structures	60	3.30	0.944	48	3.56	0.769
4. Loose elements to support active play	61	3.66	0.680	49	3.61	0.731
5. Elements that support creative play	60	2.75	1.052	48	2.79	0.798
6. Build elements to support learning	60	3.38	0.739	49	3.43	0.707
7. Natural elements to support learning	61	3.52	0.766	49	3.63	0.636
8. Places for individuals/pairs to find refuge	61	3.31	0.807	49	3.55	0.679
9. Small group gathering spaces	60	3.40	0.807	49	3.49	0.767
10. Class size gathering spaces	60	3.55	0.723	49	3.76	0.596
11. Larger than one class group gathering areas	59	3.27	0.925	49	3.43	0.791
12. Areas that are shaded	61	3.88	0.370	49	3.89	0.484
13. Areas that are sheltered from wind	61	3.44	0.807	49	3.63	0.636
14. Areas that are sheltered from rain and snow	61	3.134*	0.922	49	3.45*	0.709

Note. Levels of importance were based on a 4-point scale (1=not at all important, 2=not very important, 3=fairly important, 4=very important).

^a The socio-economic ranges (0 = highest; 1 = lowest) included in these analyses are the extreme 'thirds': High (0 – 0.33) and Low (0.66 – 1).

*t(108) = -1.98, p = 0.049

Table 12 Adequacy of Space Types by Socio-economic Status

Adequacy of Space Types	SES Extreme ^a						<i>t</i>	<i>df</i>	<i>p</i>
	High			Low					
	N	<u>M</u>	<u>SD</u>	N	<u>M</u>	<u>SD</u>			
1. Open green space	60	3.52	0.567	49	2.96	0.975	3.776**	107	0.000
2. Hard surface play spaces for sports and games	59	3.12	0.811	49	3.14	0.736	-0.161	106	0.872
3. Manufactured equipment and play structures	58	2.69	1.188	48	2.58	0.919	0.507	104	0.613
4. Loose elements to support active play	59	2.93	0.763	49	2.41	0.840	3.396**	106	0.001
5. Elements that support creative play	57	1.40	0.704	49	1.27	0.700	1.010	104	0.315
6. Build elements to support learning	59	1.90	0.941	49	1.57	0.791	1.930	106	0.056
7. Natural elements to support learning	59	2.54	0.988	49	1.88	0.881	3.654**	106	0.000
8. Places for individuals/pairs to find refuge	59	2.36	0.905	49	1.92	0.909	2.496*	106	0.014
9. Small group gathering spaces	59	2.56	1.038	49	2.06	0.966	2.561*	106	0.012
10. Class size gathering spaces	59	2.60	1.025	49	2.27	0.995	1.723	105	0.088
11. Larger than one class group gathering areas	57	2.60	1.163	49	2.41	0.998	0.887	104	0.377
12. Areas that are shaded	58	2.33	0.998	49	2.10	0.941	1.195	105	0.235
13. Areas that are sheltered from wind	58	2.09	0.978	49	1.73	0.785	2.024*	105	0.046
14. Areas that are sheltered from rain and snow	59	1.56	0.726	49	1.45	0.647	0.826	106	0.411

Note. Levels of adequacy were based on a 4-point scale (1=not at all adequate, 2=not very adequate, 3=fairly adequate, 4=very adequate).

^a The socio-economic ranges (0 = highest; 1 = lowest) included in these analyses are the extreme 'thirds': High (0 – 0.33) and Low (0.66 – 1).

p* < 0.05 *p* < 0.01

adequacy of various spaces on their own yard consistently lower than their counterparts (Table 12). Perhaps the difference in perceptions of importance are related to the fact the school ground may be one of the few places where young people are provided with opportunities to play freely, to experience nature, and to have quiet time outdoors. It is plausible that in lower SES communities, where having a variety of spaces is valued more than in higher SES communities, the potential for green school grounds to assume vital roles in children's development is even greater than in higher SES communities (see for example, Chawla, 2002b; J. L. Thomson & Philo, 2004). In these lower SES schools, perhaps implementing even small changes would make a world of difference to an otherwise impoverished natural environment. Other researchers have conjectured that small changes in already disadvantaged communities can make notable differences (e.g., Coley et al., 1997; Kuo, Sullivan et al., 1998). Coley, Kuo, and Sullivan (1997), for example, explored the impacts of natural elements on social relations in low income housing developments and found that minor changes to the landscape had significant impacts on the residents. They attest that "for people who live in often barren inner-city neighbourhoods, planting a few trees may make a world of difference" (p. 492). Perhaps the same holds true for school ground design.²⁵

The finding related to the difference in adequacy of school grounds between schools with differing SES's should not be overly surprising. Even if respondents indicated they valued a schoolyard replete with diverse spaces, if a school community is facing other challenges, school ground design may not necessarily be a top priority. Further, given that greening initiatives are financially supported through fundraisers, grants and donations, schools in more advantaged communities are likely better situated (Wyzga, 2001).

Some innovative educators have learned to capitalize on the troubling relationship found in my study between the adequacy of a school ground and SES. Martil-de Castro (1999), for example, reflected upon her experiences as a teacher working within a lower SES school in the TDSB. Despite the fact that a modest greening project had been initiated (tree and garden), Martil-de Castro found that the inadequacies of the remaining part of the school ground and the surrounding landscape provided an ideal venue for learning about the environment, class, and race. She writes,

²⁵ I am moderately troubled by some of these claims (Coley, Kuo & Sullivan, 1997) and wish to clarify that I am not arguing that it is acceptable that schools in lower SES communities should only have meager changes. They should not be satisfied with only slight changes. Such an assertion would, of course, on my part, feel somewhat patronizing. Ideally, issues of class would not assume a role in greening initiatives.

At first, I thought that the lack of visible biological diversity in our school's urban environment...would greatly limit my efforts to integrate environmental education into the curriculum. Ironically, the lack of visible species in our community actually helped my students and myself create a tremendous amount of knowledge. I was provided with opportunities to introduce issues of equity and environmental justice as I revealed there are many communities in our city that are not located near major roadways and factories. We explored class and race issues in relation to environmental degradation and health concerns. (p. 15-16)

School ground greening needs to be considered and evaluated through multiple lenses within a critical environmental education framework (e.g., race, class, gender) and the important issue of class has just been discussed here.

Section Summary

To sum, in this section of my dissertation, I explored the specific design elements of greening initiatives. Important findings emerged that point to a relationship between school ground design and SES. This was a theme that emerged on several other occasions throughout my research. Having described the school ground greening projects, I now turn to a more in-depth exploration of the process of greening.

PROCESS OF GREENING SCHOOL GROUNDS

(Objective 1C)

Questionnaires

With a view to having an understanding of who was involved in various phases in the process of school ground greening in the TDSB, questionnaire respondents were asked to reflect on the process of greening at their school. They were asked to indicate the original motivators, levels of involvement of various individuals throughout the greening process, as well as who donated the most volunteer time. I begin by presenting the results from the questionnaire followed by the results of the interviews, after which I will discuss both together.

Who Provided the Initial Impetus?

Respondents were asked to indicate the individual who, in their estimation, had provided the initial motivation to start the process of greening at their school. Given that each option was selected by at least one respondent, it appears that a wide array of individuals have been involved in initiating greening projects (See Table 13 for list of options and percentages). Teachers (41.8%), individual parents (22.6%) and principals (18.5%) were mentioned most often. A small percentage of respondents indicated that the parent teacher committee (8.2%), community members (2%), school board staff (2%), and students (1.4%) had provided the initial motivation. A small percentage of respondents (3.4%) reported that 'other' individuals (not listed on the questionnaire) had provided the initial motivation for the greening project; these included a local community restoration group (e.g., Friends of X Watershed), a graduate student, as well as the director of a daycare centre who works in the school.

Who was Involved?

All questionnaire respondents, except the uninvolved teachers, were asked to indicate levels of involvement in early and ongoing phases of greening of a variety of individuals on a 4-point Likert scale (1=not at all involved, 4=very involved) (See Table 14 for a list of possible individuals/groups). For the purposes of this question, examples were provided to illustrate 'initial phases' (e.g., designing, fundraising, initial planting) and 'ongoing maintenance' (e.g., weeding, watering in summer, harvesting).

Table 13 Individuals that Provided Initial Motivation

Individuals/Groups	%
Teachers	41.8
Individual parents	22.6
Principal	18.5
Parent teacher committee	8.2
Other	3.4
Community members	2.0
School board staff or trustees	2.0
Students	1.4

Note. N=146 respondents.

Table 14 Involvement of Individuals During Initial and Ongoing Maintenance Phases

Individual	Initial			Ongoing		<i>t</i>	<i>df</i>	<i>p</i>
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Students	97	3.27	0.822	3.04	0.910	1.957	96	.053
Teachers	98	3.37	0.831	2.96	0.924	4.768**	97	.000
Individual parents	96	3.20	1.094	2.75	1.217	4.121**	95	.000
Parent teacher committee	97	2.84	1.098	2.25	1.058	5.370**	96	.000
Community members	97	2.48	1.034	1.93	0.992	6.616**	96	.000
Principals	97	3.39	0.755	2.72	1.067	7.445**	96	.000
Custodial staff	97	2.87	0.896	2.62	0.973	2.738**	96	.007
School board ground maintenance staff	95	2.67	1.006	1.99	0.965	6.872**	94	.000
Other school board staff or trustees	83	1.98	1.023	1.39	0.682	5.584**	82	.000

Note. Level of involvement was based on a 4-point scale (1=not at all involved, 2=not very involved, 3=somewhat involved, 4=very involved).

***p* < 0.01

Initial Phases

Respondents indicated that all individuals, except school board staff and trustees, were involved, to some degree, in the initial phases of greening projects. The individuals receiving the highest ranking for involvement included principals ($M = 3.39$), teachers ($M = 3.37$), students ($M = 3.27$) as well as individual parents ($M = 3.20$). School board staff/trustees were reported as being less involved in the initial phases of greening projects ($M = 1.98$).

On-Going Maintenance

Respondents were then asked to indicate the level of involvement for individuals during ongoing maintenance. Respondents indicated that students ($M = 3.04$), teachers ($M = 2.96$), individual parents ($M = 2.75$), principals ($M = 2.72$) and custodial staff ($M = 2.62$) were the most involved. Several individuals were reported as being not involved in the ongoing projects, including school board ground maintenance staff ($M = 1.99$), community members ($M = 1.93$), as well as school board staff/trustees ($M = 1.39$).

When comparing levels of involvement between initial and ongoing phases, paired samples t-tests indicate that all rankings for ongoing phases are significantly lower than initial phases (Table 14). In other words, the respondents reported that individuals were significantly less involved during the ongoing phases than during the initial phases.

Who Provided the Most Volunteer Time?

Involved teachers and parents were asked to indicate the three individuals that had donated the most volunteer time throughout the entire greening project. Teachers (25.8% of responses), students (22.3%), and individual parents (21.8%) were listed as key volunteers (Table 15). Respondents indicated that the individuals that donated the least amount of time included school board staff/trustees (1.5%), school board ground maintenance staff (1.5%), community members (3.9%), as well as parent teacher committee members (4.4%).

Involvement and Independent Variables

I was interested in knowing if respondents' perceptions of involvement were influenced by a number of independent variables, such as the respondent's role (e.g., principal, involved teacher, uninvolved teacher, parent), level of involvement, level of interest, and gender. I was also interested in knowing if perceptions of involvement varied among projects that had been in

Table 15 Volunteer Time Donated by Individuals/Groups

Individuals	%
Teachers	25.8
Students	22.3
Individual parents	21.8
Principal	12.2
Custodial staff	6.4
Parent teacher committee	4.4
Community members	3.9
School board ground maintenance staff	1.5
Other school board staff or trustees	1.5

Note. N=72 respondents (only involved teachers and parents responded to this question).

existence for different amounts of time (i.e., new projects vs. old projects) as well as the socio-economic status of the community.

The independent variables of role, level of involvement or level of interest did not influence perceptions of involvement during initial and ongoing phases of the project. In other words, there were no significant differences between how the principal/involved teacher/uninvolved teacher/parent (role), how those were involved/not involved (level of involvement), or how those were interested/not interested (level of interest) reported the involvement of individuals.

Slight differences were detected for perceptions of involvement during initial and ongoing phases as a function of gender. On four occasions, significant differences were found: women reported that the involvement of the principal (during initial and ongoing) and custodial staff (during initial and ongoing) was significantly higher than the men reported (Table 16). When I explored the effects of length of program (more than 5 years vs. less than 5 years), two significant differences emerged: individuals who had been involved with programs that had been running for more than 5 years reported significantly more custodial staff involvement (initial phase) and significantly less parental involvement (ongoing phase) than those respondents from programs running less than 5 years (Table 16).

I was also interested in knowing if perceptions of involvement would be influenced by the independent variable of socio-economic status. I thus performed a series of independent samples t-tests to evaluate the difference in perceptions of involvement between respondents from high (0 – 0.33) and low (0.66 – 1) SES school communities. Significant differences related to perceptions of the involvement of parents and community members, during initial and ongoing phases of greening, were found: respondents from higher SES schools reported their involvement to be higher than respondents from lower SES schools (Table 17). This relationship persisted, although not significantly, for students during initial and ongoing phases, as well as for principals and teachers during ongoing phases.

Table 16 Initial and On-Going Involvement of Individuals by Gender and Length of Program

Individual	<u>Gender</u>						t	df	p
	Female			Male					
	N	<u>M</u>	<u>SD</u>	N	<u>M</u>	<u>SD</u>			
Principal (Initial)	83	3.49	0.687	16	2.94	0.929	2.792**	97	0.006
Principal (Ongoing)	86	2.83	0.867	16	2.21	0.964	2.323*	104	0.022
Custodial (Initial)	87	2.92	1.059	19	2.44	0.976	1.990*	98	0.049
Custodial (Ongoing)	86	2.78	0.963	19	1.95	0.705	3.555**	103	0.001

Individual	<u>Length of Program</u>						t	df	p
	< 5 yrs			> 5 yrs					
	N	<u>M</u>	<u>SD</u>	N	<u>M</u>	<u>SD</u>			
Custodial (Initial)	57	2.72	0.901	32	3.19	0.821	1.990*	98	0.049
Parent (Ongoing)	57	3.00	1.134	35	2.49	1.245	2.034*	90	0.045

Note. Level of involvement was based on a 4-point scale (1=not at all involved, 2=not very involved, 3=somewhat involved, 4=very involved).

*p < 0.05 **p < 0.01

Table 17 Initial and On-Going Involvement of Individuals by Socio-economic Status

Individual	SES ^a						<i>t</i>	<i>df</i>	<i>p</i>
	High			Low					
	N	<u>M</u>	<u>SD</u>	N	<u>M</u>	<u>SD</u>			
<u>Initial Phases</u>									
Students	40	3.33	0.888	36	3.06	0.791	1.390	74	0.169
Teachers	41	3.34	0.794	36	3.36	0.931	-0.100	75	0.921
Individual parents	40	3.58	0.844	35	2.74	1.197	3.614**	73	0.001
Community members	40	2.78	1.000	36	2.28	1.085	2.079*	74	0.041
Principal	40	3.43	0.712	36	3.47	0.696	-2.920	74	0.771
<u>Ongoing Phases</u>									
Students	44	3.07	0.873	38	2.82	0.865	1.310	80	0.194
Teachers	44	2.98	0.762	38	2.89	0.981	0.428	80	0.670
Individual parents	43	3.19	1.139	37	2.43	1.168	2.916**	78	0.005
Community members	44	2.30	1.091	38	1.74	0.891	2.552*	79	0.013
Principal	44	2.89	1.017	38	2.61	1.028	1.242	80	0.218

Note. Level of involvement was based on a 4-point scale (1=not at all involved, 2=not very involved, 3=somewhat involved, 4=very involved).

^a The socio-economic ranges included in these analyses are based on the Learning Opportunities Index (0 = highest; 1 = lowest). The extreme 'thirds' were analyzed in this question: High (0 – 0.33) and Low (0.66 – 1).

* $p < 0.05$ ** $p < 0.01$

Follow-Up Case Studies

When I performed the follow-up case study interviews at the five schools, I was able to gather a much more rich, textured, and complex ‘story’ of the process of school ground greening at each of the five schools. These findings helped to expand my understanding of not only who was involved in greening initiatives, but how they were involved. In the following section, I discuss the involvement of students, parents, teachers, principals, and the Toronto District School Board (TDSB).

Student Involvement

Questionnaire respondents had indicated that students were assuming important roles in selected aspects of the greening initiatives in this study. They reported that while students were almost never responsible for providing the initial motivation for the greening projects (Table 13), they were quite involved in the initial and ongoing phases of the project (Table 14) and they did provide a large amount of volunteer time (Table 15). Case study interviewees support aspects of these findings, but I also found some discrepancies between the two data sets. The interviewees reported that students were involved to varying degrees throughout the stages of school ground greening: problem identification, visioning and design, fundraising, planting, and maintenance. I will use these stages as a framework for discussing student involvement.

At all five case study schools, all interviewees indicated that students were not involved in the problem identification phase of greening at any of the five schools (i.e., “Is there a problem with the school ground being all asphalt and manicured grass?”) and claimed that this was done by adults at the school (e.g., teachers, parents, principals). This finding is consistent with the questionnaire in which respondents indicated that students were almost never involved in providing the initial motivation for the project (Table 13). When I probed interviewees as to *why* the students were not involved in this phase, many reasons were offered. Several suggested that they were too young to realize that “things could be different” (Parent, School A). Another parent contended that “at that age, you just accept what you have...you never question things” (Parent, School B). One principal who was concerned about time and curriculum demands indicated “it would take too long to get them to do that” (Principal, School D). Time pressures, in terms of funding application deadlines, also seemed to constrict the amount of student involvement in the early phases. An involved teacher indicated that her students weren’t involved in the early phases of the process of greening because “we found out about a proposal at the beginning of February and we had to have it in by February 19th. So we just rushed through

the visioning process...I thought that we'd just apply for this, we'll ask for this and this and go from there...get the students involved once we have more money" (Teacher, School C).

At all of the schools, students were involved in contributing design ideas. Schools used a number of different techniques for gathering student ideas. At one school, students were asked to complete surveys with their parents. At another school, student representatives elected to a Student Council sought design ideas from their own classes and then worked to generate a vision for a new school ground. At three of the schools, students were asked to create maps and drawings of their ideal school ground. It appears that student ideas were thus sought out and seriously considered during the design phase of the projects. Again, this finding is consistent with the questionnaire data (Table 14). Once the design ideas were solicited, however, committees comprised of adults always made the final design decisions.

Adults did the large majority of fundraising and planning for the projects in the case study schools. It appeared as though many of the interviewees shared the following principal's perspective on children's interest and ability to be involved in such activities: "When you consider that they are young children and they don't really care to know about a lot that goes into writing grants, organization or ideas...That, for them, might be a little boring" (Principal, School B). One involved parent, who had very little experience in organizing such an initiative, also indicated that when "adults are in over their heads" with fundraising and planning, "it is difficult to know how to include students" (Parent, School C). A notable exception is the grade 5 class at School A that were actively involved in raising funds through a partnership program with a Financial Institution's "Business Entrepreneur Program." This class made presentations about the greening project to approximately 25 corporations in the city. They were extremely successful and raised \$30,000!

Students were involved in the actual plantings at all five of the case study schools. At some schools, the planting occurred over a very short period and the entire student body was involved. A parent from School A reminisced how the plantings occurred over the course of one week: "The students planted all the trees throughout the week...they went out and took each class at a time and picked the tree that they wanted and planted them and then watered them for the rest of the year." At other schools, the planting occurred over a longer time period and small groups of students were involved throughout the process. Despite the reported active student involvement in planting, it appears as though sometimes student involvement in the planting was actually quite regulated and overshadowed by adults' interests. During the interviews, a parent recalled "Sometimes, I get particularly bad tempered with all these children around, because they won't do what I wanted them to do" (Parent, School B). Another teacher recalled her frustrations

in having the students involved in the plantings, “I’ve gone back on the weekends a few times, and moved their plants around...I just didn’t have the heart to tell them at the time, but I really couldn’t just leave them that way” (Teacher, School C).

In terms of maintenance of the greening projects, it appears that students are involved to varying degrees. At two of the schools, students can join clubs that help to maintain the garden (e.g., Garden Club, Environmental Club). At two other schools, students are less involved with the maintenance and this responsibility is assumed by adults (e.g., teachers / parents / principal). At these schools, students can help the adults if they like, but there is no formal club. At one of the schools, a principal expressed concern about that the maintenance of the garden could get in the way of formal teaching that should be done in the school, noting that “There’s too much for children to weed. There is just the time that... if one were to devote the time in the curriculum to doing what needs to be done, it’s a saw-off from other things that are needed to be done” (Principal, School C). This contradicts the information gathered through the questionnaire that indicates that students were quite involved in maintenance (Table 14).

In reflecting on student involvement in the greening initiatives, some interviewees noted that students who were involved in the greening project took tremendous ownership over their work. The principal from School B stressed the importance of including her students in the process of greening:

We’re continually involving the students; it’s part of our culture. And we ask the kids for their opinion, we ask for their ideas, then they bring them back to the class council meeting and they discuss them, and come up with a proposal or their preferences. And we try to act on that as much as we can, because it’s only with ownership that they’ll take responsibility. (Principal, School B)

In addition to gaining ownership for and empowerment from the projects, some interviewees also noted that when students are involved in the greening project, they learn about the power of collective action. The principal from School E suggested that:

It shows them that when they put their minds together and lean shoulder to shoulder into the task, that they can accomplish just about anything... that they can take something that looks like a wasteland and turn it into something that’s not just something aesthetically attractive but something that actually has a purpose and return it to a useful state. (Principal, School E)

All of the upper level administrators within the TDSB with whom I spoke were aware of the important role students could assume in the process of greening. In my analysis of the interviews, I found that they often had more understanding of the importance of including students throughout the process of greening as illustrated by their expressed concern about the limited amount of authentic student involvement. Bruce Day, Grounds Team Leader for the TDSB, for example, notes:

When you're talking about outdoor classrooms or outdoor environments, the kids need to be involved from day 1. What is it that the kids are looking for? What features would they like to have? But that doesn't mean that that's what they're going to get, but you need to brainstorm that. And if you can help them to get some of the features that they're looking for, they should be involved in that. But the kids need to be involved in it. If they have a bit of a say as to what's going on in their school grounds, then I'll think you'll have less vandalism, less garbage thrown around, less clutter and waste, so I think that's an important piece of this puzzle... that in a lot of cases parents or teachers may miss... because this is the Board of Education, this is not somebody's back yard... and we're all here ultimately for the children. It's a learning location. And if the kids are not involved in it, why are we doing it? What is the reason for this pretty garden? Does it serve any purpose?

Heidi Campbell, who shares the joint TDSB-Evergreen position, also recognized the importance of authentic student participation and was concerned about the current amount of student involvement:

I'd like to see a higher level of student participation in all areas actually. To start, they should be involved with the idea generation, the brainstorming. I see them involved a little bit with the designs, I'd like to see them more involved with the designing, and at the committee level I'd like to see more of their ideas and them actually at the committee meetings... or their student reps at the committee meetings for these projects. I also think there's difficulty with the timelines that people get because of the grants, etc... they get kind of into this thought pattern of "I've got to get his done this year". So it becomes this race to get the ideas. But this frame of mind often leaves out students. (Heidi Campbell, Joint TDSB-Evergreen Position)

One TDSB administrator, however, was not so convinced about the importance of student involvement, raising an issue that may explain some of the limited student involvement. He expressed concern over the fact that if students are involved in the process of greening and the initiative is not successful, then the ramifications of their 'mess up' are not easy to fix. He explains:

For a lot of teachers and educators, it's the process that counts. But then there's also the product, the design. And that's partly where we get into trouble in School Ground Greening. It occurred to me a while ago that when kids do a play or when they do art at their school or when they do whatever, process is key... you don't care as a teacher about the product so much. Kids can make a huge mess as long as they learn a lot and that's what counts. But those things, when it's over you clean it up and it's over. And what you have left over is the memory of the great process and what the kids learned. The problem with School Grounds Greening is you can have a fabulous process but if the design is lousy and it's a mess, everybody sees it as a mess... and people didn't see it, like the parents, the neighbours didn't see the process and they don't appreciate it, or 2 years later nobody remembers the great things that happened, it just looks like a mess... so there's something inherent about physically changing the grounds and it's concrete, it works against the whole greening thing, because with kids, how are you going to compete with a beautifully landscaped public park or something? (TDSB Employee)

Based on the results of both the questionnaires and case study interviews, it appears that while students in this school board contribute a considerable amount of time and labour to the

actual project, they are not overly involved with problem identification, visioning, or planning phases of greening. I would thus argue, as others have, that much room exists for students to become more involved in earlier phases of the greening projects. While it is laudable and important to include them in the designs, actual plantings and maintenance, much is being lost when they are not involved in earlier phases, particularly the problem identification phase (Dyment, 2004; R. Hart, 1997; Mannion, 2003).

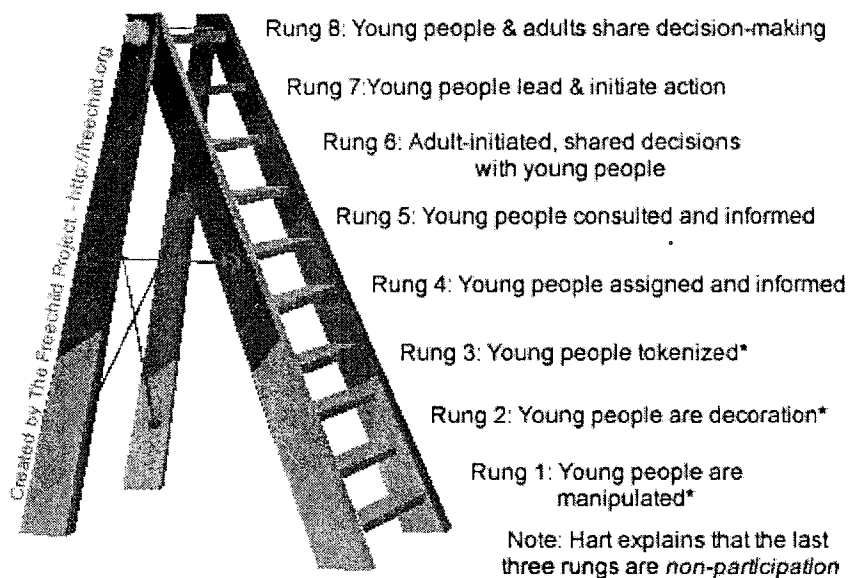
In R. Hart's (1997) "Ladder of Participation," he describes 8 'levels' of participation, ranging from 'Manipulation or Deception' (the lowest 'Rung #1' on the ladder) to 'Child Initiated, Shared Decisions with Adults' (the highest 'Rung #8' on the ladder) (Figure 1). In reflecting upon the questionnaires and interviews, it seems as though there are a range of 'rungs' represented. At some schools I found elements of 'Manipulation or Deception' (Rung #1) whereby, as R. Hart (1997) describes, "an adult designs a garden, has children carry out simple planting, and then tells journalists and photographers that the children designed and built the garden" (p. 40). For example, at School A, I found that the project was almost entirely adult driven (this will be described in much more detail in the next section). At other schools, I found elements of 'Tokenism' (Rung #3), whereby adults are interested in giving children a voice, but have not "begun to think carefully and self-critically about doing so" (R. Hart, 1997, p. 41). This level of participation emerged at School E, whereby the teachers utilized the 'language' of authentic student inclusion, but lacked the skills to meaningfully facilitate their involvement. The highest level of participation that I found to be occurring in the five schools profiled in the follow-up case studies was 'Consulted and Informed' (Rung #5). For example, at School B, students evidently understood the nature of the project, their opinions were seriously considered, and they were kept abreast of developments.

It thus appears that while students in this selected board are involved, to a degree, in school ground greening initiatives, room exists to broaden the scope of their involvement. Additional 'rungs' on R. Hart's ladder include 'Adult Initiated, Shared Decisions with Children,' 'Child-Initiated and Child-Directed,' as well as "Child-Initiated, Shared Decisions with Adults' (Rungs #6 - #8 respectively). The Toronto District School Board and Evergreen have a vital role (and a unique opportunity) to assume in enhancing young people's involvement in school ground greening. As it currently stands, much of what was reported is quite discouraging in light of the possibilities that exist to include young people (e.g., see Hart, 1997 for an inspiring read on youth participation).

Figure 1. Ladder of Participation

(adapted from R. Hart, 1997)

Roger Hart's Ladder of Young People's Participation



Adapted from Hart, R. (1992). *Children's Participation from Tokenism to Citizenship*. Florence: UNICEF Innocenti Research Centre.

Student participation in greening initiatives in the TDSB can also be analyzed and explored by using frameworks other than Hart's Ladder of Participation (1997). For example, emerging out of Jensen and Schnack's (1997) action competence work, Jensen (2000) has developed a matrix of participation that is slightly more sophisticated than the Ladder framework, in that it highlights how the level of student participation may vary at different stages of a project. It is also a helpful tool for discussion and evaluation that makes many implicit assumptions about participation more visible. Jensen acknowledges, for example, that it may not be appropriate or possible for students to be involved in some phases of initiatives, while in other phases, they may be the primary drivers and decision makers. When the student involvement reported in this study is analyzed in light of Jensen's matrix, once again, it becomes clear that students in this school board are not involved nearly as much as they could or should be throughout the greening initiatives (Table 18).

There are numerous reasons why students are not involved in more authentic ways in the greening projects profiled in this study. Chawla (2002a) summarized some of the challenges that she found limited young people's involvement in authentic planning processes, noting the following perceived barriers: time constraints; a poor understanding of child's capabilities; a belief that adults can adequately represent the perspectives of children; a belief that children are unskilled and unreliable; a lack of understanding as to how to facilitate participation; as well as a fear of politicising children, etc. It appears that many of these barriers were also present for the questionnaire respondents and interviewees in my research.

Additionally, one needs to look at the culture of schooling. Weston (1996), discussing the potential implications of the deschooling movement for environmental education, notes how schools have little room for anything beyond pre-ordained, teacher-directed activities (see also Hargreaves, 2003). It should be no surprise, then, that more participatory approaches face challenges. As Robottom and Sauvé (2003) assert, a common problem for participatory research (and environmental education generally) is the instrumentalist framework of schooling; how does one foster greater participation within the context of the status quo of technocratic rationality? Lousley's (1999) study of Environment Clubs in the Toronto District School Board demonstrated this well. Schools were wary of controversy, and teachers and administrators in her study desired

Table 18 Student Participation in Various Phases of Greening Initiatives

(adapted from Jensen, 2000, forthcoming)

	Involved or Not	Problem Identification	Visioning and Designing	Fundraising	Planting	Maintenance
Students suggest / Common decisions						
Students suggest / Students decide						
Teacher suggests / Common decisions			X		X	X
Teacher informs / Students accept or reject	X			X	X	X
Teacher decides / No room for student influence		X				

Note. Some of the phases of greening contain more than one 'X', to reflect the range of responses across the schools profiled.

to “depoliticize” the activities of any of clubs which dared stray too far from banal efforts such as recycling paper in the school. (See also Whitehouse (2001) for a description of the ways in which a group of students, too, were wary of being seen as overly political).

While school ground greening, at first glance, hardly seems radical, it’s potential to disrupt anthropocentrism (Bell & Russell, 1999) and to encourage greater participation of students suggests that, as with Lousley’s Environment Clubs, there are likely to be efforts to depoliticize the movement. Planting trees in a preordained location is one thing; students identifying for themselves their unhappiness with various aspects of schooling, such as being imprisoned indoors for large periods of time, is quite another. Feminist poststructuralism may offer interesting insights here (Barrett, forthcoming; McKenzie, in press). Rather than envisioning hordes of conservative teachers zealously squelching any sign of “real” participation by students, or conspiratorially allowing students “token” participation whilst maintaining control, it is perhaps more helpful to look at the way the very discourses of schooling constrain certain possibilities (see also Dymont & Reid, forthcoming). How might understanding of what constitutes “authentic” and “democratic” participation, “agency” and “empowerment” differ in the discourses of schools and the discourses of participatory forms of environmental education?

In sum, the work of Hart (1997), Hunter et al. (1998), Moore and Wong (1997), as well as Titman (1994), provide compelling evidence that increased student involvement in all aspects of a greening initiative will generate numerous benefits for the students, the school community, as well as the greening project. Future research on the nature of student involvement in community and environmental issues is clearly warranted. Research must continue to explore the factors that limit and enable student participation, to examine the skills needed by educators who want to adopt participatory approaches, and to appraise the role that could be assumed by a school board in creating a board-wide culture that endorses authentic student involvement.

Teacher Involvement

Analysis of the questionnaires revealed that teachers are heavily involved in many of the greening projects featured in this study and they emerged as a dominant player in every process-related question on the survey. First, 41.8% of respondents indicated that teachers had provided the initial motivation for their greening projects (Table 13). Second, teachers were reported to be actively involved in both initial and ongoing phases of the greening initiatives (Table 14). Third, respondents reported that teachers donated the most volunteer time (Table 15). When tested for a possible relationship between SES and teacher involvement, no trend emerged: respondents from all SES groupings reported similar levels of involvement by the teachers (Table 17). Based solely

on the questionnaires then, it appears that teachers are playing a vital role in school ground greening initiatives. Teachers have been noted in the literature as being key players in ensuring successful greening initiatives (Grant & Littlejohn, 2001a; Kenny, 1996; Stowell, 2001). Grant and Littlejohn (2001a), in introducing their book on green school grounds, even go as far to assert that “pedagogical theories come and go, but everywhere and always it is innovative and energetic teachers who are the real ground breakers in education” (p.vi).

In my analysis of the case study interview transcripts, the pattern of teacher involvement was not nearly so consistent. In contrast to the questionnaires that indicated teachers were heavily involved in the greening project, the case studies revealed that teacher involvement varied considerably among the five schools. It appeared that SES was, in fact, linked with teacher involvement: at schools with higher SES, teachers were noticeably less involved than teachers at schools with lower SES.

At two of the schools (School E and School C), teachers assumed absolutely vital roles in the process of greening and it would be fair to say that without their involvement, the projects would not be in the state that they are in right now. These schools were at the lower end of the SES spectrum. At School E, for example, teachers have been solely responsible for the project vision, planning, designing, fundraising and execution. An involved teacher there recalled how much work it has been: “This is a huge undertaking... just listing what we have done here and what we have planned... and this has been going on for 2 or 3 years... it is a huge undertaking” (Teacher, School E). Another teacher noted that “I started the committee; I wrote the funding applications; I planted the garden with parents and students; I organize weekend maintenance days; I am still looking for more money” (Teacher, School E). At School C, the situation is much the same with teachers assuming a vital role in the project. According to the teacher there with whom I spoke, several teachers used to be involved, but three have retired and another was moved to a new school. When I spoke with the remaining teacher who had an interest in greening, she was on maternity leave, and the project was very much suffering due to her absence.

At the opposite end of the spectrum of teacher involvement, at two of the other schools (School A and School B), teacher involvement has been very limited. These schools are also at the opposite end of the spectrum of SES: they are the schools from the highest two SES rankings. It is important to note that a lack of teacher involvement does not imply a lack of teacher support; quite the contrary, many felt that even where teacher involvement was limited, there was still support for the initiative.

Janet: How many teachers are involved in the project?

Parent, School B: None.

Janet: Is that a problem or is that okay?

Parent: I think it is a problem...I think they're philosophically or emotionally supportive of it. For example... pretty much all the teachers come to the Fall Festival and the Spring Fair and they donate money sometimes.

Janet: They're supportive of it but they don't play a leadership role?

Parent: They don't really help, no. In fact, not one bit.

At schools where teachers were not involved but were supportive, interviewees acknowledged that it did take considerable time to acquire their support. A parent at School A (where there has been little teacher involvement) described how teacher support took some time to generate: "At the very beginning obviously people [teachers] thought we were completely insane." She reminisced about the day that the students were brought to the gymnasium to help map the ideal school ground:

But just to show you the lack of support we were getting at that point from the staff... I'd asked the staff to provide their own writing materials for the mapping exercise, because it would have been really expensive for us to go out separately and purchase them, plus they were in the building. They showed up with nothing!!! Luckily, I arranged to have some entertainment that was great. I had an environmental singer come. I would have been dead in the water without this guy, because I had a sea of teachers looking at me with zero enthusiasm and a lot of antipathy. So that was round 1 with the staff. (Parent, School A)

At the final school (School D), where greening has been in place for the longest time, teacher involvement has varied considerably over time. During the initial phases in the early 1990's, when there was a very active parent community, teachers were quite uninvolved. Some teachers at the beginning were even resistant: "A lot of the teachers didn't like it. There was a lot of grumbling – 'What a waste of money - \$50,000 to plant trees, what a waste.' And the teachers were annoyed that they had to participate" (Teacher, School D). As the initial parent group that was responsible for the greening project moved on, teacher involvement has increased. Today, one teacher has really assumed, by default and necessity, a leadership role in the greening project. Very few parents are involved and the principal, while supportive, is brand new to the school. The involved teacher describes how her burgeoning role evolved:

I stuck it out with the garden. As the parents kept disappearing, nobody would do the Garden Committee. And I ended up saying 'I'll do this and I'll do that.' So there was nobody to take over the Garden Committee. So I felt so badly about it that I said I'd do it. So I became Chair of the Garden Committee. And initially we had envisioned it being parent-driven, but we couldn't get the parents. And then the parents all graduated... they did so much, they got it launched, it was well on its way, we did really well with that part of it, but the parents started drifting off. So when the parents all left... I remember coming on Sundays to water the plants....So I bungled along... we had Harvest Festivals. I remember coming out trying to do garden clean-ups, I'd be all by myself. A few people

would come out and then I'd end up there all by myself, putting the rakes away and thinking 'Why am I doing this?' There was always a few people who hung in but it was pretty hard. Now I'm seen as the expert on gardens...but really I've just stuck it out. It just takes one person to keep it going so that's why I've stayed around. It takes that one person that's still interested. And I guess that's me. (Teacher, School D)

Why are teachers assuming a vital role in facilitating the greening initiatives at some schools and not at others? At schools where few or no teachers are involved, many reasons were offered to explain their lack of involvement. Some individuals suggested that the newly revised provincial curriculum and the provincial standardized tests provided challenges ("I think the teachers are just in that overburdened place with the curriculum and the testing" Parent, School B). Others proposed that early career teachers were overwhelmed with their new responsibilities and couldn't possibly take on any new initiatives ("I've had young, brand new teachers come and volunteer and then within a month or two kind of fall to pieces and say 'I can't do it, I can only think of my classroom, I can't think of anything else'" Teacher, School D). Still others suggested that unrest in the work place (e.g., strikes, work-to-rule) has unsettled the teachers, making it difficult for them to get involved in extracurricular activities ("Last year, we had labour unrest and had restrictions... work-to-rule... so we had restrictions on what we could and couldn't do during the day" (Teacher, School E) and "There's been a war between the teachers and the Board of Education and the Harris government. And when you're in a state of war there isn't room for extras" (Teacher, School D)). Other respondents and interviewees speculated that school ground greening was another educational reform/fad ("Like many teachers, I have reached my saturation point for new initiatives!" Questionnaire respondent). Some suggested that teachers do not get involved because others are taking the lead ("I think that lots of teachers just take a step back because they can see there's so many other folks [parents] taking the lead" Principal, School B). Some also just felt overwhelmed with the increasing number of roles and responsibilities that teachers are expected to assume:

They keep piling more responsibilities on to us. Every time we turn around, they say that we have to do this and we have to do that. The teachers are sitting in the staff room saying "Don't ask me to do a single thing more." So when you say things [like] "Can we go clean up the garden?" Like, "What! Now I have to do the garden on top of everything else?" So before it was a fun thing to do and now it's "Oh my God, more work." (Teacher, School D)

A review of the literature suggests that the barriers cited by the teachers in my study are not unique to school ground greening initiatives; in Hart and Nolan's (1999) review of environmental education research between 1992-1999, they examine many studies that identify barriers to environmental education, including lack of support in terms of "funding, inservice, preparation time, and outdoor facilities and sites" (p. 24). Scott, Reid, and Jones (2003), in their

external evaluation of greening initiatives in the UK, also explore barriers that emerged for educators. They found that a key barrier to teacher involvement is lack of knowledge and expertise. Indeed, getting involved in the process of school ground greening does require a certain amount of knowledge – particularly if a teacher is expected to facilitate students successfully through the greening process. Scott et al. (2003) assert that “there is a requirement for some type of professional development training” (p.41) to provide teachers with the skills necessary to facilitate a greening initiative. Whilst there are professional development opportunities provided within the TDSB for teachers to gain skills about greening, teachers must seek out these opportunities outside of their work hours (i.e., the professional development is offered after school hours, not during professional development days).

It is interesting to ponder why teachers who are actively involved in the greening projects rarely mentioned these limiting factors. Hart and Nolan (1999) ponder similar issues related to teacher involvement in environmental education initiatives, noting from their own experience that “teachers choose to incorporate environmental education into their education programme based on internal perceptions rather than external constraints” (p. 25, see also Shuman & Ham, 1997). I suspect that this may be the case for the teachers who are actively involved in greening initiatives in my study. Somehow, the involved teachers find a way to negotiate the difficult terrain of curriculum demands, testing, and labour unrest to find time and energy for the greening initiative. And they manage to do this at a school already dealing with the challenges inherent in working in a community with a lower SES. It would be interesting to know if and how these teachers would be involved if they attended a school where there was someone else who would take the leadership role (or a higher SES school community?). Would they still be involved? Or would they direct their energies to some other program in the school that currently need someone to get involved? Are they simply the teachers that will help out with something – and if it weren’t the green school ground, it would be the band, the sport team, or some other extracurricular activity? Or, as Scott et al.’s (2003) research might indicate, are these teachers with already significant knowledge of and commitment to greening initiatives?

While it is consoling to realize that at some schools, at least one teacher was involved, some researchers warn against relying only on an individual teacher to keep the project alive (Kenny, 1996; Russell et al., 2000). Reflecting on school ground greening initiatives in Scotland, Kenny (1996) notes that the large majority of projects are initiated by teachers. She cautions, however, not to rely solely on one teacher:

Experience has shown that it is extremely important to involve all teachers, or as many as possible in the project to ensure its longevity. Too many projects have floundered or failed because only one member of staff was involved and they subsequently moved on

or lost enthusiasm. If a project is to be sustained year after year, then a sufficient proportion of the staff must be both enthusiastic and committed to the idea right from the onset. (p. 7)

Furthermore, when only a handful of teacher is involved, the opportunity for many teachers to develop a sense of ownership is limited. And as Stowell (2001) asserts, “the more ownership they feel, the more they will use the site as a teaching tool” (p. 17). If few teachers are involved in the actual process of greening the ground, then it is plausible that few teachers will actually have an interest in using the space as an outdoor classroom (see also Russell et al., 2000).

In the school board involved in my study, no compensation is offered to teachers who facilitate greening projects. They do not have reduced teaching loads or extra help in the classroom to compensate for their generous allocation of time to facilitating greening projects. Not surprisingly, then, despite their active involvement and apparent passion for greening initiatives, many involved teachers with whom I spoke reported difficulty in balancing their teaching and administrative responsibilities with the school ground greening initiatives. This balancing act is complicated by significant curriculum changes mandated by the Provincial government that have required teachers to modify their teaching approach and content.

The high level of teacher involvement at some schools should be a concern for administrators and the school board. Furthermore, the relationship that I found between teacher involvement and SES should also be a concern. Burnout is a real possibility for educators trying to balance their involvement in a greening program (and other extracurricular activities) with their teaching and administrative responsibilities (see Comishan, Dymont, Potter, & Russell, 2004; Horwood, 1995; Russell & Burton, 2000). If burnout is to be avoided, explicit efforts should be made to support teachers, particularly those teachers working in schools in lower SES communities.

Parental Involvement

The important and unique role that parents can assume in greening projects has been noted in the literature (Hunter et al., 1998; Stowell, 2001). Stowell (2001) argues that parents can make special and varied contributions to the greening process, such as stimulating their own children’s enthusiasm as well as bringing specific expertise in areas such as fundraising or design. My questionnaire respondents also reported that parents assume important roles in greening initiatives in the TDSB. First, 22.6% of respondents indicated that parents had provided the initial motivation for their greening projects (Table 13). Second, parents were reported to be actively involved in both initial and ongoing phases of the greening initiatives (Table 14). Third, respondents ranked parents third in terms of their volunteer time (Table 15). Fourth, when I

explored if and how SES influenced perceptions of parental involvement, respondents from higher SES schools reported significantly more parental involvement than their counterparts from lower SES schools (Table 17). Finally, while they were reported to be heavily involved in early phases of greening, respondents also indicated that they were significantly less involved in both initial and ongoing phases of greening for projects older than 5 years as compared to projects less than 5 years old (Table 16). Based solely on the questionnaires, then, it appears that parents are playing a vital role in school ground greening initiatives around the school board. They also seem to be assuming a larger role at schools in upper-middle class neighbourhoods.

I was able to gather, through my case study analysis, a clearer understanding of the role of parental involvement and how it varied among the five schools. Not surprisingly, parental involvement looked very different at each of the five schools and SES continued to relate to levels of parental involvement: at higher SES schools, parents appeared to be much more involved.

At two of the schools with the highest SES (School A and School B), parents were extremely involved and there was a general consensus that “You need a leadership person outside of the school administration to run this thing because they're [teachers and administrators] too busy” (Parent, School A). At one of these schools (School A), the initiative was driven almost entirely by one parent. While she does have a very active parent committee that supports her, she is very much the leader of the project. I asked her to describe her involvement:

It is intense, a lot of work, almost on a daily basis I'm working for that garden, it seems. It seems that way because if you're not actually gardening you're doing things like this, like talking about the project or planning for the future or doing research... you hear about something on a radio show and that takes you to the internet or to look up things, searching out funders. (School A, Parent)

At a second school (School B), there was a very committed group of parents that worked together on the greening project (no single parent assumed the leadership role). It seems that someone from this group of parents gives time almost on a daily basis to the garden project. One parent described that “Not a day goes by when we're not thinking about the garden and dealing with the garden in some way.” At School B, one of the parents, fondly known as Captain Compost, helps with the compost program every day on his way to work. He stops, turns the compost and often gives mini-lessons to the children in the winter.

At the schools with such active parent involvement, the dedication extends into summer (“We would be over there weeding all through the summer, and no children around, and whenever any of us had a minute we would go over there and weed” (Parent, School B)) and weekends (“I was actually driving by on Sunday and I saw both these dads out with their shovels

in the rain and they were mulching” (Parent, School A)). Dedication even appeared to persist once the children of the parents graduate from the school.

Janet: Will you stay involved when your last child moves on?

Parent, School A: I probably will but I'm extremely unusual in lots of ways.

Janet: Why will you stay involved?

Parent: Because I'm in the community. I'll stay involved weeding what I've done and I'll stay involved making sure mulch gets there, making sure it gets spread out... trying to keep the areas that we were responsible for tidy. But I'm very unusual for that.

I got the sense that at one of the schools (School A) with a very active parental community, there were aspects of competition amongst the parents and that an interest in greening the school ground extended beyond wanting to make a better and healthier space for young people. This emerged in the form of fundraising ‘competitions’ where the parents ended up “competing to see who could donate the most money” (Parent, School A). Here is a parent description:

The teacher had the kids phone their parents for interviews, so they went down to about 15 companies. The first one they went to was my dentist, and he gave \$1,000 bucks and that was great, we were thrilled, because it was one of the biggest donations we had. So then they went to my husband's company and he gave \$1,500. And my father-in-law matched it. So then when the kids went to subsequent businesses they knew... so we didn't get anything smaller than \$500.00 out of those parents. (Parent, School A)

I also sensed that one of the parent communities felt pressure to impress the other parents. For example, when I asked one parent why she had spent so much time on a certain task, she replied that “I'd just done it because I don't want the parents to see it looking a shambles” and that “if I don't get that done the parents are going to shoot me” (Parent, School A).

At another of the schools (School D), parent involvement has shifted considerably over time. In the early 1990's, when the project was just beginning, it was entirely parent driven. But then the parents moved on because “the cycles in the school are 6-year cycles. And the parents are involved for 6 or 7 years while the children are at the school. And then they leave” (Teacher, School D). Today, none of those original parents are involved and the project is almost entirely run by one teacher who has been there for the duration of the project. A teacher at School D recalls: “And then the parents all graduated... they did so much, they got it launched, it was well on its way, we did really well with that part of it, but the parents started drifting off. And there was no one left to do the work” (Teacher, School D). This assertion correlates with the findings in Table 16 whereby questionnaire respondents reported that parents were significantly less involved in ongoing maintenance of projects older than 5 years old as compared with projects less than 5 years old.

At the opposite end of the spectrum of parental involvement, there is little to no parental involvement in the greening courtyard program at School E. Interestingly, this is the school with the lowest SES as well. Many reasons were offered as to why parents were not involved. One teacher suspected that the cultural makeup of the student and community body explained why so few parents were involved. In a school where more than 73 countries are represented, it was postulated that language barriers might limit parental involvement. It was also thought that in many of the home countries of the students, it is common for parents to stay very removed from their child's education and only become involved if there is a problem. Furthermore, for many of these new Canadian families, "a lot of these parents are working 2 and 3 jobs... so it's very hard in this area to get parents to go above and beyond the call for extracurricular stuff. We don't put that pressure on them, we don't feel that's fair" (Teacher, School E). The small size of the courtyard was also given as a reason: "by the time you get a class or two into the courtyard quite frankly... it's not a big courtyard, there's not a lot of room for parents" (Principal, School E).

Even at schools with active parent groups, interviewees noted the challenges of parents working together. Time appears to be a barrier for most parents, so even at schools with an active parent group, active parents would like to see more involvement by other parents ("We have probably 25-30 families that are actively involved. And then, at most events, the participation rate is usually between 25 and 50% depending on the event. So it's always the same old people pulling the rope. So you get to a point of exhaustion" (Parent, School A)). Maintaining longterm commitment is also a challenge in working with parents ("One family in particular that was very active has a child here in grade 6 and has been extremely supportive all through, but is getting to direct their interests in other ways... older children going to other schools. One family that was particularly involved is no longer interested" (Principal, School C)). Another challenge mentioned is that some parents don't understand the value of having students involved (e.g., "I was particularly bad tempered with all these children around because they weren't doing what I wanted them to do" (Parent, School B)). Finally, it appears that some parents do not value the greening program and would rather see money directed towards other more academic initiatives ("I think a lot of people were sort of staggered by the idea that we had this money and weren't going to put in a computer lab or something else academic" (Parent, School E)).

It thus appears that the nature of parental involvement varies considerably among the five schools. The relationship that emerged in my research between SES and teacher/parent involvement is an important one to note, and one that, to my knowledge, has not been elucidated in the literature on greening initiatives. Put most simply, at schools with higher SES, parents are taking the lead and teachers are less involved. Conversely, at schools with lower SES, teachers

are taking the lead and parents are much less involved. Such findings beg me to consider the works of researchers who study issues related to social capital. Glover (2004), for example, explored if and how community gardens are “a social context in which social capital is produced, accessed, and used by a social network of community gardeners” (p. 143). Perhaps such an exploration is warranted in terms of school ground greening initiatives? Are school ground greening initiatives sites where social capital is produced, accessed and used? If so, is there equal access to and distribution of the capital? Or is there inequality in the social capital as a result of its distribution? In his own research, Glover (2004) found that there was inequity in the distribution of social capital amongst the members of the community garden as a result of their advantaged or disadvantaged structural positions. The very fact that higher SES schools in my study had active parent bodies involved suggests that these projects would necessarily have more access to the social capital (and other forms of capital) necessary to develop a successful project. For parents to have time to donate such a large amount of volunteer time, during school hours, it is likely that many of them are not working full time which leads me to suspect that they are financially secure. Conversely, in lower SES schools where teachers are assuming the leadership role in the greening initiatives, it seems to me that these projects would be able to access less social capital (and other forms of capital) because these teachers are juggling the project with their own teacher and other responsibilities.

Principal Involvement

The absolutely vital role that principals assume in the process of greening has been noted by many researchers (Hunter et al., 1998; Kenny, 1996; R.C. Moore & Wong, 1997; Stowell, 2001; Wyzga, 2001). Wyzga (2001) notes that principals are an “essential component of the [greening] team” and that they will often bring different perspectives and concerns to the planning table, such as “money, time, liability, parent participation, vandalism, and student behaviour” (p. 20). The questionnaire respondents and interviewees also noted these important roles. In the questionnaires, principals were identified as being one of the top three individuals that provided the initial motivation for the project (Table 13) and they also received the highest ranking in terms of involvement during the initial phases of the greening process (Table 14). Respondents did indicate that principals donated a modest amount of volunteer time relative to other individuals (Table 15) and that they were less involved in the ongoing maintenance stage of greening (Table 14). In my follow-up case study interviews, I was able to gain a deeper understanding of how principals were involved in the process of greening the school grounds.

Through my interviews, I realized that while principals' involvement varied considerably among the five schools, their involvement could essentially be categorized as either principals who had been involved in the project from the beginning, were knowledgeable, and were confident or principals who were transferred to the school during or after the greening process, were not necessarily knowledgeable, and lacked confidence about their own role in the space.

At three of the case study schools (School A, School B, School E), the principals had been working at the school for the entire duration of the greening process. At these schools, the vital role that the principals assumed in facilitating the process of greening was acknowledged by both the principal and the other interviewees (e.g., teachers, parents). To illustrate, the principal at School B acknowledged that:

It has to be something that the principal in the school believes in. And you can have lots of wonderful parents who are willing to do lots of work or lots of wonderful teachers willing to do lots of work, but if the principal isn't on board, then it's not going to work.
(Principal, School B)

Parents and teachers were also aware of the important role that the principal plays. A parent from School B commented that her principal "was there right from the beginning which made a dramatic difference, to just making the process flow. So that's great. I have a feeling she's very unusual, that she gets the whole thing and has the time and the patience."

Interviewees with supportive principals described the numerous roles that principals assumed before, during and after the greening process. They stated how principals:

- *Incorporate the greening project into the whole school philosophy* ("From when I started, I think the environmental part of the whole school has increased. It's everywhere...the curriculum, the philosophy...the principal has really made it a priority for our whole school" Parent, School B);
- *Balance the greening initiative with other school projects* ("The greening project also has to maintain the proper balance within the context of the rest of the school. It's important, but it's not everything. It is one aspect of the things that we do here. And as with any initiative, people who are really into it sometimes can't see that there other things that are as or more important in some cases. So part of my job is to make sure that the balance is maintained" Principal, School B);
- *Liaise with school board officials* ("He's there facilitating relationships with the Toronto District School board, making sure they know what is going on" Parent, School A);
- *Negotiate with the school board grounds department and the union issues* ("I had to remind the committee to follow all of the rules that the Toronto District School Board

has in place for work that is done here at our schools and on our grounds. I learned I have to keep a little closer eye on things. When you're dealing with a large organization, there are also sidebar issues related to safety, etc., and delivery times..."

Principal, School B);

- *Bring a committee together to achieve a common goal* ("And any good leader, whether it's a committee head or the principal of the school or teacher, has to be able to draw people together and help them focus on whatever the agenda is. And it's drawing a lot of different types of people together, to show them that they have the same values and beliefs, and to acknowledge and recognize their contribution. And it's part of my job in many different ways" Principal, School B);
- *Physically help the greening committee* ("You would come in to drop your kids off and there the principal would be, working in the garden..." Parent, School A);
- *Provide maintenance to the garden in the summer* ("In the summer, during the times that he's here, he checks on the courtyard and makes sure everything's okay...he waters it too" Teacher, School E);
- *Provide support for budgeting* ("She's been really supportive too when we've had plans to do things and when she has money from one budget left over, like a maintenance budget, she'll use it to pay for something... and the reserve for the green dollars can go towards ongoing other initiatives" Parent, School B).
- *Provide a longterm vision for design and sustainability* ("And while we're marching along I'm constantly saying 'sustainability... I don't want this to die. It can't just end when you as parents leave this school and I as a principal leave this school..." Principal, School B);
- *Mediate the interests of students, parents, teachers and the community* ("And sometimes I think some committee members have thought she's not so supportive, but always think she's speaking for 700 kids, 40 staff, a whole sector of administration on top of her... there's a lot of people that she's heard what they have to say along the way. So she has to say no sometimes. And then you think she's so blunt, but I think it's just from her vast experience – she knows that this won't fly because of this reason" Parent, School B);
- *Help with timing* ("Sometimes I have to say guys 'I want to slow down a little bit' or 'Who's going to actually pay for that?' 'Where are we going to get the money from?'" Principal, School B);

- *Encourage teachers to use the space as an outdoor classroom* (“Sometimes I suggest... ‘What do you think of doing your structured activity outside?’ And those teachers who are solid in their control of their children and comfortable and excited with those kinds of opportunities say, ‘What a great idea... didn't think about that!’” Principal, School B); and,
- *Hire teachers who are interested in being involved in the greening initiative* (“When principals are hiring they need to look at people who have an interest in the environment, so that the new teachers coming on board, they know that that's part of the expectation to take care of the garden” Principal, School D).

At two of the schools (School C and School D), the principals' role was much less defined and perhaps the biggest reason for this is that both principals arrived in the middle of the greening project or after the project had been mostly implemented. At both the schools, many of the original teachers and parents who were involved are no longer at the school, and thus the responsibility has fallen mostly on the shoulders of the new principals. For example, at School C, the new principal found herself at the helm of the greening initiative:

Janet: So at this point with those previously involved teachers who have been moved to a new school, and the one remaining teacher is on maternity leave, are there any teachers or parents right now that are interested in the initiative or is it left mostly on your shoulders?

Principal, School C: Left mostly on my shoulders. There's some peripheral interest but not anyone that would be a driving force, they wouldn't really be able to carry the ball, to organize... naturalization committee meetings and chair those... and phone to get parental support...that's falling on me.

The new principals at both of these schools expressed a sincere desire to be more involved in the greening project. In fact the principal at School D felt obliged to reawaken the garden: “For me it felt... because so much money and time went into this garden and it was at the forefront of the environmental movement for Toronto... I was ashamed to just leave something already there.” Despite this interest and desire, the principals also indicated that time constraints, lack of knowledge, and other priorities inhibited their involvement. To illustrate, I contacted a teacher from School D who used to be involved in the greening initiative and she commented that “the new principal is interested in doing things and improving it...the principal even asked me about grants. I think she needs some help. She doesn't know where to start. It's her first year.” Not surprisingly, then, at both schools, maintenance of the gardens has become a real challenge for the principals, with few teachers using the spaces for teaching, and almost no parents involved.

I sensed that these two principals felt a considerable amount of guilt at the state of the green initiatives at their schools. One of the principals said “I don't want to sound down about it...I would be happy to shoulder the blame that it isn't our prime focus right now” (Principal, School C). The feelings of these two principals point to the challenges of sustaining these projects over the longterm: given the ephemeral nature of the school communities, it is a reality that the student, parent, teacher and principal community will change in a predictable manner. Therefore, whatever legacy is created through a greening project will, at some point in the future, become the responsibility of a new set of students, parents, teachers and principals. The challenges of this transfer are clearly illustrated in the experiences of these two principals who expressed feelings of being overwhelmed and, at times, burdened by the greening project that “came along with the school” (Principal, School C).

In the schools profiled in the case studies, all the principals were, to a degree, supportive of the greening initiatives. Even if they were new to the school, and unsure of how to best make use of the green school ground, I did sense that they were interested in and positive towards the initiative. In my research, I also became aware that there were principals who were not at all supportive of greening initiatives. In fact, it appears that some principals are very much against such initiatives and have used their position to essentially block the initiative. As an example, interviewees at School D described how one principal, who was moved to the school after the space had been greened, had a very negative effect on the initiative:

Our first principal that was totally supportive...but then the Board moved him. The parents were really upset, we were upset. We pleaded that he should stay because he was so into the garden and into the school... and he was going to retire in 3 years anyway. So we couldn't see why he couldn't stay here for 3 more years? They refused to let him stay. So he said that as a prerequisite it absolutely had to be that the next principal we got had to like the garden and had to be in agreement with the garden. So supposedly they interviewed all these different people, and we were supposed to get a principal that was pro-garden, that was our demand. Anyway we didn't get one. We got a principal that hated the garden, openly hated the garden – felt it was too much work, too much time (her time), and within 4 years she pretty much chased all the parents out of the school who were pro-garden. They quit coming to the meetings, the teachers quit coming to the meetings. We started off with 20 people in our garden committees that used to meet regularly once a month. By the end of it, we could hardly get 2 people to come. She was awful. She'd go to the meetings and tap on the table like this, look at her watch – ‘When is this meeting going to be over and why are we wasting our time?’ She was horrible. (Teacher, School D)

Ephemeral School Communities

One theme that emerged throughout the interviews was that the school communities were constantly changing. Principals and teachers are moved from one school to another (“The initial

members of staff who were behind the push for the garden no longer is on the staff. One is on maternity leave and the others have gone to different schools” (Principal, School C)). In addition, students graduate and their parents become involved in another school (“Like with most parents, it’s transitional, you bring your support to the school that your kids are” (Parent, School C)). Thus securing involvement over the longterm is difficult. Heidi Campbell, who shares the joint TDSB-Evergreen position, is no stranger to the ephemeral nature of school communities and its impact on greening projects. She has noticed that:

What’s interesting is that beginner schools or schools that are just starting can often make great strides and put out a lot of energy to create a bigger project. What I’ve seen happen anyway is that you get a bit of burnout after that really initial big thrust to get a project going, and they don’t consider in the process all that’s going to happen as far as stewardship and maintenance. Who will do the work after the burnout period? (Heidi Campbell)

Questionnaire respondents indirectly alluded to this ephemeral nature of school communities: when they were asked to describe level of involvement for initial and ongoing phases of the greening project for a number of individuals, including teachers, students, parents, etc., they reported a significant decrease in involvement between initial and ongoing phases of the greening project (Table 14).

The consequences of an ephemeral school community have been felt especially at the School D project, where a very active parent group initiated the project and then moved on as their children graduated. The current principal described how “once their children graduated, the parents all left and the next group of parents were interested in other things.” When this active founding parent group moved on, the project suffered considerably for a number of years. Interestingly though, the ephemeral ‘cycle’ of interest and involvement seems to be making a full circle at School D: with the arrival of the new principal, there is renewed involvement in the greening project. A teacher at School D describes this fresh interest and enthusiasm: “We have a whole bunch of new parents and kindergarten seems really excited about the garden. So there seems to be a whole new rush of enthusiasm for the garden” (Teacher, School D).

The impacts of reduced involvement over time are potentially detrimental to school ground greening initiatives, for a variety of reasons. First, the project might be perceived as another education ‘reform’ initiative, which fails to be maintained over the longterm. Hall and Hord (2001) discuss the problems that emerge when “the never ending quest to improve schools” is seen to lead to “fads” that “swing back and forth like a pendulum” (p. 20). It appears that some respondents in this study did indeed perceive green school grounds as a ‘fad,’ as illustrated by a teacher who said in her questionnaire, “Like many teachers, I have reached my saturation point for new initiatives.” A principal also appears to perceive greening projects as fads, as illustrated

by this comment in the questionnaire, “Initially my principal was involved, but has since changed his focus to computers.”

Second, in the absence of longterm commitment, green school grounds can become overgrown and appear unmaintained, a problem that has been identified in the literature (Kenny, 1996). A lack of continued involvement is negatively affecting some schools in this study, as noted by the following teacher, “It is difficult to keep the garden maintained and most plants have died in summer due to not enough watering.” Longterm maintenance is vital to ensuring that the original goals and objectives of greening initiatives are met.

Third, when a school community moves on, too often, it seems that when new people arrive at a school with a greening project, they don’t know what to do or how to use the project. Mutton and Smith (2001) note that an important part of planning for a project is ensuring that “ongoing care of the project” (p. 28) is considered. In the case studies profiled in this research, for example, the two principals from School C and School D expressed concern about how to use the greening projects. The project at School D suffered greatly when the original parent community moved on, taking with them a considerable amount of institutional knowledge about the workings of the garden. Even though there is renewed interest in the greening initiative at School D, the principal describes how she has a few parents that “want to help but have no idea what to do to even begin!” Mutton and Smith (2001) suggest that “a diary of notes and photographs is a good way to document progress in a naturalized area and serves as a keepsake” (p. 28) for individuals who will get involved in the future.

A final concern with reduced involvement over time relates to the benefits to volunteers that are potentially lost. Miles, Sullivan, and Kuo (2000; 1991) explored the benefits that emerge for volunteers involved in ecological restoration projects. They found that volunteers experience a wide range of satisfactions from their participation in restoration projects, including a sense of accomplishment in working with the land, a feeling of personal growth, the chance to meet other people, as well as a fascination with nature. They also discovered that people who volunteer more often, and who volunteer for additional activities, experience significantly higher levels of satisfaction than those who participate less frequently. These results provide some insight for coordinators of greening projects who want to recruit and retain volunteers. Since frequent participation appears to be related to higher levels of satisfaction, effort might be directed towards encouraging volunteers to be involved regularly to enrich their restoration experience.²⁶

²⁶ For information on volunteer involvement in school ground greening initiatives, see www.evergreen.ca.

When these projects are initiated, it is important that the ephemeral nature of school communities is recognized and, in essence, planned for. As the new principal at School D noted:

School ground greening runs along a continuum and we're further along that continuum. So it's important for the new schools starting out... I think it's great that they're doing that, great that they're digging up the asphalt and getting rid of the manicured lawns. As long as they keep in mind that you don't want to overload anyone... and that that parent community will move on, so to keep that interest growing... and also the staff interested. So that involves...when principals are hiring they need to look at people who have an interest in the environment, so that the new teachers coming on board they know that that's part of the expectation to take care of the garden. (School D, Principal)

A teacher at School D agrees with her principal, noting: "Make people aware that they have to pass on the information...it's true when that whole group of parents leave it's hard to find another group that's equally as excited... because projects change. But also the school grounds can sit for a few years, it's not as if it's going to disappear. And if it's well thought out and well designed to begin with it should be all right."

To ensure ongoing commitment over the longterm, some schools established systems that they hope will avoid dwindling interest, support, and energy. For example, at School B: 1) the design of the school ground is sustaining so that when the original committee moves on, the space will need very little maintenance; 2) there is an elected position on school council that is responsible for the green school ground; 3) the environmental focus is explicit in the school's mission statement; and 4) community support from neighbours has been actively sought. It is hoped that these efforts will help to manage and sustain the green space once the original group of parents, teachers, students and principal is no longer involved.

School Board Involvement

The questionnaire respondents in this study reported moderate to low levels of school board support and involvement in greening initiatives: Only 2% of respondents indicated that school board staff/trustees had provided the initial motivation for greening (Table 13); respondents reported that school board staff/trustees were 'not very involved' in the initial and ongoing phases of greening projects (Table 14); and they indicated that school board staff and trustees donated a very small amount of volunteer time (Table 15).

I explored the issue of school board involvement in the greening projects profiled in the follow-up case studies and, not surprisingly, there were many differing perspectives as to if and how the school board had supported the various projects.

In my interviews at School D, the project that has been in place for over 10 years, I was able to gain a better understanding of how school board involvement has shifted in the last

decade. When the project was being initiated, the relationship between the organizing committee and the school board was described as being very contentious, hostile, and divisive. The relationship was probably so tense because it was the first school in the former board that undertook a greening initiative. One of the landscape architects involved in the project in the early 1990's said that "at that time there was very little School Board support" because there was "a new landscape initiative or landscape vocabulary that they didn't fully understand" (Landscape Architect, School D).

The relationship with the TDSB has improved markedly in the last 10 years. I asked the teacher at School D to describe the TDSB's changing involvement:

Janet: Can you speak to the School Board's involvement in this whole process here at School D?

Teacher: At the beginning the Board was no help at all, they were opposing us. We couldn't get anywhere. They wouldn't help us, they dragged their feet, they complained all the time. We asked for help to put in a sprinkling system – "No, you've got to do it yourself." We asked for help to plant trees – "No, do it yourself." Everything was a no. So the parents got discouraged big time. But then we kept asking and kept pushing and finally they slowly started agreeing with us and would help us out a little bit. And now it's like... we ask for help and no problem, they seem to come right away. We asked for some mulch, we did a whole garden clean-up this year. They brought a truckload of mulch, dumped it in three sites which we asked for... a little truckload here and there and there... and then the workers stood around and watched to see what we'd do with it, they were so interested. Then all the kids came out with wheelbarrows and shovels and we put mulch around every single plant and shrub everywhere.

Janet: So you feel the Board is more involved than they were?

Teacher: Yes, they're way more helpful than they used to be.

I was well aware that the school board's involvement and support have shifted considerably in the last decade from a place of resistance to a place of endorsement for the process of greening. Not surprisingly, then, when I probed interviewees about the school board support for greening, the large majority indicated that they felt some support from the TDSB. When I asked for clarification as to how the support was manifested, many described how the board was helpful in very specific ways related to accessing and delivering physical materials. Interviewees described how the TDSB helped by "delivering mulch" (Parent, School A) or "bringing us our topsoil" (Teacher, School E). Interviewees were also quick to complain about TDSB support, indicating frustrations with the amount of time it takes to get materials delivered ("They've helped us out with wood chips, etc., but the only problem is it takes a lot of time to get those things... it might take a few months or a few phone calls" (Teacher, School C) and the restrictions placed on them because they are working with a union ("We could have got compost for free, but the union wouldn't let us" (Parent, School B)). I also sensed that interviewees

resented when personnel from the TDSB expressed concern about a certain initiative (“And he said to us... at the very beginning he said, ‘forget it, the composter won't work,’ but we proved him wrong” (Parent, School B)).

I then asked interviewees if they felt that the upper echelons of the school board were supportive of these initiatives. Many interviewees felt like there was little to no top-down support for their initiative: “In terms of the general support from the TDSB, we haven't had a lot of involvement with them...I haven't got a sense that they're saying, ‘Let's have all the schools have green areas’” (Teacher, School E). This sentiment was echoed by the principal at School B who felt that the TDSB was “being supportive of us, but I don't see that they are strongly encouraging all schools to do this. I think the support is there if you've got a community who wants to set out on that path.”

Given their limited descriptions of school board involvement, I then asked interviewees about the involvement of specific individuals working within the school board that help to facilitate school ground greening initiatives. For example, I asked, “Can you tell me about the involvement of Heidi Campbell (Joint Evergreen/TDSB Position) or Bruce Day (Grounds Team Leader, TDSB) throughout the process of your greening initiative?” When I shifted my question away from TDSB institutional level support to TDSB personnel level support, I got very different responses. I asked the principal at School B about how Bruce Day has been involved:

You know the most wonderful person is Bruce Day. And I've known Bruce for years long before I came to School B...He's very supportive. He's so easy to work with because he listens to what your ideas are, and will be very honest and say that “That's not going to work, what about this?” He's exceedingly positive in the right kind of way...I muddle through, but Bruce is my guide because he knows, he works with the plant materials and he knows what dies and he knows what doesn't. He's been wonderful. And all of his crew, all of the people who look forward to him, whether it's the guy who puts the caging around trees or the gentleman who delivers our bark mulch or top soil... all these people you can just feel them being proud of this place when they come to bring us something, and they know about us before they get here. And I think it's because of Bruce... because he says, “This is a great school, make sure you take good care...” (Principal, School B)

A teacher from School E also had much praise for individual TDSB employees who are helping to facilitate the process of greening. In the following quote, he described how Heidi Campbell (Joint Evergreen/TDSB position) has been instrumental in their greening project:

Heidi has been nothing short of amazing in terms of helping us get this thing off the ground. She has been involved with us for 2 or 3 years now. I think it's great to have plans, and ours are fairly grandiose I think, they're ambitious... but without somebody who knows what they're doing, who can make you feel confident that what you're doing is not a waste of time, but that it's worthwhile and can provide all kinds of experience and insight into Native species and the right ones for the location... basically she came in many times and looked at the situation, “Here's what you probably should be looking at

in terms of species that would survive in this environment, etc.” And she basically then came in when we were doing the planting and she led the planting and taught all the kids the best way to do the planting, etc. So without her we probably might have still got a few things done but I'm not so sure how many of them would still be alive today in terms of the trees and bushes. (Teacher, School E)

I found these responses very interesting in light of responses to my earlier questions that probed for TDSB involvement and endorsement of the greening initiatives. Recall that interviewees reported minimal levels of institutional support (e.g., mulch and topsoil delivery). Yet when I probed about specific individuals or programs that I was aware were in existence, many interviewees had much praise for them. It thus appears that there is some kind of disconnect between how interviewees perceive the TDSB from an institutional perspective, and how they perceive TDSB personnel who assist with their greening program (e.g., Bruce Day, Heidi Campbell). Interviewees did not seem to connect that the personnel were, in a very direct way, a manifestation of TDSB institutional support.

The questionnaire respondents' and interviewees' perceived lack of involvement by the school board was surprising given that the TDSB has, in recent years, demonstrated considerable interest and involvement in school ground greening initiatives. In fact, the school board's involvement in greening initiatives was a major determinant in selecting the site for this research project. The school board's Environmental Education Department has demonstrated their support for greening initiatives in a variety of ways, including the publication of two books: *Transforming the schoolyard: How Local Communities Design and Build their Playground Learning Environments* (Toronto District School Board, 2000) and *A Breath of Fresh Air: Celebrating Nature and School Gardens* (Houghton, 2003). They have also formally partnered with Evergreen, a national non-profit environmental organization that helps to facilitate school greening initiatives. This partnership manifests most explicitly in the form of Heidi Campbell's shared position as “Schoolyard Greening Design Facilitator” that is funded through both Evergreen and the school board. The Design Facilitator is responsible for helping schools in the board green their grounds by providing workshops, design support and site visits to help in all aspects of the greening projects. The Design Facilitator provides training opportunities, expertise, and curriculum materials for greening project in this board. More recently, the TDSB Environmental Education Department has also shown their commitment for greening initiatives by: 1) creating a board wide environmental education policy; 2) launching the Ecoschools

program (Toronto District School Board, 2003a, 2003b, 2003c); 3) proposing an Annual Environmental Report; and 4) working towards developing a Sustainable Blueprint for Schools.²⁷

Why are the services provided by this board not more recognized as being key enabling factors for school ground greening success? Could the school board services help to alleviate some of the pressure placed on individuals who are in danger of burnout? Are the majority of respondents in this study unaware of the school board's support for greening initiatives? Why are they not able to understand that the support of Bruce Day and Heidi Campbell represents institutional support from the TDSB? If all these mechanisms are in place to support greening, and if the TDSB as an institution has made a commitment to greening, why were the interviewees and questionnaire respondents critical of TDSB support?

Richard Christie postulated that many of the TDSB initiatives that seek to provide support for greening initiatives might be too "new" to have had a "board level effect." Given that many of these initiatives have been conceptualized and developed only within the last few years, perhaps the schools profiled in this study were truly unaware of the initiatives. Perhaps, then, the timing of my study influenced the responses that I heard and that if I were to perform the study even a few months later, I might hear very different responses.

With a view to exploring if schools that are initiating their project within the last year would indeed be more aware of these board level initiatives, and in turn feel their support, I asked my supervisor if I might perform one last interview with an individual involved in a very new greening initiative to ascertain how they understood the TDSB to endorse and support their initiative. To that end, I made contact with the principal at School F (271 students, 25 staff, medium SES).

The greening project at School F began very recently and based on my interview, it appears that the new TDSB initiatives were recognized, utilized, and valued. There was a whole new vocabulary being used by the principal that was missing from my other earlier interviews. For example, the principal was aware of the Ecoschools program, and how her greening project was a part of something much bigger than just school ground greening ("Our program is part of the whole board-wide Eco School philosophy"). She was also aware of the importance of keeping board officials at the 'front end of the train' ("So again it was crucial that Bruce Day be involved because there was a lot of thinking in this, so that if we ever needed to have more mulch, the machines could get to that, and the lawn mowing there was room to go around the

²⁷ For a more detailed discussion of TDSB commitment to school ground greening, see section entitled "Selection of School Board: Rationale" in Chapter 3.

outside, in-between and the middle... So that is crucial in the plan because you've got to think of your maintenance while you're doing the planning.”) Her school had adopted the trees/rocks/mulch approach to greening. Taking the advice from the TDSB/Evergreen workshops, she had made a concerted effort to include students early on in the process of greening, with a view to including them in an authentic way:

Janet: Were students involved in the planning committee?

Principal: Not at the beginning but through Heidi and Marcia's [workshop presenters] influence we started to include them... and I don't know why we hadn't thought of it.

Janet: Does it work?

Principal: It works.

Janet: Do they have stuff to say... or are they too little?

Principal: They have stuff... we ask... we direct questions to them. But you know it changed the way we talked about it when you have children there at the committee meeting. And I don't know why we didn't think of doing that... yes, we'd had children do plans, etc., and talk about it in their classroom, but to actually attend the committee meeting they hadn't been part of it... so that was Marcia and Heidi who encouraged us to do that.

Based on my interviews with TDSB personnel and the principal at School F, it appears that the TDSB is getting “on board” the train of school ground greening. But they are not only going to be a passenger; there is a desire to be “at the front of the train.” If the TDSB is successful in implementing all of these initiatives, I suspect the potential of school ground greening in this board could actually be maximized. School ground greening will move away from being done by individual schools in isolation from the board. It will move towards being a board-wide endeavour, with mechanisms in place to support these initiatives over the longterm.

In the literature, I found a modest number of references to the potential role that school board officials could assume in greening projects (e.g., Evergreen, 2002; Kenny, 1996; Stowell, 2001). Stowell (2001) describes how school board administrators were seen to bring important issues to the planning table, such as budgeting and liability. A recent publication by Evergreen (2002), *School Ground Greening: A Policy and Planning Guidebook*, suggests that the role that can be assumed by school boards could be much larger than it currently is. They note that the growing interest in and demand for school ground greening initiatives has presented “significant challenges for school districts not yet equipped with supportive policy, design frameworks, maintenance strategies, or even funding” (p. 4). Not all school boards are unequipped: some have successfully devised approaches to support greening initiatives in their region over the short and longterm. Evergreen (2002) notes some of these approaches:

Some school boards have made significant progress in developing approaches to planning, designing, constructing and maintaining projects that ensure success. Some have hired landscape facilitators to guide schools through a comprehensive redevelopment of their grounds. Others have provided detailed guides to the greening process, suggesting funding sources or required adherence to a strict set of rules. Still others have taken an approach that establishes a formal agreement between school board and school so that lines of responsibility are clear. (p. 6)

Some school boards have also developed policy related to school ground greening that help to clarify key issues related to school ground greening including: the key educational objectives, the environmental criteria for project evaluation, the amount of funding that will be provided, and the process for approving greening projects (Evergreen, 2002). Policies also help to frame greening within the context of existing (and often higher level) school board policies related to facilities management, environmental education, and grounds maintenance.²⁸ In the case of the school board involved in this study, such policies might help to clarify their role. Policies might also contextualize the project within other provincial, federal, or international initiatives (e.g., Canadian Biodiversity Strategy, Agenda 21). Unfortunately, however, many school boards in Canada have not established policy to guide the process of greening:

At present, most greening projects are developed in a policy vacuum... That means that decisions are often made on an ad hoc basis without a set of transparent standards. Therefore, changes to the school landscape do not necessarily reflect the principles of the school board and may fail to match expectations on all sides. (Evergreen, 2002, p. 10)

To conclude, it appears that the school board in this study is making concerted efforts to help facilitate school ground greening initiatives. Yet the questionnaire respondents' and interviewees' lack of recognition of the board's involvement suggests that much room exists to strengthen, clarify, and refine the role that the school board is assuming with a view to maximizing this potentially vital enabling factor for school ground greening.

Section Summary and Conclusions

There is no one true story of the process of school ground greening; the results therefore cannot be generalized, but there are lessons to be learned. There is no one right way to green a school ground. Each school has taken a different route to achieving their current status in their ongoing journey of school ground greening. In some schools, teachers have taken a leading role;

²⁸ In arguing for upper level support for greening initiatives, I am also wary of inscriptive and deterministic support that can lead to the 'institutionalization' or 'technification' of greening, which turns school ground greening into a 'tool' / 'technique' that is 'done' at all schools (see O'Donoghue & Lotz-Sisitka, forthcoming).

in other schools parents have assumed this role. In some schools, the principal has been involved in the planning, planting, and maintenance; in other schools, principal support has come from a distance; still in other schools a new principal has arrived to a project in progress or a completed project and is struggling to figure out how to be involved.

The stories vary not only among schools, but also within schools. It was not uncommon for questionnaire respondents from the same school to respond differently to questions related to the process of greening at their school. One of the best examples of inconsistent perceptions of the story of greening was the difference in dates as to when a greening initiative at one school began: the involved teacher indicated the greening project began in 1990 whereas the involved parent indicated that the project began in 2001 (a difference of 11 years!). These differences are testimony to the range of perceptions individuals have of the same project; they are also indicative of how time influences perceptions. When a school ground greening initiative has been in place for several years, and a new individual becomes involved, their 'story' of greening begins, in essence, with their involvement. While they are able to listen to oral recollections of the history of greening, the story they will tell does revolve primarily around their own experience. It seems that the history of these spaces is passed down, almost entirely, through story telling since very little is actually written down). Given the ephemeral nature of schools, much of the history can thus be lost.

The stories I heard from the case study interviewees were not always in support of the findings that had emerged during via the questionnaires. Sometimes, my data sets even appeared to contradict each other. For example, in analyzing the questionnaires, it appeared that students were very involved in many aspects of the greening process (Table 14 and Table 15) yet when I probed about the type and quality of their involvement during the case study interviews, I found that student involvement appeared to be actually quite limited (and even unauthentic at some of the schools). Such a difference does not, of course, imply that questionnaire respondents were not telling the truth; quite to the contrary, I think they were telling their 'truth.' But when I probed for more specifics about the involvement, I realized that much room existed for students to be involved in a more meaningful, participatory way.

Having explored the process of school ground greening through analysis of both the questionnaires and case studies, I now turn to a presentation of the reported *impacts* of school ground greening.

IMPACTS OF GREEN SCHOOL GROUNDS

(Objective 2)

Questionnaires and Follow-Up Case Studies

In the earlier sections of this chapter, I presented a profile of *who* completed the questionnaires and participated in the case studies. I also described *what* the actual school ground greening projects looked like and summarized *how* the process for greening unfolded. Having gained an understanding of answers to the important questions of *who*, *what*, and *how*, I then turned my focus to exploring another compelling question: *so what?*

To answer this ‘*so what?*’ question, survey respondents and interviewees were asked a series of questions related to the impacts of school ground greening. At the onset of this project, I was interested in knowing if and how these projects influenced eight areas: curriculum, teaching practices, student learning and academic achievement, student behaviour and social development, environmental awareness and stewardship, safety/health, play, as well as inclusivity. Note that many of these impacts were mentioned in the research literature (Chapter 2).

Given the similarities in the responses that I gained through both the questionnaires and the interviews for these eight themes, the following section of this chapter reports the findings from both research tools together. (Note: this differs from earlier sections whereby the results from the questionnaire and interviews are presented separately, then compared and contrasted). To differentiate between respondents and results of the two research tools, the terms “questionnaire respondent” and “interviewees” will be used. In presenting the findings from the questionnaire respondents, I initially consider the entire sample and then explore if and how perceptions of school ground greening differed as a function of characteristics of the school (e.g., SES) and respondent (e.g., gender, role).

Not surprisingly, several additional impacts of school ground greening emerged in my interviews than in the questionnaires. For example, interviewees described how school ground greening projects were venues for community outreach, political activism, and values transfer. These additional impacts emerged because interviewees were provided with much less structure than they were in the questionnaires and this freedom allowed them to discuss impacts above and beyond those addressed in the questionnaire. I welcomed their insight and was again reminded of the value of mixed methods that allowed me to understand a range of impacts – those I had anticipated and those I had not. At the end of this section, I present these additional perceived impacts.

Spheres of Influence

Curriculum

Questionnaire respondents were asked to indicate how often the green school ground is used for instructing five subjects.²⁹ It appears that the green school grounds are used most often to teach physical education and science, with 47% of questionnaire respondents indicating that the green school ground is used ‘often/regularly’ to teach these subjects (Table 19). Language arts, mathematics, and geography are taught less frequently on the green school ground, with 41%, 53% and 46% of questionnaire respondents indicating that these respective subjects are taught ‘never/rarely.’ Questionnaire respondents and interviewees commented that the green school ground is used to teach other subjects not listed on the questionnaire, such as art and drama.

The questionnaire respondents were also asked to indicate what percentage of the teachers at the school use the green school ground as an outdoor classroom. At more than half of the schools profiled in this study, less than 10% of the teachers instruct lessons on the green school ground (Table 20). These findings are markedly lower than the findings reported from the results of a survey conducted by the National Wildlife Federation in which educators associated with green school grounds in the Schoolyard Habitat program were asked to indicate the percentages of teachers that instruct formal curriculum on the green school ground (National Wildlife Federation, 2001). The percentages of teachers using the green school ground in this program are notably higher than in the TDSB: 0-19% of teachers use green school ground (24% of respondents); 20-39% of teachers (20% of respondents); 40-59% of teachers (23% of respondents); 60-79% of teachers (11% of respondents); 80-100% of teachers (16.2% of respondents).

Not surprisingly, the amount of teaching occurring on the green school grounds in my study varies among schools and is influenced by numerous factors, a finding noted by other researchers (Scott et al., 2003; Simmons, 1998). At a small number of schools, it appears that a considerable amount of teaching does happen on the green school ground. One principal, for example, encourages all her teachers to use the green school ground for instruction and stated that “lots of teaching is happening on the yard...almost everyday” (Questionnaire respondent).

²⁹ These five subjects were chosen because they represent the main subjects delivered through Ontario’s mandated curriculum. Of course it would have been interesting to have many more subjects listed in this section of the questionnaire, such as art, drama and music, but in the interest of length restrictions, these five were selected.

Table 19 Collapsed Perceptions of Entire Sample

		<u>Percentage of Respondents Reporting</u>		
Curriculum				
<i>I use our school ground to help me instruct curricular material related to:</i>				
	N	Never/ Rarely	Some- times	Often/ Regularly
1. Language arts	127	41	39	20
2. Mathematics	125	52	36	12
3. Physical education	130	24	29	47
4. Geography	128	46	32	22
5. Science	134	21	32	47
Effect on Teaching Practices				
<i>As compared to teaching indoors, when I teach on the green school ground:</i>				
	N	Strongly Disagree/ Disagree	Neutral	Agree/ Strongly Agree
6. I use an interdisciplinary approach when I am teaching on the school ground.	121	3	33	64
7. Other teachers support my use of the school ground for teaching.	129	6	26	68
8. My administrators (e.g., principal, vice-principal) support my use of the school ground for teaching.	132	1	9	90
		Greatly Decreased/ Somewhat Decreased	Not Changed	Increased Somewhat/ Increased Greatly
9. My motivation for teaching has.....	122	1	29	70
10. My willingness to use innovative instructional strategies has.....	121	0	28	72
11. The amount of team teaching I do has.....	114	3	63	34
12. My ability to maintain class control has.....	117	16	63	21
13. My need for assistance (e.g., parent helpers, volunteers) has.....	117	4	55	41
14. The amount of time I spend preparing lessons has.....	117	2	67	31
Student Learning and Academic Achievement				
<i>As compared to teaching indoors, when I teach on the green school ground I find that:</i>				
	N	Greatly Decreased/ Somewhat Decreased	Not Changed	Increased Somewhat/ Increased Greatly
15. My ability to meet the learning styles of a diversity of students has.....	119	0	34	66
16. Student enthusiasm and engagement for learning has.....	120	0	10	90
17. Student ability to retain knowledge and skills has.....	116	0	28	72
18. Student ability to think more creatively has.....	117	0	23	77
19. Student academic learning, as measured by performance on standardized tests and improved mastery of curriculum standards, has.....	85	1	60	39

Student Behaviour and Social Development

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:

	N	Greatly Decreased/ Somewhat Decreased	Not Changed	Increased Somewhat/ Increased Greatly
20. The level of positive and civil behaviour amongst students has.....	126	3	25	72
21. The amount of effective communication between students has.....	126	1	36	63
22. Cooperation among students has.....	125	1	30	69
23. Student discipline problems have.....	126	44	40	16
24. Positive social interactions between teachers and students have.....	125	2	29	69
25. Overall student pro-social behaviour (cooperation, respectful, non-violent) has.....	126	2	25	73

Environmental Awareness and Stewardship

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:

	N	Much Less/Less	Not Changed	More/ Much More
26. Students are likely to explore _____ widely.	130	0	10	90
27. Students are able to learn _____ about their local environment.	130	0	9	91
28. Students show _____ care and respect for the school ground.	130	2	18	80

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

29. Provides _____ stimulation of students' curiosity and "sense of wonder."	131	0	8	92
30. Provides opportunity for students to have _____ interaction with the natural environment.	130	0	3	97
31. Fosters _____ environmental awareness in students.	130	0	7	93
32. Fosters _____ environmental stewardship in students.	130	0	8	92
33. Provides _____ opportunities for students to have something to care about.	130	1	5	94
34. Provides _____ opportunities for students to understand their relationship to the natural world and to understand that they are a part of nature.	130	1	5	94

Safety/Health

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

	N	Greatly Decreased/ Somewhat Decreased	Not Changed	Increased Somewhat/ Increased Greatly
35. The likelihood of "knock and bump" injuries has.....	121	42	47	11

36. Aggressive behaviour amongst students has.....	120	44	54	2
37. The incidence of crime (e.g., vandalism, graffiti, trespassing) on the school ground has.....	120	33	55	12
38. Pesticide use has.....	115	54	45	1
39. The amount of shaded space has	122	4	32	64

Play

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

	N	Much Less/Less	Not Changed	More/ Much More
40. Promotes _____ cooperative and collaborative play.	119	0	27	73
41. Promotes _____ diversity in the types of play.	119	0	24	76
42. Encourages students to be _____ bored.	120	74	23	3
43. Promotes _____ negative and aggressive play.	119	66	30	4

Inclusivity

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

	N	Much Less/Less	Not Changed	More/ Much More
44. _____ inclusive with regard to <i>gender</i> .	125	0	46	54
45. _____ inclusive with regard to <i>socio-economic status</i> .	124	0	53	47
46. _____ inclusive with regard to <i>ability</i> .	124	1	47	52
47. _____ inclusive with regard to <i>ethnicity</i> .	124	1	53	46

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."

Table 20 Percentage of Teachers that Instruct on Green School Grounds

Percentage of teachers ^a	Frequency	%
0	5	13.9
1-10	14	38.9
11-20	4	11.1
21-50	7	19.4
>50	6	16.7

Note. N=36 schools.

^a 9 schools did not respond to this question.

At School B, one of the case study schools, questionnaire respondents and interviewees indicated enthusiasm for teaching on the school ground is high and teachers are encouraged to use the outdoor classroom for teaching a variety of subjects. They described how curricular opportunities emerge via the green school ground that could only be achieved previously through a field trip. The principal at School B described how some teachers at her school are using the school ground as an outdoor classroom:

Our grade 1's have just been have just finished a unit on bugs. Four years ago we didn't have any bugs in our school yard. Now we have a ton of bugs. In fact our trees were totally covered with ladybugs for about a week, and a whole different variety of types of ladybugs, which is quite exciting. I didn't know that there were that many different types of ladybugs until they went out there. And they had their magnifying jars, and their reading buddies who are the older students, who were their science buddies for that day... they went out looking for bugs and they found all kinds of wonderful bugs. So there's a very simple example...before you'd have to shove them on a bus, send them to a conservation centre, or maybe walk down into Riverdale Park which is tougher to do with short-legged grade 1's. But now all they have to do is go out the back. (Principal, School B)

At points in time during School D's school ground greening project, a lot of teaching occurred in the school ground as well. In the mid-1990's, a teaching aide was hired for 9 hours a week and her sole responsibility was to provide instruction in the garden. Free from the confines of a mandated curriculum, she had much liberty in her teaching. She described how much informal learning happened through the maintenance of the garden:

Teaching just happened out there...we picked up apples and leaves and put them in the composter. We screened compost. We brought mulch in and soil in, and the older children spread it on the hillside. We planted. And I did a lot by letting them learn through playing. ...They would dig deep holes in them, build landscapes, whatever. Stomp through puddles. (Teacher, School D)

While these positive descriptions of how teaching occurs on the green school grounds in the TDSB did emerge occasionally in the questionnaires and interviews, most respondents and interviewees told a very different story about teaching on the green school grounds and were very critical of the amount of teaching that occurs. They felt convinced that more teaching could and should be occurring in the outdoor classroom. As an example, a parent reported that "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" (Questionnaire respondent). This sentiment was echoed at all the schools where follow-up interviews occurred: "I would say probably not as many teachers use it as they should or could" (Parent, School A); "Probably at the beginning there were more teachers involved and slowly it's become less unfortunately" (Teacher, School C); "It is rarely used for teaching anymore" (Teacher, School D); and, "They are using it, although not enough" (Teacher, School E). This sentiment was even echoed by interviewees at

School B, where a considerable amount of teaching actually is happening: “Potential for teaching is not being realized for sure” (Parent, School B) and, “There could always be more” (Principal, School B). Heidi Campbell, who shares the joint TDSB-Evergreen position, agreed that much more teaching could and should be happening on the school grounds. She also noted the barriers that currently impede the use of the greening space:

Heidi: What I see happening is that lots of the teaching stops happening after the planting has been completed. Everyone seems to think that planting is the last stage...so they think... "Oh it's in, now we can take a break"...So then what I see is a bit of drop off in terms of use, and only certain classes are using it, and this is mostly elementary classes. You see maybe the grade 3 and grade 4 using it, and the Kindergartens might go out and use it a little bit, but you don't see that whole school kind of working the site. Yes, so I see a bit of a drop off.

Janet: Why is that?

Heidi: I think the times have changed. The teachers are more teaching to the tests, and that concerns me in a big way. And I think too I feel that there isn't enough in-service... like help for the teachers, workshops on say "How to utilize the pond environment"... or even curriculum ideas, like if there was more... I think there's a lot of ideas out there, it's how to connect them seasonally to the site. All these things that happen over a full year, there isn't a comprehensive guide on how to use your outdoor class... and that's what they're looking for, whether we need it or not. If we need it, great, but they're saying "We want something in our hands" kind of thing to help us use it as an outdoor classroom.

It appears that many teachers are currently unaware of the curriculum possibilities of a green school ground and that they require assistance and support before they are willing/able to instruct on the green school ground. Countless resources are available that provide helpful tips for teaching in the outdoors (e.g., McCutcheon & Swanson, 2001; R.C. Moore & Wong, 1997) and numerous resources that make explicit links to mandated curriculum are becoming increasingly available (Department of Education and Skills, 2003; Kenny, 1996). Future studies must track if and how curriculum delivery on green school grounds changes over time as some of these barriers are addressed.

Several individuals involved with school grounds that were in the beginning phases of greening said that they intended to use the school ground more in the future. One principal commented, “We have not reached this stage yet...but I am working hard to make sure we can have lots of teaching happening outside in the future” (Questionnaire respondent). A parent at School A also anticipated that teaching would increase once the trees get bigger: “And I think, too, the trees have grown out the front so incredibly in one year. Last year they were little thin... so it wasn't really all that inviting... felt like you were sitting in a bush or something. But it's 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” (Parent, School A).

Teacher interest and involvement is also necessary for outdoor learning to occur as illustrated by the following parent who noted, “Over the past few years, the time my kids spent learning in the garden has really depended on how enthusiastic their teacher has been about it. This has varied for my three children who attend the school” (Questionnaire respondent).

Evidence from the literature indicates that a wide array of subjects can be taught on a green school ground, including reading, writing, mathematics, science, art, environmental education, drama and social studies (Adams, 1990; Centre for Ecoliteracy, 1999; Cronin-Jones, 2000; Lieberman & Hoody, 1998; R.C. Moore & Wong, 1997; Rhydden-Evans, 1993; G. Thomson & Arlidge, 2000). The questionnaire respondents and interviewees in this study, however, reported that many subjects are not being taught with regularity on the green school ground. It thus appears that much room exists to enhance the teaching that is occurring on the green school grounds in this study.

Several participants indicated that certain subject areas or grade levels lent themselves more easily to using the green school grounds. As one teacher suggested on her questionnaire, “For some grades, it is easy to find ways to use the outdoor garden; for others it is almost impossible.” Where the mandated curriculum links were most obvious – for instance, the grade three unit on outdoor nature – teachers were more likely to take students outdoors.

It appears, however, that many teachers feel as though only traditional subjects with an obvious ‘outdoor emphasis,’ such as science, can be taught on the green school ground. A teacher from School A explains “Some people think that the only thing you can teach outside is science...they don’t realize that there are probably 3,000 places in the elementary curriculum where we could be out there teaching.” Many teachers indicated that subjects such as math could not be taught outdoors, as indicated by the following teacher who said “Some teachers think “This is math time, I can’t go outside”” (Teacher, School C).

Where curriculum ties were not obviously apparent, some teachers found it difficult 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” (Teacher, School A). Because of situations like these, some study participants suggested that curriculum packages are 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 programmes 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 in-service training would be helpful to broaden teachers' understanding of how green school grounds can 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 from School B 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 in-service training, for example workshops geared to particular grades or subject areas or school ground features, could be extremely beneficial.

As some study participants suggested, however, the challenge lies much deeper: teachers are 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 sit uneasily with the realities of outdoor education where the learning environment is less easy to control, where learning outcomes are less predictable and not necessarily measurable, and where learning experiences are more fully embodied. As one teacher explained, "it's just easier and safer maybe to teach the old way in the classroom" (School A).

Indeed, the fear of losing control was a challenge identified by a number of participants. Classrooms offer 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... because obviously outside it's a different place... so it is harder to teach in that environment. So maybe some people are hesitant to teach out there" (School C).

Many of the teachers expressed a need for environments that are safe, comfortable and conducive to learning and that accommodate large classes. The design of school grounds is thus a critical factor in enabling teachers to deliver the curriculum outdoors. Areas are needed, for instance, where teachers can 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, that's good. The rock formation has given teachers a safe space to facilitate teaching outside" (School B).

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 reported to be crucial in either endorsing or limiting the amount of teaching that occurred. The whole

school can feel their encouragement to use the outdoor classroom – 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, study participants reported that greening initiatives can easily become too much of a burden without broader, institutionalized support.

Other researchers have also noted the barriers to teaching outdoors, including a lack of curricular resources, knowledge, funding, confidence, philosophical commitment and upper level administrative support as well as concerns about student safety (e.g., Comishan et al., 2004; P. Hart & Nolan, 1999; Hsu & Roth, 1998; Malone & Tranter, 2003b; Shuman & Ham, 1997; Simmons, 1996, 1998). In discussing barriers to curriculum delivery on the school ground, Malone and Tranter (2003b) suggest that a school’s philosophical view of outdoor learning may be one of the biggest factors in determining if the green school ground is used for curriculum delivery. They suggest “school ground design, although instrumental in the potential for extending curriculum, is not as vital as having a view of learning that does not distinguish between the indoor-outdoor environments” (p. 299).

Given that such a lengthy list of barriers was generated during my study, the question as to why and how any teacher is able to successfully use the outdoor classroom begs to be answered. Why are some teachers driven to overcome these barriers? Perhaps the answer to such questions comes from researchers such as Shuman and Ham (1997) who assert that factors such as an intrinsic interest in nature and environmental issues go a long way towards helping teachers overcome the barriers to teaching outdoors.

Teaching Practices

Questionnaire respondents were asked nine questions that explored the influence of green school grounds on teaching practices. The vast majority of questionnaire respondents (90%) indicated that administrators were supportive of teaching occurring on the green school ground (Table 19). Sixty-eight percent of the questionnaire respondents reported that teachers appear to be supportive of other teachers who teach on the green school ground.

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 (School E) 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 favorite times with students, because I get to know them a lot better" (School B).

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" (Questionnaire respondent). 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" (School D).

Many of the positive findings related to teaching practices are consistent with other research initiatives that have explored teacher perceptions of instructing using an outdoor classroom (Centre for Ecoliteracy, 1999; Lieberman & Hoody, 1998; R.C. Moore & Wong, 1997). In *Closing the Achievement Gap*, for example, Lieberman and Hoody (1998) reported that the majority of teachers using the environment as an integrating context for learning had increased enthusiasm and commitment toward teaching, better working relationships with their students and colleagues, and more occasions to use innovative instructional strategies.

Some teaching practices, however, appear to change very little when teaching occurs on the green school ground as compared to indoor teaching. For example, the majority of questionnaire respondents indicated that the amount of team teaching, the ability to maintain class

control, the need for assistance, as well as the amount of time spent preparing lessons remained unchanged (63%, 63%, 55%, and 67% respectively) (Table 19).

A small, but notable, number of questionnaire respondents (16%) suggested that the ability of teachers to maintain class control decreased when teaching occurred on the school ground. This was reinforced in the interviews, when some interviewees expressed concern about teachers' abilities to maintain class control when using an outdoor classroom: "And 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 afraid of losing control" (Teacher, School C). McCutcheon and Swatton (2001) acknowledge that maintaining class control is a valid concern for teachers who are new to teaching outside or who are simply afraid to give up their control:

In the middle of the night, are you jolted from your bed by nightmarish images of children running hither and yon in the wilderness as you take them out to investigate the water quality in nearby stream, play a predator-prey game, or study the life cycle of monarchs? If so, you are not alone. (p. 124)

McCutcheon and Swatton present many strategies for effectively teaching in the outdoors. Many of these strategies require teachers to let go of 'control' that comes through four walls and to welcome a new sort of freedom that is conducive to outdoor learning. Of course, teaching outdoors requires teachers to be flexible because nature will provide many unexpected lessons that may or may not align with the designated lesson plan. McCutcheon and Swatton (2001) remind teachers that:

No matter how wonderful a teacher you are, natural lessons outdoors will sometimes be more compelling than the task at hand. The turkey vulture soaring overhead or the rabbit running across the trail may interrupt your lesson, but accept that it is a natural attention magnet for your students. Take the broader view of learning and turn these opportunities to your advantage. They are the moments your students will likely never forget, and if you can bridge these spontaneous events to the lesson at hand, you will likely cement the learning. (p. 125)

As mentioned in the previous section, several respondents and interviewees commented that teachers are currently unaware of how to use the green school ground as a teaching site and therefore their teaching practices couldn't possibly be affected. To that end, many suggested that teachers need to be provided with training in how to use the space. One questionnaire respondent claimed that "teachers are not aware of the potential and they don't know how to use it" and an interviewee indicated "unless they have an interest in the outdoors, they won't know how to use it...teachers need training" (Parent, School B).

The results of this section of the questionnaire also point to areas where attention could be directed to fully supporting teachers interested in using the green school ground as a teaching site. Given that 41% of questionnaire respondents reported that teachers' need for assistance had

increased and 31% reported that teachers spend more time preparing lessons, it is important to explore why these increases are occurring. Some interviewees also indicated that it took a considerable amount of time and energy to use the outdoor classroom: “I think it definitely takes more planning and work to take the kids outside for class” (Teacher, School D). As other researchers have noted, it is plausible that burnout is a risk for teachers who use outdoor classrooms (see Comishan et al., 2004; Russell & Burton, 2000); it is thus vital that opportunities for teacher renewal and support are available to ensure that a longterm program succeeds (Horwood, 1995).

In order to enhance teaching practices through a green school ground, lessons could be drawn from programs that have been successful in the longterm and that have been well integrated across the school curriculum (e.g., the Edible Schoolyard in Berkeley, California, see Centre for Ecoliteracy, 1999; Lieberman & Hoody, 1998). Lieberman and Hoody (1998), for example, found that team teaching helped to alleviate many of the concerns raised in my study. Teachers in *Closing the Achievement Gap* reported that team teaching helped to relieve pressure placed on a single teacher, by spreading the work load and providing emotional support.³⁰

Student Learning and Academic Achievement

Questionnaire respondents were asked to compare student learning and academic achievement on the green school ground as compared to an indoor classroom setting. Almost all questionnaire respondents (90%) indicated that students showed more enthusiasm and engagement for learning that occurred on the green school ground (Table 19). The majority of questionnaire respondents also thought that students were able to retain knowledge (72%) and think more creatively (72%) when they were learning on the green school ground. Many questionnaire respondents (66%) indicated that a teacher’s ability to meet a wide range of learning styles increased on a green school ground. To illustrate, one teacher commented, “Students whose learning styles are interpersonal and bodily kinaesthetic show fresh enthusiasm when they are learning on the yard” (Questionnaire respondent).

When I asked interviewees to explain if and how outdoor classrooms affected student learning, many reported positive impacts. Some described how students showed more

³⁰ In stressing the importance of team teaching, and its potential contribution to outdoor learning on the green school ground, it is important to note Russell and Burton’s (2000) emphasis on having authentic team teaching (i.e., collaborative), as opposed to “relays, where teachers do not actually teacher together” (p. 300).

enthusiasm for learning (“Most students have never really had any experience with nature... and they're just so excited about getting in there and learning new things” (Parent, School E)) and indicated that students welcome the change from classroom learning (“I think they just love being out there, and they're happy and they're excited to learn about whatever they're doing, and it's just such a change from being in a classroom all day long” (Parent, School E)). Others described how students are provided with a more natural timing sequence when the natural world is used for instruction (“The important thing about a garden is that when you're one with nature, time flows in a different way, and 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” Teacher, School D). Still others suggested that students whose learning styles do not match the traditional indoor 3-R view of learning are able to “shine in the garden” (Principal, School B).

These findings from the questionnaire respondents and interviewees are not surprising. Other researchers have also found that students show renewed engagement with the learning process (Centre for Ecoliteracy, 1999; Lieberman & Hoody, 1998; R.C. Moore & Wong, 1997). The majority of educators involved in Lieberman and Hoody's (1998) study, for example, reported that when the environment was the context for learning, students demonstrated more willingness to stay on task, an increased ability to think creatively, as well as a greater proficiency in solving problems and thinking strategically.

When questionnaire respondents were asked to indicate if they had seen a change in student performance on standardized tests or improved mastery of curriculum standards, 60% indicated that they had seen no change while 39% indicated that student performance had increased. Interestingly, only 85 out of a possible 149 questionnaire respondents answered this question (the lowest response rate of the 49 questions). Many of the non-respondents commented that they were unable to assess this as no “hard data exists to measure this” (Questionnaire respondent). Some questionnaire respondents questioned if they could isolate the effect of the green school ground from the other initiatives occurring in the school community. To illustrate, one teacher said, “Although the school's test results have improved, I do not know how much of the improvement can be attributed to outdoor learning” (Questionnaire respondent).

While many have speculated that academic performance increases when learning occurs on the green school ground, very little rigorous research has been performed that explores this relationship. Two important exceptions do, however, exist (Lieberman & Hoody, 1998; Simone, 2002). First, Lieberman and Hoody (1998) explored the relationship between academic

performance and learning with the environment. Their study reviewed 40 U.S. schools that used the environment as an integrating context in a variety of ways (e.g., classroom settings, campus settings, undeveloped areas on or off the campus, off-site locations, multiple locations), and much insight can be drawn from the findings of this study that might apply to students who are learning on a green school ground. Through an examination of standardized tests, samples of curricular material, and interviews with teachers and administrators, Lieberman and Hoody (1998) documented a significant improvement in student performance in language arts, mathematics, science, and social science.³¹ In another study, Simone (2002) explored the relationship between student achievement and school ground greening in elementary schools in a city in Ontario, Canada. She found that students attending schools with green grounds performed better on province wide standardized tests than students attending schools without green yards.

Other researchers working within a qualitative framework have also supported the contention that green school grounds provide unique opportunities for developing cognitive skills (e.g., critical thinking, creative inquiry, problem solving) (Abram, 1996; Bell, 2001a; R. Hart, 1987; Kellert, 2002; R. C. Moore, 1986a; R.C. Moore & Wong, 1997; Nabhan & Trimble, 1994; Sobel, 1993; Susa & Benedict, 1994). Evidence from a number of other settings, for both children and adults, lends support to the notion that a relationship exists between cognition and exposure to green spaces.

Not all educators, however, strive for academic improvement as measured by standardized tests. At the Edible Schoolyard in Berkeley, California, for example, educators emphasize the importance of the process of learning more than the final product of grades. Neil Smith, the principal at the Edible Schoolyard, comments,

One of the tasks of middle school is to excite kids about learning, and the Edible Schoolyard is successful there. If at the end of a child's 8th grade experience, the child has certain facts down, how long will those facts be remembered? But if the child is excited about a particular subject, he or she is going to become a real student and go on learning about it. That's really what you want to do – in middle school in particular – isn't it? (Centre for Ecoliteracy, 1999, p. 51)

In sum, the questionnaire respondents and interviewees generally reported that school ground learning positively influences aspects of student learning, such as enthusiasm, engagement and creativity. While respondents expressed uncertainty about whether outdoor learning directly influences students' grades, as measured by standardized tests, evidence from

³¹ A number of comparisons were made to document this 'improvement' including comparisons between 1) schools with and without EIC programs, 2) students attending the same schools who were/were not participating in EIC programs, and, 3) students pre-post attending EIC programs.

the literature does lend some support for this relationship. Clearly, more research is warranted to explore these relationships more completely.

Student Behaviour and Social Development

Questionnaire respondents were asked to indicate if they had seen changes in student behaviour and social interactions on a green school ground as compared to a typical asphalt and turf ground. The majority of questionnaire respondents indicated an increase in many attributes, including the level of positive and civil behaviour among students (72%), the amount of effective communication between students (63%), the amount of cooperation between students (69%), as well as the number of positive interactions between students and teachers (69%) (Table 19). Forty four percent of the questionnaire respondents reported that student discipline problems had decreased on the green school ground, while 16% reported that discipline problems had increased.

Questionnaire respondents and interviewees offered many examples of how the green school positively influenced student behaviour and social development. One teacher noted, "Students seem much more peaceful at recess and social problems seem to have decreased somewhat" (Questionnaire respondent). Another teacher observed that "active boys seem calmer in the green school ground" (Teacher, School C). At one school, the green school ground is used as part of a behaviour modification program. The teacher at this school suggested 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" (Questionnaire respondent).

The positive findings reported in my study support existing research that has explored the relationships between environment and behaviour of young people on school grounds (Cheskey, 2001; Harvey, 1989a; Lieberman & Hoody, 1998; R.C. Moore & Wong, 1997; Titman, 1994; Weinstein & Pinciotti, 1988). The majority of educators in Lieberman and Hoody's study (1998), for example, noticed improvement in students' abilities to collaborate on projects with others, to function democratically, to communicate with others, to give care to self and others, and to practice civility towards others. In reflecting on behaviours on the Environmental Yard, in Berkeley, California, Moore and Wong (1997) noted that "asphalt generated more conflict and stress...compared to the more diverse setting which...engendered a more harmonious relationship between children of all ages" (p. 34). Other researchers have explored the relationships between nature and behaviour for a variety of age cohorts, including pre-school children (Huttenmoser,

1995; G. T. Moore, 1986), school aged children (Alexander et al., 1995; Cheskey, 2001; Titman, 1994; Weinstein & Pinciotti, 1988), and adults (Kuo, Sullivan et al., 1998; Kweon et al., 1998) and found a correlation between natural environments and positive behaviours.

A small number of questionnaire respondents were unconvinced that the green school ground had a positive effect on student behaviour. One principal noted that “so many things influence behaviour...like the parents, teachers, TV...it doesn’t seem like a green school ground could have much of an influence” (Questionnaire respondent). When a greening program is spatially small and/or isolated, some questionnaire respondents questioned its potential influence. As an example, one teacher noted, “Our 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” (Questionnaire respondent). Some respondents noted that in some circumstances, a green school ground may not influence an entire student body; it might instead influence only those students who are directly involved in the project. As an example, at one school, a ‘Garden Club’ is solely responsible for maintaining the green section of the school ground. A parent of a student at that school commented that “it is hard to measure the social influence of the space, because membership in the club is voluntary. I think it has a positive effect on those students involved, but not all students at the school” (Questionnaire respondent). Concerns related to accessibility and student involvement in the greening project point must be addressed during the planning of a greening initiative. In order to fully maximize the potential of greening initiatives for the largest numbers of students, the green space must be accessible to students and must include a large number of students (R. Hart, 1997; Stowell, 2001).

It appears that overall, questionnaire respondents and interviewees believed that the green school ground did exert a positive influence on student behaviour and development. A small number of respondents and interviewees raised important issues related to the impacts, accessibility and student involvement. Educators embarking on greening initiatives should consider these concerns.

Play

Questionnaire respondents and interviewees were asked to describe if student play on the green school ground differed as compared to a typical asphalt and turf ground. The majority of questionnaire respondents generally reported positive changes in play behaviour on the green school ground, noting an increase in cooperative and collaborative play (73%), an increase in diversity of play (76%), a decrease in boredom (74%) and a decrease in negative and aggressive play (66%) (Table 19).

Overall, the positive perceptions related to play support the work of several researchers that have explored the influence of green environments on play behaviour (Faber-Taylor et al., 1998; Kirkby, 1989; Malone & Tranter, 2003b; R.C. Moore & Wong, 1997; Nabhan & Trimble, 1994; Sobel, 1993; Weinstein & Pinciotti, 1988). Many of these researchers resist the notion that play time and recess facilitate only the “release [of] surplus energy,” (Evans, 1998, p. 17) and acknowledge the important role that play can assume in facilitating intellectual, physical, and social growth of children (see Evans, 1998; Malone & Tranter, 2003b). Many also report that children are provided with a diversity of play opportunities on a green school ground as compared with a traditional asphalt and manicured grass ground. Moore and Wong (1997), for example, found that a transformed school ground allowed young people to “expand the play repertoire” (p. 91) by engaging them in less organized play and more unorganized ‘free’ play. They observed an increase in active play, creative play, pretend play, exploratory play, constructive play and social play as compared with the original school ground. Respondents in my study also reported a diversity of play spaces on their transformed school ground influenced the play of students. A principal describes play on her green school ground:

It's quite magical. They have names for various spots. And it really quite delightful to see them in a very informal setting... they will get in under trees and hiding, there's a lot of "hide-and-peek", there is a large sand box which is a popular item... but then there's also little places where they sit and talk. We got these very large boulders brought in there along the soccer field side of the naturalization area and they love to play on them. I find it quite delightful, just to see them playing so creatively. (Principal, School C)

Another interviewee noted that the green school ground provided more freedom “just to wander around the garden and lie down and look at the sky, whatever they needed to do” (Teacher, School D). This is in stark contrast to the “the old playground that just promoted active play. Once you get into that perimeter of the playground... you're there either to jump around or you're going to get run over basically” (Parent, School C). One parent stated that she even chose her children’s school because of the diverse play opportunities provided:

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. (Questionnaire respondent)

Other researchers have stressed the importance of ‘refuges’ (Kirkby, 1989), ‘special/secret’ places (Sobel, 1993), and ‘world-making’ activities (Cobb, 1977) for young people, especially in middle childhood. Questionnaire respondents and interviewees provided countless examples of how their green school ground provided spaces for these activities. A teacher described ‘world-making’ activities on the school ground at School D:

The garden is an enchanting play space for them... in which they play games of the imagination. And I would say it even furthers games of the imagination which you can't do when there's asphalt and concrete and chainlink fences. It's much harder for children to do that. It's an impoverished environment that doesn't nourish the soul, and this environment nourishes the soul. I saw them playing 'house' on the hillside, like divide 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. (Teacher, School D)

Other interviewees described how green school grounds provided more 'refuges' and quiet spaces for small group gatherings: "on the logs...on the rocks...often you'll see the classic little girls having a little chit-chat, eating their snack" (Parent, School B). Another parent commented that there are more refuges and different group size play spaces that encourage a range of activities, noting "there are more quiet places for kids to linger and talk...There are bushes to play hide and go seek...There are spots for quiet reflection" (Questionnaire respondent).

A small number of questionnaire respondents, however, indicated that play did not occur on the green section of their school ground. One teacher commented, "the garden is not accessible during free play;" another teacher noted "the green space is isolated and used for teaching, not for play" (Questionnaire respondents). Other questionnaire respondents felt that it was "too early to tell" (Questionnaire respondent) if the greening initiative was influencing play behaviour.

It thus appears that most school grounds in the TDSB that have been transformed have the potential to provide a diversity of play spaces as compared to traditional school grounds. Nonetheless, the concerns of some respondents and interviewees related to accessibility of the green space during recess should be considered when future initiatives are planned.

Environmental Awareness and Stewardship

Questionnaire respondents were asked to describe if a green school ground influenced student environmental awareness and stewardship. This section of the questionnaire had the highest response rate (87%) and questionnaire respondents' perspectives were very consistent (Table 19). Over 90% of questionnaire respondents indicated that student environmental awareness had increased on the green school ground as compared with a traditional asphalt and turf school ground. Questionnaire respondents also suggested that students are more likely to explore widely (90%), learn about their local environment (91%), and have a greater 'sense of wonder' and curiosity (92%). One teacher commented 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” (Questionnaire respondent). A parent described the increased awareness in students in the following statement, “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” (Questionnaire respondent).

Almost all questionnaire respondents (97%) and interviewees indicated that children are provided with more opportunities to have interaction with the natural environment on a green school ground. They indicated that this was especially important in large urban centres, where many children have little or no access to green spaces (see Kahn Jr., 2002; Kellert, 2002; Rivkin, 2000). One teacher commented that his green school ground is very important for his students who “live in apartments and have absolutely no exposure to green space” (Questionnaire respondent). Another teacher noted that “many students do not play outdoors when they are out of school...for many, school grounds provide the only connection to the outdoors” (Teacher, School E).

Interviewees supported these assertions and were able to provide countless examples of how students are provided with opportunities for connecting with the environment on the green school ground. One principal described how his students get to “turn the soil over and smell the soil, to see the worms and the bugs and not freak out, to pick them up. Those are the experiences that I think contribute to not having all kinds of fears and misconceptions about insects and the environment” (Principal, School E).

For some time, a great deal of attention in environmental education research has pointed to the importance of providing young people with opportunities to connect with the natural world in an intimate and embodied manner, particularly during middle childhood (e.g., Bell, 2001a; Chawla, 1992; Cobb, 1977; R. Hart, 1987; Hutchison, 1998; Nabhan & Trimble, 1994; Sobel, 1993). In *Growing Up Green*, Hutchison (1998) argues that that during middle childhood, young people develop a ‘working theory’ of the world. During this time, children develop certain ideas about nature and the environment, such as an ecologically sensitive cosmology, that is carried into adulthood. Just as there are developmental stages for skills acquisition related to language, Hutchison stresses the developmental importance of having opportunities to connect with nature during middle childhood. In concluding his book, Hutchison suggests that green school grounds are one venue for facilitating this contact. According to the respondents in my study, it appears that green school grounds are providing these opportunities.

A notable number of researchers have also explored if and how significant environmental experiences in childhood influence adult willingness to care for and act on behalf of the environment (Chawla, 1986; Corcoran, 1999; R. Hart, 1987; Hsu & Roth, 1998; Palmer,

Suggate, Bajd, Hart et al., 1998; Palmer, Suggate, Bajd, & Tsalaki, 1998; Palmer et al., 1999; Shuman & Ham, 1997). They suggest a link between positive attitudes toward the environment during adulthood and positive experiences in natural settings, during middle childhood, often with an important adult. Respondents in my study also postulated a connection between the students, contact with nature on the green school ground, and adult behaviours. To illustrate, one principal described her hopes that the green school ground would instil values that would extend into adulthood:

It's a small... it's an 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. We take the green in the city for granted, and all one needs to do is go around the world in different cities where there is no green, where there's only cement... and then you can appreciate how important the environment is in growing up... and also for adults to be surrounded by green. (Principal, School D)

Not all respondents and interviewees were unanimous in their contention that the green school grounds fostered environmental awareness and stewardship. One parent commented that the exposure to green space might not be enough to influence awareness and stewardship. She suggested that teachers must provide instruction and teaching to fully maximize the environmental benefits of a green school ground. Another teacher asserted that awareness and stewardship might increase only for students who are actively involved in the greening project. She suggested that “students who are involved in the Environment Club who plant and care for the garden benefit directly. Others don’t really notice at all” (Questionnaire respondent).

Similarly, one teacher raised an important issue when she queried the relationship between students’ environmental awareness and their involvement with the process of greening. She wondered if the students who arrived at the school after the project was completed might take the state of the school ground for granted: “If you didn't see what was there before, you don't miss what was there, you don't know.” Given that she works at School D, where the project is completed, she always “takes the students to look at other school grounds and compare and come back... and say ‘that's what our school used to look like.’ But you have to tell them that because they don't know” (Teacher, School D). This issue is not raised in the literature by those who advocate for the importance of process during greening initiatives (R. Hart, 1997; Hunter et al., 1998), but deserves consideration.

The relationship between student involvement in the process of greening and environmental stewardship/awareness is also interesting to consider in light of Kahn’s (2002) notion of ‘generational environmental amnesia.’ Kahn argues that each generation “starts afresh,

unencumbered mentally by the environmental misdeeds of the previous generations” (p. 113). The concern raised by Kahn is obviously intended to be applied to those who are experiencing increased environmental degradation. But what about those individuals who experience enhanced environmental conditions? For example, will students who arrive at an already ‘green’ school ground have opportunities to develop environmental awareness as much as those who were involved in the process of transformation? Will the already transformed ground foster as much environmental stewardship for these students who did not participate in the transformation? In pondering this matter, I find some resolution in those who argue that school ground greening initiatives are never really finished. There is always maintenance, restoration, and new initiatives that, hopefully, provide opportunities for recently arrived students to connect with the natural environment (Mutton & Smith, 2001).

The results of the questionnaires and interviews appear to add further support to the contention that small green urban spaces can play important roles in fostering an environmental ethic. They might be especially important for young people who have limited opportunities to have direct experiences with the more than human world.

Health

Questionnaire respondents were asked to comment on two issues related to health and green school grounds: shade and pesticides. Sixty four percent of questionnaire respondents reported that the amount of shaded space had increased (Table 19). Many questionnaire respondents and interviewees, however, commented that shade would only be provided as the trees grew larger. A parent noted, “We just planted small trees that will someday provide shade. Not yet though!” (Questionnaire respondent). When asked to comment on pesticide use, approximately 50% indicated that the amount had ‘decreased’ or ‘not changed.’

In terms of health concerns, some proponents for school ground greening assert that exposure to midday sun and pesticides can threaten children’s health and are motivated to green school grounds to mitigate human health hazards (see Evergreen, 2003; Heisler et al., 1995). University of Waterloo researcher Moogk-Soulis (Evergreen, 2003) measured surface temperatures on 15 school grounds in the Waterloo area and found that they were, on average, 5.2 degrees hotter than surface temperatures of the surrounding area. Moogk-Soulis postulates that school ground greening projects that include trees could help to mitigate the high temperatures found on school grounds by facilitating evapotranspiration of heat into leaf mass, by acting as a windbreak to decrease the rate of infiltration of hot air into buildings, and by creating shade to reduce clear sky radiation. Although it appears that some schools in the TDSB are too small to be

providing these services, future studies are clearly warranted to understand how trees influence temperatures and sun exposure.

Some interviewees interpreted my questions related to ‘health’ more broadly and felt that school ground greening initiatives contributed to the overall well-being of the school community. For example, one interviewee commented, “When you transform a school from almost like a prison compound to a diversified landscape, it’s a sign of health. It’s a sign of health and it’s a sign of growth” (Landscape Architect, School D). Others pointed to the psychological health benefits of green school grounds. A teacher commented, “I’m sure psychologically there must be some sort of tempering... because they’re not boxed in, they have hills to go up on” (Teacher, School D) and another parent noted “I just really believe that there is a psychological benefit to being near a tree as opposed to a steel pole – the interconnectedness between children and their immediate environment, it has big impacts on everything...health” (Parent, School B).

Advances in the field of environmental health have also pointed to the positive physical and psychological health effects of exposure to a natural environment (Frumkin, 2001; Hartig et al., 1991; Kaplan, 1984, 2001; Lewis, 1992; Olds, 1989; Ulrich, 1984; Ulrich & Parsons, 1992; Ulrich et al., 1991; Wilson, 1983). These studies have demonstrated the positive health influences of natural environments around a wide array of urban structures, including hospitals, prisons, and apartment buildings. Olds’ (1989) paper, entitled “Nature as Healer,” suggests that natural environments can be physically and emotionally healing for children and adults, yet “nature the healer is rarely available for such purposes given current urban planning, architectural, therapeutic, and educational practices” (p. 32). Frumkin (2001) summarized many of these studies with his contention that “contact with the natural world may be directly beneficial to health” (p. 234).

I realize now that my study only peripherally explored the relationship between school ground greening initiatives and physical and psychological health. Yet as I review the results, I think that this area of research deserves much more exploration. For example, do green school grounds positively influence attendance rates? Students’ sense of well-being? Students’ anxiety levels? Students’ exposure to UVA and UVB radiation? More research is clearly warranted on this complex and poorly understood relationship.

Safety

When questionnaire respondents were asked about safety on green school grounds, 42% reported that the likelihood of ‘knock and bump’ injuries had ‘decreased’ whilst 47% maintained that it had ‘not changed’ (Table 19). When I explored the issue of safety on green school grounds

with interviewees, they reported ample anecdotal evidence indicating that green school grounds were physically safer. A principal summarized many of these anecdotes, describing how “in terms of falling down and hurting themselves... it's softer... We would have a lot more accidents in the office if it weren't for that space the way it is right now. If you'd have cement and asphalt, you'd have a lot more scrapes and bruises” (Principal, School D).

A small percentage of respondents (10%) indicated that the likelihood of ‘knock and bump’ injuries had increased. Evidently other ‘new’ hazards that emerged as a result of greening initiatives were reported, including problems with insects (e.g., bees), plants (e.g., burdocks getting stuck on children), and decreased sight lines due to vegetation growth. Gamson-Danks (2001) acknowledges that water elements (e.g., ponds, wetlands) can also raise important and new concerns about student safety. One principal acknowledged these new safety risks, but that she felt it was worth taking those risks: “Climbing on a rock...that's something kids need to experience...but I do realize that there is room for a potential disaster there” (Principal, School C). While new kinds of accidents might be inevitable on green school grounds, Evans (1995) notes that school administrators who accept these risks are going to have to deal with parents who appear to be less and less willing to accept scrapes and bruises. He notes that “parents no longer look upon playground accidents as an inevitable consequence...They now want to know how the accident happened, particularly if it happened in a situation where supervision was expected” (p. 17). Evans concludes his paper by asserting that “the challenge before us is to develop playgrounds that give due attention to safety without placing excessive limitations on the child’s experiences” (p. 22, see also Rivkin, 1995, 2000).

Just under half (44%) of questionnaire respondents reported that incidents of aggressive behaviour had ‘decreased’; the remaining 54% and 2% of respondents indicated that it had ‘not changed’ or ‘increased,’ respectively. Interviewees were also divided as to if and how the amount of aggressive behaviour had changed on green school grounds as compared to the old grounds. Many felt that it had decreased. A 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 these big fort spaces... used [for] pummeling a kid when there were no teachers around” (Parent, School B). Many other interviewees agreed, claiming that the diversity of environments on the green school ground provided options for young people to engage in a variety of activities, thus decreasing incidents of bullying and other aggressive behaviour. A principal described:

I believe that the installation of the bushes and the trees and the plants and all that stuff out there has gone a long way to making our schoolyard more peaceful, and 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... there are places to sit down, there are places to go that are quiet, where they can eat a snack with a friend. There are a variety of places to be now, whereas 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. They can hide behind the bush now when they're playing with a friend or seek some shade from some of our trees. (Principal, School B)

The positive perceptions of decreased aggressive behaviour on green school grounds in the TDSB are in stark contrast to a growing body of literature that points to the increase of aggressive behaviour and bullying on school grounds (Borg, 1999; Craig et al., 2000; Evans, 1998, 2001). In response to the increase in aggressive behaviour on school grounds, schools are using a number of approaches to tackle the issue, such as increasing the number of teachers on duty, enforcing stricter rules, having segregated playgrounds, enforcing anti-bullying policies, reducing the length of recess, or even totally eliminating recess (Evans, 1997, 2001).

Other researchers, however, have proposed less confrontational approaches to managing aggressive behaviour. These researchers point to the relationship between the design of a school ground and behaviours (Evans, 2001; R. C. Moore, 1986b; Rivkin, 1995; Titman, 1994), noting that dull playgrounds are very boring, which in turn can lead to its users becoming frustrated, annoyed, and even aggressive. By offering young people a diversity of play spaces, these researchers note that playgrounds become much more peaceful and harmonious. Researchers like Titman (1994) and Moore and Wong (1997) note that the changes in behaviour can be even more dramatic if the young people are involved in the process of greening. Based on the findings from my study, it appears that many schools in the TDSB with greening initiatives are seeing less aggressive behaviour.

In terms of crime and vandalism, 57% of questionnaire respondents indicated that incidents had not changed, whereas 33% thought it had decreased (Table 19). Questionnaire respondents and interviewees provided descriptions of vandalism and crime that occurred in their green school grounds. They described how interpretive signs were burned down, graffiti was painted, fences were broken, bird feeders were stolen, and plants, shrubs and vegetables were stolen from the garden. One principal suggested that green school grounds are a “haven for gangs” and a parent thought that it “may promote more smoking” (Questionnaire respondents). Some interviewees, however, believe that the amount of vandalism had decreased as a result of student ownership and involvement in the greening initiative. A parent described how a scarecrow for Halloween that was outside the school was not vandalized: “And 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 got to do with the involvement of the children in the school with regards to the garden” (Parent, School B). One respondent, however, suggested that a green school ground alone will not

influence the safety of a community, writing that “it will take much more than a greening project to produce movement in the systemic lack of self-control and respect for others in the inner city” (Questionnaire respondent).

The issue of vandalism is certainly not unique to greening initiatives in the TDSB. Stout (2001) recognizes that vandalism is complex to understand and difficult to predict, noting from her own experience with school ground greening initiatives that incidents of vandalism on school grounds can increase or decrease after a greening initiative is created. She goes on to suggest a number of strategies for reducing vandalism in grounds, including: demonstrating territoriality through signage and active maintenance; providing natural surveillance through landscaping; encouraging activities that enlist community support; and directing the flow of pedestrian traffic to maintain control. Yet Stout cautions that even if all these initiatives are in place, there still exists a possibility of being a target of vandalism. In the unlikely event that a green school ground is targeted, she suggests that project organizers clean up immediately, contact authorities, advise neighbours, and learn from the experience.

Other researchers have explored the influence of green space on crime, violence and sense of safety in urban housing complexes (Kuo, Bacaicoa et al., 1998; Kuo & Sullivan, 2001a, 2001b). Kuo and Sullivan (2001b) compared levels of crime reported among apartment buildings with varying degrees of surrounding vegetation. They found that residents who lived in buildings surrounded by green space reported fewer property and violent crimes than residents who lived in buildings surrounded by barren landscapes. In another study, Kuo and Sullivan (1998) found that residents felt a greater sense of safety when trees surrounded their housing complexes. Could these findings be similar to school environments? Could levels of crime and sense of safety be influenced by the landscape architecture of the school setting? Future studies are clearly warranted.

Inclusivity

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 (52%) and ability (46%) (Table 19).

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; R. Hart, 1987; R. C. Moore, 1986b; 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 poorer children (Chawla, 2002b; Malone, 2001; Rivkin, 1995; J. L. Thomson & Philo, 2004). Study participants from schools located in poorer Toronto neighbourhoods also noted this pattern, suggesting that green school grounds might assume an especially significant role in their communities, since young people might not have access to natural settings or opportunities to travel or camp with their families during school holidays. Many of these schools are surrounded by housing and industrial development. 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. As one principal (School C) explained: "It [the green school ground] does expose children from poorer homes... who perhaps don't have backyards at their home...[at school they have] the ability to just play in a wooded grass area."

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 poorer neighbourhoods 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 School E, 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 play 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, & McMnamin, 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 living 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 from School A 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.

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 from School B 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 from School B 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.

Composite Thematic Perceptions

Having explored and discussed perceptions of questionnaire respondents as a group, I was next interested in exploring if and how the perceptions of green school grounds differed as a function of characteristics of the respondent and characteristics of the school. For example, were the perceptions of involved teachers different than perceptions of uninvolved teachers, administrators and principals? Did men and women perceive the effects of the green school ground differently? Did questionnaire respondents from schools with different socio-economic status report different perceptions? Did questionnaire respondents from elementary schools perceive the green school grounds differently than respondents from middle or highschools?

For the purpose of these analyses, composite variables for each of the eight themes were obtained by averaging the responses for each question within the theme (Table 21). Before collapsing the questions into themes, selected questions were reverse coded as necessary. Internal consistency estimates of reliability of the questions within the composite thematic variables were computed. Six of the composite themes had coefficient alphas³² over 0.70, indicating satisfactory reliability. However, two of the composite themes, 'teaching practices' and 'safety/health' had coefficient alphas of 0.61 and 0.54 respectively, indicating poorer internal consistency.

I considered the following independent factors related to the school: socio-economic status of the school community (very high, high, medium, low, very low); length of school ground greening project; level of school (elementary, middle, high school); number of staff; and number of students. I also explored if the characteristics of questionnaire respondent, such as role, gender, age, level of education, years teaching, area of education, as well as level of involvement and level of interest influenced the perception of the collapsed themes. To examine these independent variables, I performed several one-way analyses of variance (ANOVAs) and independent samples *t*-tests. Only two of the independent variables, *role* and *level of interest*, revealed any significant differences for the dependent variables (the collapsed thematic

³² Cronbach's alpha is a measure of how similar the items in each category are to each other (in terms of responses they evoke from participants). The alpha's range from 0 to 1.0; the larger the alpha, the stronger the association between the items.

Table 21 Collapsed Thematic Perceptions by Role

Impact	Reliability Alpha	Principal	Involved Teacher	Uninvolved Teacher	Parent	M
Curriculum ^a	0.83	3.11 (0.716)	2.95 (0.978)	2.79 (1.04)	2.82 (0.934)	2.93 (0.917)
Teaching Practices ^b	0.61	3.59 (0.347)	3.61 (0.357)	3.55 (0.330)	3.65 (0.540)	3.60 (0.391)
Student Learning/Academic Achievement ^c	0.89	3.87 (0.542)	3.95 (0.442)	3.78 (0.535)	4.15 (0.640)	3.92 (0.545)
Student Behaviour and Social Development ^d	0.85	3.67 (0.826)	3.745 (0.475)	3.598 (0.543)	3.83 (0.584)	3.70 (0.630)
Environmental Awareness and Stewardship ^e	0.94	4.36 (0.423)	4.285 (0.520)	4.01 (0.419)	4.31 (0.582)	4.24 (0.499)*
Safety/Health ^f	0.54	3.48 (0.487)	3.471 (0.405)	3.67 (0.565)	3.52 (0.543)	3.54 (0.504)
Play ^g	0.82	3.90 (0.519)	3.84 (0.538)	3.71 (0.498)	3.96 (0.668)	3.84 (0.553)
Inclusivity ^h	0.93	3.55 (0.575)	3.74 (0.626)	3.54 (0.619)	3.66 (0.793)	3.62 (0.646)

Note. Based on a series of 5-point Likert scales, where 1 represents disagreement/decrease, 3 represented a neutral/no change, and 5 represented agreement/increase. Selected questions have been reverse coded for the purpose of creating this table (see below).

*Results of ANOVA: $F(3,127) = 3.398, p = 0.02$

^a Questions 1-5

^b Questions 6-13, 14R (R=Reverse coded)

^c Questions 15-19

^d Questions 20-22, 23R, 24, 25

^e Questions 26-34

^f Questions 35R-38R, 39

^g Questions 40, 41, 42R, 43R

^h Questions 44-47

perceptions). I begin by presenting the findings from these analyses before turning to a discussion of the findings.

Effect of Role: Results

Several one-way analysis of variance (ANOVA's) were conducted to evaluate the relationship between the role of respondent and the collapsed perceptions. The independent variable, respondent, included four categories: administrator, involved teacher, uninvolved teacher, and parent. As illustrated in Table 21, the dependent variables were the mean of the eight collapsed themes. The ANOVA was significant for only one of the collapsed themes, Environmental Awareness and Stewardship, $F(3, 127)=3.398, p=0.02$. The strength of the relationship between the role of respondent and the collapsed perception, as assessed by η^2 , was moderate, with the respondent factor accounting for 8% of the variance of the dependent variable. Follow-up tests conducted to evaluate pairwise difference among the means revealed a significant difference between the perception of the uninvolved teacher ($M = 4.01, SD = 0.419$) and the principal ($M = 4.36, SD = 0.423$). No other significant differences existed. While the mean for the principal was significantly higher than the mean for the uninvolved teacher, it is important to note that the difference is in the amount of positive perceptions: both respondents reported positive changes in environmental awareness and stewardship; the principal, however, reported more positive changes.

While no other significant differences were found with any of the other collapsed themes, several trends do emerge in Table 21. The mean responses of seven of the collapsed themes for the uninvolved teacher are lower than all the other respondents. For four of the collapsed themes, the mean for the parent is slightly higher than the rest of the respondents.

Effect of Level of Interest: Results

I conducted independent samples *t*-tests to evaluate if collapsed thematic perceptions differed as a function of interest level in school ground greening (i.e., interested vs. not interested). Given that only 8% of questionnaire respondents reported being 'not interested,' the independent *t*-test assumption that the sample sizes for the two populations be equal was violated. Therefore, the test procedure that was ultimately used computes an approximate *t*-test that does not assume the population variances are equal.

The tests revealed significant differences between interested and uninterested perceptions for four collapsed themes: 1) Student Learning and Academic Achievement; 2) Environmental Awareness and Stewardship; 3) Play; and, 4) Inclusivity (Table 22). In all significant cases, the

Table 22 Collapsed Thematic Perceptions of Interested/Uninterested Respondents

Impact	Interested		Uninterested		<i>df</i>	<i>t</i>	<i>p</i>	<i>n</i> ²
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
Curriculum ^a	2.94	0.895	2.76	1.172	134	0.62	0.54	
Teaching Practices ^b	3.62	0.387	3.39	0.395	131	1.83	0.07	
Student Learning/Academic Achievement ^c	3.96	0.538	3.44	0.367	119	3.14**	<0.001	0.08
Student Behaviour and Social Development ^d	3.73	0.632	3.37	0.522	126	1.8	0.07	
Environmental Awareness and Stewardship ^e	4.29	0.467	3.67	0.491	129	4.26**	<0.001	0.13
Safety/Health ^f	3.54	0.516	3.45	0.359	122	0.59	0.55	
Play ^g	3.88	0.549	3.41	0.407	119	2.79**	0.01	0.06
Inclusivity ^h	3.65	0.656	3.27	0.425	123	2.68*	0.02	0.06

Note. Based on a series of 5-point Likert scales, where 1 represents disagreement/decrease, 3 represented a neutral/no change, and 5 represented agreement/increase. Selected questions have been reverse coded for the purpose of creating this table (see below).

p* < 0.05 *p* < 0.01

^a Questions 1-5

^b Questions 6-13, 14R (R=Reverse coded)

^c Questions 15-19

^d Questions 20-22, 23R, 24, 25

^e Questions 26-34

^f Questions 35R-38R, 39

^g Questions 40, 41, 42R, 43R

^h Questions 44-47

mean for the interested respondent was higher than the mean for the uninterested respondent. The eta square indexes, η^2 , indicated that between 6 and 13% of the variance of the collapsed perceptions was accounted for by whether a respondent was interested or uninterested. Despite a lack of significant difference for the remaining themes, the means for the interested questionnaire respondents were higher than the means for uninterested respondents.

Discussion of Composite Thematic Variables

With a view to exploring if perceptions differed as a function of characteristics of the questionnaire respondents (e.g., gender) or the school (e.g., level of school), I performed a series of statistical analyses on the composite variables of the eight themes. A remarkably small number of differences emerged: 1) the principals reported significantly more positive changes than the uninvolved teachers for the Environmental Awareness and Stewardship composite variable (Table 21); and, 2) interested questionnaire respondents reported significantly more positive changes than uninterested respondents for four of the composite variables (Student Learning and Academic Achievement; Environmental Awareness and Stewardship, Play, and Inclusivity) (Table 22).

I was able to generate several possible reasons why some questionnaire respondents reported more positive impacts of the green school ground than others. Perhaps respondents who have been actively involved in the project are more aware of the initiative and the potential benefits. Given the large amount of energy that must be invested in greening initiatives (e.g., Stowell, 2001; Wyzga, 2001), it is plausible these same people are looking for the positive outcomes because of their investment/interest. Perhaps they are spending more time on the green school ground, which provides more of a chance to observe the positive changes. Perhaps the positive impacts of the greening initiatives are truly extending into all aspects of the school community, and even uninvolved teachers are able to detect the differences. Future studies are warranted to explore the reasons contributing to these significant differences.

Even though these significant differences exist, it is important to recognize that the mean responses for all but one of the collapsed variables (Curriculum) for all respondents indicated a positive change as a result of the greening initiative (i.e., greater than 3 on the 5 point Likert scale) (Table 21). Stated more clearly, all respondents reported positive changes for the composite variables; the significant differences reported herein reflect discrepancies in *amounts* of positive change. As an example, both the principal and uninvolved teacher reported positive changes in Environmental Awareness and Stewardship; the principal did, however, report significantly more positive changes than the uninvolved teacher ($M = 4.36$ vs. $M = 4.01$).

The lack of significant differences amongst the respondent's perceptions came as a surprise to me. In designing my research, I had explicitly chosen to include 'uninvolved teachers' as questionnaire respondents. I made this decision as a result of identifying that the majority of researchers investigating the potential of green school grounds had sought out almost exclusively the voices of interested teachers, parents and administrators (e.g., Lieberman & Hoody, 1998; R.C. Moore & Wong, 1997). With a view to filling a gap in the literature, I wanted to hear from those individuals who were uninterested/uninvolved in the greening initiative. Despite my efforts within my research design decisions to have a multitude of voices represented, a fairly universal pattern of responses emerged.

To summarize, my findings suggest that the questionnaire respondents involved in this study share somewhat similar perspectives on the influence of green school grounds. Further, these perspectives, by and large, are positive, irrespective of the respondents' characteristics (e.g., role, gender, age) or the school's characteristics (e.g., grade level, socio-economic status).

Additional Impacts Described by Interviewees

In addition to the eight themes described above, interviewees also reported further impacts of the school ground greening initiatives. Some interviewees described how these spaces became sites for community outreach, others explained how they became sites for political activism, and others felt they became sites for teaching values to their children. I now briefly describe these additional perceived impacts.

Sites for Community Outreach

Glover (2004), in his research on community gardens, asserts that "community gardens are less about gardening than they are about community" (p. 143). In addition to the work of Glover, the extensions of the impacts of urban green spaces into the broader community have been noted by other researchers (e.g., R. Barker, 1994; Hartig, Bowler, & Wolf, 1994; House, 1996; Lambert, 1999; Lewis, 1992; I. Miles et al., 1998, 2000; Shapiro, 1995). The research participants in my study also described a number of benefits emerging via the school ground greening initiatives that extended beyond the immediate school environment into the larger community. The specific nature of community outreach was varied and manifested itself in a number of different ways.

Respondents in my study felt that school ground greening committees were very inclusive, welcoming those individuals that might be in a time of transition or difficulty. At one school, for example, a number of new Canadian parents were part of the adult greening

committee. One of these parents has recently emigrated from Yugoslavia and she said that her involvement in the project “helped me learn the language, make some contacts, make some friends” (Parent, School B). Similarly, a principal described how social networks can be created through the greening committees that assist people who are having difficulties:

If they're facing a real tragedy in their personal life, like life is really tough for them... for a whole variety of reasons, and 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, School B)

The inclusive and friendly environments created via greening initiatives have been noted by other researchers (R. Barker, 1994; Glover, 2004; Lewis, 1992; Shapiro, 1995). Shapiro (1995), for example, asserts that “teaming up with our neighbours to stop toxic dump emissions in our own neighbourhoods builds a sense of belonging and community” (p. 238).

Not all researchers agree that community gardening projects are unequivocally inclusive. While Glover (2004) recognizes the inclusive potential of greening projects, he also brings a more critical stance to the notions of inclusivity via community gardening projects. In his study on community gardens as a vehicle for the creation of social capital, he found that individuals within the community gardening group had unequal access to social capital. Factors such as race and class proved to be important factors that determined how social capital was distributed amongst the members of the community gardening group.

Other individuals in my study described how the community members that were in close proximity to the school benefited by having a more beautiful environment near their home. One interviewee even postulated that housing prices might increase! At some schools, interviewees felt that the green school was used much more by community members than before the greening (“Then later in the summer and the next summer lots of people come just to sit, from the apartments or wherever. A lot of people will come in to read the stones. And the playground area as well is very used by the community. You always drive by and see somebody there” Parent, School A).

Finally, some interviewees felt that the green school ground enhanced community connections, by providing opportunities to meet new people, make new friends, and strengthen old friendships. In reflecting upon his involvement at School D, an interviewee commented:

One of my interests in landscape is how landscape can work at bridging alienation, societal alienation... because I think our greatest problem nowadays is alienation... because the city is really a world of strangers. So either social alienation, self alienation and environmental alienation. How people can be brought together through landscape and be reconnected with landscape and other people... and I think that that really is such an incredible benefit of landscape and the potential landscape. And I saw it happen. (Landscape Architect, School D)

One of the parents at School B supported the notion that community bonds are developed through participation in the greening projects as she recalled when a family member from out of town visited: “They said, ‘Do you know everybody?’ And 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, you want to be friendly and welcoming” (Parent, School B). Other researchers have pointed to the social potential of greening projects. Miles, Sullivan and Kuo (1998; 2000) found a similar trend with respect to community connections in their study that explored satisfactions that volunteers derived from a prairie restoration initiative in Chicago. They found that a major source of satisfaction for their volunteers was the opportunity for them to “meet interesting and friendly people,” to “accomplish something in a group,” and to “have a broader social experience” (1998, p. 33).

Sites for Political Activism

Selected interviewees also believed that green school grounds can be sites for political activism. One interviewee noted that “most people feel, especially in post-amalgamation Toronto, that they can’t effect change because there are so many bureaucratic filters that really stifle democracy” (Landscape Architect, School D). He went on, however, to describe how the parent committee at School D worked together to challenge the institutional barriers and became political to achieve their goals: “they had incredible willpower to be political... you don’t see it now and it’s very rare, but they had this sense of political efficacy that is all too rare.” Another interviewee noted how her involvement with the greening project evolved into something quite political:

And then it’s kind of funny because I started doing the garden thing and we were outside of the Parent Council, and eventually after a while they made a position on the School Council so that the initiatives begun would be permanently taken care of by somebody. So I sat on that position for 2 years because nobody else wanted it. And so now I’m the Chair of the School Council. I’m not sure how that happened, but I think it was just me being, like going to the meetings and talking... I was always the one who had so much to report at every meeting. Other committees weren’t doing anything... and I’m like ‘this week we’ve got this, and this is happening...’, so then ‘we need a Chair and you would be good,’... So. I think that’s sort of peculiar for me that it ended up that way, because I never would have seen it. Suddenly I’m totally involved. (Parent, School B)

Many interviewees spoke about their political involvement in the greening initiatives with a great deal of pride. They shared how they hoped their involvement would be seen as their personal or professional legacy. One principal explained, “It’s wonderful to walk down the street and look and think... ‘you know what, I had a part in this’ ...” (Principal, School B). Another teacher commented that:

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, you just realize that you're giving these kids a chance to really appreciate where they are. Not that they don't, because... some of the countries they come from, they come from just horrible circumstances... but again maybe because of that they are extremely sheltered. And so it really makes one feel really warm to your heart to think that we can actually open them up and let them see what is possible. I come from a camping background, wilderness canoe tripping, and I share that with the students as much as I can... I've even managed to spark interest in one or two of them. I've had great satisfaction in doing so. That's what makes it special for me. (Teacher, School E)

In addition to leaving a personal/professional legacy, several interviewees believed that their political involvement with the greening initiative would send clear messages about the importance of activism to their own children. A parent recalled how her involvement in the greening initiative taught her children the importance of volunteering: "I want to show my kids that it is important to give back to the community. In terms of that, it's a volunteer project. And I liked it because I got my kids to volunteer. So it benefited me and my family as well" (Parent, School C). Interestingly, a notable number of interviewees commented on their own parents' involvement in volunteer projects, noting that they had learned a great deal by watching their own parents volunteer. A parent illustrated this phenomenon:

My dad was a teacher. When something had happened or some award or whatever, and I was just thinking I used to watch my dad all the time going off to Scouts and doing Stamp Club and Litter Pickup and all these little things out in the community. So then I think it reinforces me... yes, it did influence me...so I can influence my son and his friends as well. (Parent, School B)

Other researchers have noted the political potential embedded within greening projects. Miles, Sullivan, and Kuo (1998; 2000), for example, in their work with ecological restoration volunteers in Chicago, found that volunteers' greatest source of satisfaction with their participation related to the fact that they were involved in "meaningful actions." More specifically, the volunteers felt as though they were "making life better for the coming generations," "doing something useful" and "bringing a benefit to society or the community" (1998, p. 33). Shapiro (1995) also observed that community restoration projects can bring a lightness and joy to political activism work, making it more inviting. He writes, "many people [activists] who usually work in isolation form spontaneous little teams. Activists who generally relate to the 'environment' with tension and worry become giddy and exhilarated...[when working on restoration projects]" (p. 226).

Section Summary and Conclusions

In this section of the dissertation, I explored the '*so what?*' of green school grounds in the TDSB by describing and discussing several impacts of school ground greening initiatives. Questionnaire respondents and interviewees were asked to comment on if and how green school grounds influenced a number of themes. While I do not wish to overgeneralize the findings, the questionnaire respondents and interviewees did mostly report that green school grounds seem to enhance teaching practices, curriculum delivery, teacher practices, student learning and academic achievement, student behaviour and social development, environmental awareness, safety, health, play as well as inclusivity. These positive reports emerged across a range of independent variables, such as respondent characteristics (e.g., gender, role, age) or school characteristics (e.g., grade level, SES). Respondents and interviewees also reported that green school grounds are being used to a degree as an outdoor classroom, but that much room exists to enhance the teaching opportunities. When interviewees were provided with an opportunity to describe additional impacts, they described that green school grounds were venues for community outreach, political activism, legacies, and values transfer.

Based on these findings, it does seem that there are trends emerging across the schools profiled in this study. This is an important distinction from the majority of research on green school grounds performed using a single school case study research approach. While many of the impacts I explored in this study have been described in previous studies, my findings are noteworthy in that they represent perspectives across a large number of schools. These findings thus add further evidence to support these earlier studies by reporting the perspectives of a large number of individuals associated with a large number of greening initiatives. To those who query previous studies that report positive impacts from a single school, wondering if any of the findings are indeed transferable, these results provide some strong support.

In presenting these findings, it is important to restate that the questionnaire respondents and interviewees profiled in this study are all associated with school ground greening programs. The large majority of respondents who filled out the questionnaires thus had an interest in their greening project (i.e., all respondents except the uninvolved teachers (and possibly the principal) had an interest in greening projects). All interviewees with whom I spoke had enthusiastic interest in and pride for their greening project. Even those individuals associated with projects that were unused, overgrown, and unmaintained had a certain amount of pride and an awareness of what could be possible. While (re)stating these facts may seem obvious, I offer them here as a reminder of how the respondents' 'location' might be influencing the results found herein. It is plausible that the questionnaire respondents and interviewees are, to borrow a term from Cam

Collyer (Learning Grounds Manager at Evergreen), on the “Good Ship Greening.” In other words, they believe in school ground greening – if they didn’t, they would most likely not be willing to donate the amount of time, energy and resources that they currently are. If they are indeed on the “Good Ship Greening,” it is plausible that they are telling the stories that they *want* to hear, not the stories of what is actually happening. Perhaps this might explain why the reported impacts described herein are so positive.

Although it is important to acknowledge that I might have been hearing a ‘good news story,’ it is my hope that this research was designed to solicit a range of perspectives and avoid solely hearing perspectives of those individuals on the “Good Ship Greening.” I did, for example, seek input from questionnaire respondents that were supposedly not interested in greening (i.e., uninvolved teacher). Yet, for the most part, their perceptions of the impacts of green school grounds did not differ significantly from the respondents who had more of a stake in the greening projects and respondents were *not* unequivocally positive about school ground greening. When asked to comment on if and how teaching is occurring on green school grounds, many respondents were critical about the amount of teaching that was happening. These examples provide me with some confidence that the positive perceptions described above are actually occurring.

The concerns raised in this section of the dissertation, particularly those related to the amount and type of teaching occurring on green school grounds, should not go unnoticed. It does appear that a very small percentage of teachers are using the green school ground as an outdoor classroom (Table 20). When it does occur, it appears that at the majority of schools, a very limited range of subjects is being taught (Table 19). The interviewees and questionnaire respondents provided countless reasons as to why so little teaching was occurring. It seems that in these situations, when a green school ground is not used for teaching, important opportunities to realize the potential of the green space are lost. The space is, in effect, left to ‘speak for itself.’ While there is no shortage of evidence that the green school ground will indeed speak for itself, as indicated by the reported impacts on student behaviour, play, inclusivity, etc., I would argue that efforts be directed towards removing the barriers that currently inhibit, impede, and prohibit teaching on the green school ground.

Having examined the perceived impacts of school ground greening projects that emerged through my analysis of the questionnaires and the interviews, I now turn to a presentation of the barriers and enabling factors for school ground greening projects.

LIMITING AND ENABLING FACTORS

(Objective 3)

As the previous section of Chapter 4 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 my study were quick to point out the benefits of greening initiatives, they were also keen to share ideas about areas for improvement. Many believed that important aspects of the greening initiatives remained ‘untapped,’ ‘under-realized’ or ‘under-explored.’ They identified a number of challenges and opportunities that needed to be addressed in order to maximize the potential benefits of green school grounds.

In this section of my dissertation, I begin by presenting the quantitative data that emerged from my analysis of the questionnaires and the qualitative data from my interviewees before moving into a discussion of the issues raised by both. I also draw on literature from other practitioners and researchers who have also explored the factors that both limit and enable other school ground greening projects (National Wildlife Federation, 2001; School Garden Resource Network, 1999; Scott et al., 2003; State of New Hampshire Fish and Game Department, 2000).

Questionnaires

Limiting Factors

With a view to understanding limiting factors for school ground greening initiatives, questionnaire respondents were provided with a list of 15 factors that had possibly limited the success of their school ground greening projects (Table 23). Respondents were asked to identify the main factors that had limited the success of their project.

No one factor was selected by the large majority of respondents; instead respondents indicated that a wide range of factors had limited their projects. The three most commonly reported limiting factors were: 1) availability of funding (17% of responses); 2) demands on time (15%); and 3) difficulty with maintenance (15%) (Table 23). It appears that teacher involvement (11% of responses) limits the success of projects much more than community involvement (4%), student involvement (2%), or principal involvement (1%). The three factors that were least mentioned were: 1) student involvement (2%); 2) principal involvement (1%); and 3) access to expertise (1%).

Table 23 Limiting Factors

Limiting Factors	%
Availability of funding	17
Other demands on time	15
Difficulty in maintenance	15
Teacher involvement	11
Vandalism	7
Parental involvement	6
Access to physical materials	6
School board support	5
Key organizer moved on	5
Community involvement	4
Availability of training opportunities	3
Student involvement	2
Principal involvement	1
Access to expertise	1
Other	1

Note. N=407 responses.

Enabling Factors: Past and Future

Respondents were then asked to indicate three factors that had enabled the school ground greening project in the past. They were also asked to indicate three factors that would enable the initiative in the future. The dominant responses for past and future enabling practices were very similar: the top five responses were the same, in only a slightly different order (Table 24). Respondents reported that the involvement of teachers, parents, principals, and students enabled the success of greening projects in the past (21% of responses, 14%, 14%, and 9% respectively), and their continued involvement will facilitate success in the future (20%, 14%, 9%, and 9% respectively). Funding appears to be an important aspect of ensuring the success of greening projects, and was in the top two rankings for both past and future enabling factors (19% and 21% respectively). External support, in the form of school board involvement, access to expertise, availability of training materials, as well availability of curriculum materials were not rated as important enablers.

Follow-Up Case Studies and Questionnaires

In the interviews, I was interested in exploring the factors that individuals perceived to have limited and enabled their projects. I was especially interested in learning if they would mention similar factors that were on the list provided on the questionnaire or if they would offer different factors. Many of the themes that surfaced on the questionnaires resurfaced in the interviews.

Some factors emerged as both limiting and enabling factors: what was a limiting factor to one individual was an enabling factor to another (e.g., adequate funding is enabling; poor funding is limiting). In the following section of this chapter, I thus present the limiting and enabling factors simultaneously. I also incorporate some of the comments that were made by the questionnaire respondents.

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 Limiting Factor #1 and Enabling Factor #2) (Table 23, Table 24), a finding that has been noted by other researchers (Kenny, 1996; Lucas & Mountfield, 1995; Wyzga, 2001). As one principal aptly commented, “There’s only so much money that cup-cakes and hotdogs can bring in...so we must actively fundraise” (Principal, School D). While some schools found that fundraising was very easy, others indicated that it had been a key barrier in the process of greening.

Table 24 Past/Future Enabling Factors

Enabling Factors	<u>Past</u> ^a			<u>Future</u> ^b		
	F	%	Rank	F	%	Rank
Teacher involvement	80	21	1	75	20	2
Availability of funding	70	19	2	80	21	1
Parental involvement	54	14	3	55	14	3
Principal involvement	53	14	3	36	9	4
Student involvement	33	9	5	35	9	4
Access to physical materials	29	8	6	23	6	7
Community involvement	23	6	7	26	7	6
School board support	14	4	8	23	6	7
Access to expertise	15	4	8	13	3	10
Availability of training opportunities	3	1	10	2	1	11
Availability of curriculum materials	1	<1	11	14	4	9

^a N=375 responses.

^b N=384 responses.

Some individuals were critical of aspects of the fundraising process. They described how funding applications are often lengthy, time-consuming, and overly detailed, particularly in relation to the amount of money they actually grant (“Some of the hoops we have to jump through to get the funds...It’s almost not worth it to get their \$200” (Parent, School B)). Wyzga (2001) agrees, noting that “some smaller grants are not worth the effort...you must weigh the investment of your time against the size of the grant” (p. 21). Some individuals also expressed concern that funding is secured for specific projects (e.g., building composting stations), and is rarely ongoing, making fundraising a continuous project. To that end, some individuals suggested that funding be secured for a longer time frame, instead of the once-off type of funding that currently exists. This would allow funding to be directed beyond capital projects, allowing it to provide for maintenance and curriculum development. Some questionnaire respondents and interviewees were concerned that funders can dictate the nature of the project; projects are often selected to meet the mandates of the donors instead of the goals of the school ground greening initiative. Wyzga (2001) acknowledges the nature of many of these difficulties associated with funding, and stresses the importance of longterm planning for fundraising. She writes,

Alluring as it may be, resist the temptation to apply for a grant just because it becomes available. Develop your plan first, and then look for funding. Otherwise, you run the risk of letting grants dictate what is valuable to you, rather than setting the agenda yourself. (p. 19)

In light of the challenges of fundraising, some individuals in my study asserted that funding should come from the school or school board, to relieve the pressures of external fundraising (“The school board should be providing more money to make these projects happen” (Parent, School B)). One uninvolved teacher, however, who was not an advocate of greening initiatives, disagreed, stating that, “Money at the school and school board level should not be spent on this project. Funds should come from the money raised by the parents’ council for the benefits of the students. The funding for this project should not negatively impact funds for classroom use” (Questionnaire respondent). Whether or not funding comes from the school board, Wyzga (2001) stresses the importance of including school administrators in the process of fundraising. Keeping upper level administrators abreast of fundraising efforts is critical to ensuring that their buy-in is secured.

In discussing the issues and challenges related to funding, it was interesting to note the one interviewee from a school with higher SES presented the notion of “social moral consciousness” and problematized the school’s position of privilege to be able to raise such a large amount of money (more than \$250,000). She recognized that schools within lower SES communities would never be able to raise equivalent funds and acknowledged that they probably

could have made significant changes to their own yard with considerably less money. This, of course, would leave money for those schools that “probably need the changes much more than we do” (Teacher, School A). Indeed in the field of fundraising, as Wyzga (2001) notes, “money draws money, and success breeds success” (p. 22). Close attention must be paid to consider the needs of schools in lower SES communities that may not be able to get a chance to ‘get ahead’ and get their first round of money which would allow them to breed ‘further success.’

Teamwork and Leadership

When I asked interviewees to describe limiting and enabling factors, a major theme that emerged was that of teamwork and leadership. While the interpretation of teamwork varied among individuals, it was a dominant theme. In reviewing the questionnaires, it appears that this finding emerged as well: respondents indicated that key enabling factors were the involvement of various individuals (e.g., teacher, parent, principal) (Table 24). Implicit in their responses, I now believe, was the fact that these individuals worked together, usually with the leadership of one or two individuals. 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 (Limiting Factor #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 (Enabling Factor #1, 3-5) (Table 23, Table 24).

Interviewees indicated that one key to success was ensuring that there is a dedicated committee comprised of teachers, parents, principals and students, a finding that has been noted by others (Mutton & Smith, 2001; Stowell, 2001; Wyzga, 2001). Mutton and Smith (2001), for example, insist that one of the first steps to starting a greening initiative is forming a committee “consisting of a few people with a common goal and lots of energy to get the project wheels turning. Include parents, teachers, administrators, student representatives, the school grounds caretaker, and a school administrator” (p. 25). Stowell (2001) also stresses the importance of an active team, commenting that while “approaches [to greening] may differ, all successful outdoor classrooms have one thing in common: teamwork!” (p. 16).

While questionnaire respondents and interviewees differed on who, exactly, was the most important, there was generally agreement that a team approach was necessary. Some respondents felt that teachers were especially important on the greening team. As one respondent said, “Teachers made our project happen. They are the ones with the vision, energy. They are the ones on the yard seeing what is possible” (Questionnaire respondent). Others indicated that

parents were vital to ensuring a successful team, “Parental involvement is the key to ongoing success. Parents can encourage both students and community members to create a green space that benefits everyone” (Parent, School A). Still others described how principals assume a vital role on the team, and ensured the success of greening projects by influencing the perceptions of teachers, parents and students. One respondent commented, “Without the principal’s endorsement, nothing can happen” (Questionnaire respondent); another noted, “We had a principal who made [the school ground greening project] a priority so it all was able to happen” (Teacher, School D). Finally, some respondents felt that students were the key team players that enabled the success of the project. One respondent observed, “Students serve as the catalyst for these projects...their enthusiasm is required to make the greening [project] succeed” (Questionnaire respondent). Others disagreed on the role of students, noting that, “It all comes down to interested adults. The idea of students taking change on a longterm basis is unrealistic” (Questionnaire respondent). Perhaps the respondent who noted, “People are key. Time is so very tight and with many hands, the work is easier” (Questionnaire respondent) recognized the importance of all of these groups working together to achieve common goals.

While it seems that teamwork enabled many of the projects evaluated in this study, a common feature is that within a team, a single individual was willing to take a leadership role. And often that one individual is perceived as being the key to enabling the project, as noted by this respondent, “We seem to be able to do small projects around the school, but until the ‘key organizer’ can be found, large scale greening projects will have to wait” (Questionnaire respondent). Stowell (2001), however, cautions too much emphasis being placed on a single individual, noting that while “the initial spark may come from one inspired teacher, parent, or community member...for the spark to be sustained and the project to succeed, there must be leadership from a variety of individuals” (p. 16). A TDSB employee also noted that despite the intentions of having an active team to share the work, inevitably one person takes the brunt of the responsibilities. He describes what he has noticed with respect to team work on greening initiatives:

I think even projects where you had a very participatory process, where there was a lot of people involved, and School D is a good example... well, still inevitably it seems that it dies. And I've also observed that at School X with Teacher A and School Y with Teacher B, that those projects now have been around a good 12 to 15 years. And it's really come down to one person at both schools. Teacher A has involved a lot of people over time, but the reality is they've had a person who's been deeply committed and for 10-15 years has poured their professional life into that. So I don't necessarily buy that it's the broad process that is really going to buy itself. (TDSB Employee)

In exploring the idea of teamwork, many interviewees commented that their committee excelled because it had a clear vision and goal that provided members with direction in times of difficulty. The principal at School B explained:

It's identifying a goal, and it's getting consensus that, yes, that's where we want to go, and it's everybody heading in the same direction together. And if you imagine little arrows and all the people in this community and this school being an arrow, and when you've got everybody pointing in the same direction, the power just grows and you can do anything. (Principal, School B)

Having a goal appears to help a committee set measurable targets ("I think our original vision was very simple and specific and had goals that we could meet and I think that was a good place to start, because if you set a goal that you can reach and then you think 'we did that, what can we do next?'" (Parent, School B)) and negotiate through times of difficulties ("You just have to keep ongoing through thick or thin...sticking to your plan... you'll have good times and bad times" (Teacher, School D)). Mutton and Smith (2001) agree with the importance of having a clear vision, asserting that the first step in getting started on a greening project should be identifying a vision, philosophy and objectives that help to keep the project "in line and attainable" (p. 25).

Some teams, it seems, actively struggled without a clear vision or plan. At one of the schools, School C, there was really no plan in place and this appears to have limited the success of the initiative. I asked the teacher to explain how her own vision did not mesh with that of her team's:

Teacher, School C: That's just the kind of person I am. I want to do this so I'm going to keep going. But unfortunately... that's something... maybe I went too fast for some people... that's my personal thing though.

Janet: What do you mean 'went too fast?'

Teacher: Some people wanted to know where specifically we were going to place each of these plants... really specific. We worked with a complete spectrum of people – right wing basically...and some wanted to know exactly where things were going to go, and other people were so naturalist that it was like "What's the problem here?" So my challenge was trying to bring these different perspectives and people together to work together and not be upset with each other, and sometimes I would go ahead and do things I think that made the people, the more straight-laced people... I don't know... they didn't want to go that fast. They were "Let's plan this, let's think..." I'm sorry but I'd say "I'm a doer. I'm gardening, hello, let's just do it." But I'm sure, looking back, I could have slowed down a bit and we should have had a vision together.

Interviewees also felt like a strong team was able to diffuse negative attitudes that are inevitably expressed about a project. A parent described how the team had to ignore "negative attitudes from people before we even began imagining our downfall" (Parent, School B). When the team rallied together, they were able to welcome people's feedback and advice:

Don't be bogged down by people who don't believe, because they can become believers later. Like the first time we went public with our little plan for the school and we had a

little suggestion board... people just kept saying negative things. We just kept writing them all down on the suggestion board. Because it was like, "Okay we want to hear what you think is not going to work," and then as we go along we can design our marketing to say, "We know you're probably concerned about vandalism, etc., but really this is the outcome that's more likely." Or, "You think it's not going to be watered, here is the whole roster of families." (Parent, School B)

Ideally, if a strong team is in place, interviewees felt that the challenges of an ephemeral school community could be managed in advance. Turnover could occur in a gentle way, so that the project was never left unattended for extended periods of time. A parent explains: "We're all trying to bring in regular new blood... and there is new blood that wasn't there in the beginning that is involved regularly...hopefully there will never be a big gap" (Parent, School B).

Relationship with Custodial Staff and School Board

Many interviewees commented that relationships with custodial staff, school board grounds staff, and TDSB officials could both limit and enable the success of the project, a finding that has been noted in the literature (Mutton & Smith, 2001; Stowell, 2001). This was somewhat different than responses that emerged from the questionnaires, where these did not rank noticeably as being major limiting or enabling factors (Table 23, Table 24).

Some felt that these relationships limited the success of a project. One involved teacher, for example, indicated that "caretaking staff refuse to help with watering or fixing outside faucets" and another principal noted that "there has been complete lack of initiative/ownership from the custodial staff" (Questionnaire respondent). One involved teacher offered the following advice: "Don't go to all the work if your caretaking staff has not bought into the entire project" (Questionnaire respondent).³³ Closely related to the issue of custodial staff is the issue of school board unions, with some questionnaire respondents and interviewees commenting that they had experienced frustrations in working with the TDSB unionized grounds staff. These individuals felt frustrated because: 1) they could not accept donations ("they restrict us from getting free compost or services donated...in other words, we have to pay for unionized board services that we could get elsewhere for free!" Questionnaire respondent); 2) they had to wait a long period of time for materials ("it takes a lot of time to get those things... it might take a few months or a few phone calls" (Teacher, School C); 3) they had to "remember to follow all of the rules that the

³³ Some of the perceptions of the role that custodial can assume are troubling to me. One could argue that custodial staff should be involved in greening initiatives in 'authentic' ways, like students. I wonder if issues of class and social capital are appearing here (yet again), with parents/teachers assuming that custodial staff have little to offer beyond physical assistance?

Toronto District School Board has in place for work that is done at the schools and on the grounds” (Principal, School B).³⁴

While some described these relationships as limiting factors, others indicated that these very relationships were key enabling factors in their project. For example, one respondent did note a positive relationship: “custodial staff and grounds people have been very helpful in providing some tools, heavy machinery, and compost for development” (Questionnaire respondent). Perhaps it does take some time for custodial staff to have buy-in towards the project and demonstrate their support. As revealed in Table 16, custodial staff were reported to be significantly more involved in initial and ongoing maintenance in projects that were older than 5 years as compared with projects that had been in existence for less than 5 years. Other interviewees asserted that resources offered through the Toronto District School Board had been absolutely critical in enabling their greening project. These individuals explained how the TDSB’s workshops (“I learned so many things from the Evergreen/TDSB workshops” Questionnaire respondent), site visits (“The information she gave us when she came was absolutely invaluable” Teacher, School E), and curriculum guidance (“I learned how to incorporate the greening project into my teaching...through board resources” Questionnaire respondent) were instrumental in facilitating their projects.

Stowell (2001) attests to the important roles that school boards and custodial staff can (and should) assume before, during, and after the process of school ground greening. She maintains that a solid team must include representatives from both groups. In terms of school board involvement, she asserts that “support and participation of school officials is critical, as they can offer insight into budget concerns, future building plans, liability issues, community relations, and funding opportunity” (p. 17). Similarly, she stresses the importance of including maintenance staff: “As the people with the most knowledge of the conditions of your site and the equipment available, they can assist in offering valuable advice on locating and using the tools needed for construction and maintenance” (p. 17). Stowell disagrees with the commonly expressed concern that green school grounds will increase work for maintenance staff. Instead, she asserts that a green school ground should, in fact, reduce work for maintenance staff because “over the longterm, the planted areas will require less watering than lawns and they will need no fertilizers...which translates into savings for the schools maintenance budget” (p. 18).

³⁴ Many of the comments about ‘unions’ and ‘TDSB staff’ appear to be quite individualistic, with little empathy or understanding of the rationale behind why (and how) these ‘rules’ have come to be (e.g., job security, level playing field, etc.).

Teacher Education

Given the vital role that teachers assumed in both limiting (Limiting Factor #4) and enabling school ground greening projects (Enabling Factor #1) in the TDSB (Table 23, Table 24), it was not surprising that during the interviews, study participants emphasized the critical role of providing teacher training. 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 to prepare lessons dramatically reduced the amount of teaching that could occur.

Participants suggested that the necessary professional development could be offered to practicing and training teachers. In addition to providing teachers with the skills and confidence to use the outdoor classroom, these programmes could also address commonly cited barriers such as fundraising, time management, maintenance and concerns about health and safety.

In addition to training teachers, some study participants noted that educational opportunities should be offered to other stakeholders, such as custodial staff and grounds maintenance staff. This is especially important given that these individuals are often associated with schools and projects over the long term (whereas teachers are often relocated and shift their support to their new school).

Curriculum Constraints

In addition to teacher training, study participants also identified the need for curricular materials to help teachers take students outdoors. Given that teachers are very busy (Limiting Factor #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 (Table 23, Table 24). Many participants reported, in fact, that the burden of finding curricular links presently falls on the shoulders of teachers. This, they stated, was because the Ontario curriculum does not explicitly endorse or encourage the use of school grounds for teaching. Rather, it assumes that the bulk of teaching and learning will take place within the classroom (see Fisher, 2001).

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, School B). According to one questionnaire respondent, this often can leave little room for using the outdoor classroom: “Teachers who focus on the 3-R’s 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 as an outdoor classroom is diminished.

Design Issues

Despite the fact that the literature is replete with design recommendations for greening school grounds (e.g., Adams, 1993; R.C. Moore & Wong, 1997; Stine, 1997; Titman, 1994; Toronto District School Board, 2000), it appears that the issue of ‘design’ continues to both limit and enable the greening projects profiled in the present study. In hindsight, I realize that the issue of design was explored only superficially in the questionnaire when I asked respondents if and how ‘maintenance’ influenced the success of the project (Limiting Factor #3). Based on my analysis of the interview transcriptions, I realize now that design also plays an important limiting and enabling role.

When issues related to design were presented in a negative limiting manner, interviewees reported how school ground greening projects were too large (“It is absolutely staggering the size of this garden...how on earth are we going to sustain it?” (Principal, School C)). Some felt like the green school ground was too unwieldy (“We bought a big variety of plants and we were recommended also to plant them randomly. So when it came time to actually weed the garden, the kids didn't know... it all looked like weeds” (Parent, School C)). Still others felt like their space lacked flow or direction (“We just put everything together...we should have separated it...there is no flow” (Parent, School C)). Some felt like their green space was far too complex (“There were just a million things going on in the garden...no one knew even where to begin helping” (Principal, School C’’)). Some expressed concerns that their green school ground required too much maintenance (“A lot of the designs are such that, if you've got like a garden of Perennial flowers let's say, often what happens is if you neglect it, the invasive weeds come in and take over and it looks awful” (TDSB Employee)). Finally, some noted that their spaces were not designed with children in mind (“We tried to get a bang for our buck so we were buying a lot of smaller trees... 3 ft. high... and we planted them around the perimeter so that when they matured it'd be like a shade patch, so kids could sit underneath it. But unfortunately the kids didn't know and then during the winter the branches would snap, kids would start pulling them out... so we did a big investment program trying to protect the trunks, but even that didn't work...we lost everything” (Parent, School C)).

Not surprisingly, the problems associated with a poorly designed green space persist and affect issues related to maintenance. Indeed, maintenance can be a time-consuming, daunting, and expensive endeavour, especially if it is not taken into consideration in advance (Grant &

Littlejohn, 2001b). As an extreme example, the complex green space at School D presented numerous challenges for maintenance, particularly when the original parent group moved along. I asked the landscape architect who had been involved in the project 10 years earlier to comment on the current 'state' of the green school ground. He said:

I'm in a little bit of shock just because... I'm thinking to myself, if School D is such a precedent-setting project for schoolyard naturalization and if it's got the all the precedents... and you're doing research on it now... and if it's so important to the so-called 'movement' or greening of schoolyards movement, then why hasn't it been cared for, right? And basically it looks like a landscape that's been neglected and unloved basically. And maybe not through anything kind of malignant, malignant neglect, for lack of a better word... but I think there's a lot of people... there's been a transition, a turnover of people at the school – parents, teachers, staff... if they really don't understand what is required for the maintenance. (Landscape Architect, School D)

Other researchers have noted how the issue of maintenance can be a barrier to the success of a greening initiative. For example, the National Wildlife Federation asked 222 teachers associated with green school grounds if they had difficulty in maintaining their site: almost half of the respondents (45%) reported challenges associated with maintenance (National Wildlife Federation, 2001).

For some schools in my study though, their design has been a key enabling factor in their process of greening. Many terms were used to describe this longterm planning approach, including "designing for neglect" (TDSB Employee) and "designing for sustainability" (Principal, School B). Working under such a model, a TDSB employee explains how, "You would design it and anticipating it would be neglected. So that determined your design" (TDSB Employee). Essentially, with such a longterm vision, problems related to maintenance and continuity decreased significantly. Mutton and Smith (2001) agree that designs should be sustaining: "The ultimate aim is to have a self sustaining and ecologically balanced plant community that is integrated into the local environment" (p. 26).

The issue of design is a key one being addressed by upper level TDSB administrators who are striving to encourage proper designs and longterm planning. Recognizing that design can be both a limiting and enabling factor, TDSB officials are emphasizing that initial planning and design, when done properly, should take upwards of one and a half years. By stressing the importance of longterm planning and proper thoughtful designs, the board also wants to emphasize that the work continues after the plantings have happened.

With my workshops I try to help them see that the project isn't static, it keeps growing and it's going to keep changing, and that that framework needs to be set in place for all participants who are there now and in the future to become involved. So I see that as a lot of schools don't see how to make that framework happen... and lots of these projects are parent driven, and then they try to bring more parents on board, but they don't have

that framework in place... so it's like "come and be part of our project"... but it's done basically... it's just this funny kind of way, it's kind of residential gardening, they kind of put the garden in and then they think it's finished. (Heidi Campbell, Joint TDSB-Evergreen position)

Design issues are explicitly addressed by the school board in the EcoSchool's document entitled *School Ground Greening: Designing for Shade and Energy Conservation* (Toronto District School Board, 2004). It emphasizes and promotes modest designs with three structures: 1) trees; 2) rocks; and 3) mulch that will simultaneously provide shade, conserve water, and enhance the aesthetics and functions of the school ground.

The emphasis on 'Trees/Rocks/Mulch' excites Richard Christie, District-wide coordinator of Environmental Education within the TDSB, who has seen too many elaborate and complex green school grounds developed by enthusiastic parents and teachers become maintenance "nightmares" that end up being the responsibility of Facilities Services Department. While Christie is supportive of having a few exemplary and complex green school grounds, he is also a strong advocate of having all schools in the board adopt the "Trees/Rocks/Mulch" approach to green school grounds. He noted that:

In the really restricted area of shade, my hope is that there will be a significant transformation, that more people will be willing to make modest commitments to school ground greening...they will have a narrower set of objectives that will be achievable...they'll feel successful, the Board will feel successful, and we'll have this sense that the entire board is making progress in an important area. (Richard Christie)

He notes that "a lot can happen with trees, rocks and mulch...it is beneficial for so many different reasons and you will get buy-in from Facilities." It is hoped that all schools in the board could adopt such an approach and that support will be available to facilitate such a large number of initiatives.

Within the guide, a "five step process" for school ground greening is promoted and a number of 'recommendations' are provided regarding minimum sizes of trees, etc. These recommendations have emerged from the experiences in the board. While the Ecoschools guide does contain elements of 'prescription,' Heidi Campbell is quick to note that the guide does not promote a "cookie cutter approach to school ground greening." Rather, she explains that the guide is intended to "help schools get going in a creative way that ensures success." This approach will be strongly promoted and targeted to schools that are just beginning the process of greening their grounds. It is hoped that this approach will avoid the worst case scenarios. As Bruce Day says,

I've been trying to do this for years, because the butterfly gardens, the veggie gardens, the wild flower meadows, all of these are different projects... they all come with a lot of desire and passion up-front, but when the folks who are organizing these things move on,

if the teamwork hasn't included the school staff and it hasn't been integrated into the curriculum, then... and there have been quite a few failures. And that's an added maintenance cost.

It is hoped that a 'Trees/Rocks/Mulch' approach to greening will be:³⁵

- *Meeting multiple objectives* ("And trees obviously for not only aesthetics but for reduction of solar... skin cancer... problems with skin cancer... exposure to the sun's rays... and obviously a place for the kids to be where it's cooler, and part of that being a place to sit, and most of the schoolyards there's nowhere to sit. So I need a place that's cooler and is in a shady area, and they need places to sit...oh...and an outdoor classroom" Bruce Day);
- *Easier to initiate* ("So a lot of people don't really know what they're going to do with this money – they want to get the money, they want to do some greening, but what is the plan, what's the longterm goal for this project? So by defining trees, rocks and mulch, it has a place for sitting, learning, outdoor classrooms, whatever... in a lot of cases people say 'That's a good idea. I really don't have too much time right now to research all of this'" Bruce Day);
- *Easier to expand* ("Some schools have had a long range plan and they've said, "We know what we want to do but we don't have very much money. We will fundraise \$300 this year...next year we will fundraise the other \$350 or \$400, and we'll plant another tree." And next year they came back and said "Same plan next year." So the plan is there, it's just that they're not going to put it all into place all at once, because the school can't get all of that money at once" Bruce Day);
- *Easier to maintain* ("It's great to be creative, and we can have all the landscape architects and artists designing creative things, but if they're not practical and they get abandoned down the road in 2 or 3 years, what message does that send to the children that we've failed... and how do we keep or maintain some of these gardens with a declining budget. With trees, rocks and mulch, there is almost no maintenance" Bruce Day).
- *Be sustaining in the longterm* ("If you can get a tree established, then you've got something there for 50-75-100 years; a perennial garden maybe there for a 2-5-10 years; but with trees there is a longevity to those and there's a future to those and it's something that we need" Bruce Day);
- *Coordinate efforts at a school board level* ("Up-front we need to have a list of standards, principles, guidelines so that we can give to these people because everybody and their uncle is involved in schoolyard greening, and they bring in outside contractors, outside landscape architects and the whole shebang, and there's materials coming into the school grounds which we don't approve of, and so we have to get something in writing up-front, so that we can give to these people and we can get everybody on the same path. With the [trees, rocks, mulch] approach, it is very easy to coordinate and offer support across the board" Bruce Day).

³⁵ See also Toronto District School Board (2003b; 2004).

Section Summary and Conclusions

In this section of this chapter, I presented the perceived barriers and enabling factors that were described by questionnaire respondents and interviewees. Other organizations (similar to Evergreen) have investigated the factors that limit and enable greening initiatives. The responses are strikingly similar, suggesting a fairly universal set of limiting and enabling factors for school ground greening. Time, funding, and maintenance are barriers not only for TDSB school grounds. For example, the National Wildlife Federation in the United States runs a program called Schoolyard Habitats. In 2001, they received responses from 222 teachers who identified the main obstacles to their greening initiative. The main obstacles were very similar to the ones found in this study: 1) lack of time (48% of respondents); 2) lack of buy-in from teachers (29%); and 3) lack of funding (19%) (National Wildlife Federation, 2001). The School Garden Resource Network of Sonoma County, California also investigated the barriers to greening initiatives in 1999. They surveyed 142 greening initiatives and found that the key ‘difficulties’ in having a school garden were: 1) lack of resources (48% of respondents indicated that this was a difficulty); 2) lack of funding (47%), difficulty in maintenance (46%), and lack of gardening experience (34%) (School Garden Resource Network, 1999). As another example, the State of New Hampshire Fish and Game Department operate a program called Project HOME that facilitates school ground greening. In 2000, they surveyed 63 of their schools with a view to understanding, amongst other things, the key barriers. The top two barriers were: 1) other demands from curriculum³⁶; and 2) lack of money (State of New Hampshire Fish and Game Department, 2000). Finally, when external evaluators assessed the Growing Schools Innovation Fund Projects in the United Kingdom, their respondents described the following key barriers: lack of awareness; lack of knowledge and confidence; lack of time; staff changes within schools; lack of funding; vandalism and damage; health and safety concerns; weather concerns; and seasonal difficulties (Scott et al., 2003). Clearly, then, the barriers and enablers identified in my study are not overly unique to the Toronto District School Board – the four studies described above found similar factors.

Upon reflection, the large majority of the limiting and enabling factors identified in this and other studies, for the most part, do not seem overly unique to school ground greening initiatives. I suspect that many of the factors would be listed by adults involved in any number of extracurricular initiatives occurring in schools, for example the play, the art club, the book fair, etc. These initiatives that lie outside of the mainstream education mandate share ‘universal’

³⁶ Percentages for these barriers not available.

barriers and enabling factors, such as the challenges of fundraising, the need for a dedicated team, a lack of time, and a good relationship with the school board (e.g., Comishan et al., 2004; Simmons, 1998). The only limiting/enabling factor unique to the issue of school ground greening that did emerge related to design issues.

If my contention is founded that the barriers are not overly unique to school ground greening initiatives, it seems to me that many of the perceived barriers and enabling factors could have been identified at the outset or the pre-planning stages (e.g., If we are thinking of doing this, what problems are we likely to encounter? How can we allow for or address these? If this worked before, let's make sure it happens again). Are the barriers going to be in existence forever? Other researchers have raised these questions as well. Scott et al. (2003), in their evaluation of the Growing Schools Initiatives in the UK, were troubled by the nature of the barriers that had (and had not) emerged for the schools. They ask key questions in light of the identified barriers:

- Whilst there are barriers listed here, there are also a lot of issues that might (should?) have been anticipated;
- What was mentioned isn't a barrier; it's a question of poor allocation of resources. Neither is this; rather it is an example of a poor decision made by someone.
- Schools provide a long list of problems and barriers. The question that needs asking, however, is just how many of these have emerged from the experience of the Growing Schools initiative? (p. 33).

Furthermore, Scott et al. (2003) noted that many of the teachers and administrators in their study seemed unable to critically reflect upon their greening projects. I found similar trends in my study: there appeared to be little evidence of systemic critical engagement and evaluation of the greening projects in the TDSB. As a result, some of the barriers that stand to really limit the potential of school ground greening initiatives were not mentioned by questionnaire respondents or interviewees. For example, issues related to lack of student involvement and lack of teaching that is occurring on the green school ground were not mentioned when the respondents/interviewees were asked to discuss barriers. There was little emphasis or concern placed on how the greening initiatives influenced (or did not influence) students' learning experiences. While they were mentioned in other sections of the interview, when probed by the interviewer, their lack of presentation in the context of barriers seems to suggest that interviewees might be unaware of how much of a barrier these factors might actually be and how they are particularly unique to the situation of school ground greening initiatives.

So, what can be done to manage both the limiting and enabling factors described by questionnaire respondents and interviewees? What strategies exist to mitigate the barriers and to capitalize upon the enabling factors? What can be put in place to ensure that predictable barriers

that are not unique to school ground greening initiatives are foreseen? How can attention be shifted away from expected barriers and directed towards those barriers that truly stand to limit the potential of school ground greening projects? What role could formal internal/external evaluations play in resolving/addressing barriers? Should funders be encouraged to request evaluations of projects? Are more resources need to help address barriers (e.g., books, brochures, workshops, training sessions)? What role could various stakeholders assume in guiding these processes to avoid/manage barriers (e.g., parent teacher committee, teachers, principals, school board)?

The above list of questions begins to elucidate the numerous approaches that could be taken in seeking to enhance the school ground greening initiatives in this board. Clearly, many individuals and parties have a role to assume in making green school grounds what they could be. Yet one of these stakeholders is, I believe, particularly well situated to address a large number of the enabling/limiting factors. This stakeholder is the Toronto District School Board. Given that all the schools profiled herein are within the same school board, it seems to me that there is an important, unique, and arguably powerful role, to be assumed by the school board to help facilitate school ground greening initiatives. If the TDSB were to fully endorse the notion of school ground greening, they could help to create a board wide culture that honours the process and product of greening. In reflecting on the barriers and concerns that were identified by my questionnaire respondents and interviewees, I suspect that upper level institutional involvement might work to manage barriers and mitigate concerns. In particular, the TDSB could play an important role in dealing with:

- *ephemeral nature of school populations* (with TDSB support, they, in effect, become a constant key player/thread that helps particularly in times of personnel transitions);
- *poor designing, short term planning that require tremendous amounts of maintenance* (with TDSB support, and emphasis on Trees/Rocks/Mulch designs will be reviewed to ensure issues related to maintenance and sustainability are considered);
- *teachers not using for instruction* (with TDSB support, curriculum material can be created, in-service workshops offered, and endorsement offered for this type of teaching);
- *unauthentic student involvement* (with TDSB support, student involvement could be incorporated into curriculum); and,
- *funding constraints* (with TDSB support, funding could be coordinated and centralized).

CHAPTER SUMMARY

In Chapter 4, I presented and discussed the key findings from my investigation of school ground greening in the Toronto District School Board. I began by presenting a profile of the individuals, schools, and projects that were involved in my study. I then examined issues of design on the school grounds, by exploring the importance and adequacy of a variety of space types of the school ground. Next, I explored how various stakeholders were involved throughout the process of greening before turning to an investigation of the impacts of these initiatives. I concluded this chapter with a discussion of the key limiting and enabling factors for school ground greening.

In the next and final chapter, I reflect on this dissertation in its entirety, offering a concluding commentary on both the process and product of my study. I also present recommendations for research.

CHAPTER 5: REFLECTIONS AND RECOMMENDATIONS

Summary of Research

Many researchers have stressed the importance of allowing all individuals, regardless of age, opportunities to experience ‘nature.’ Personally, I am particularly interested in the relationship between children, nature and green school grounds. I worry that opportunities are becoming increasingly limited for young people in urban Canada to connect with the natural world; understanding the role of green school grounds in providing nature experiences for young people thus should not be underestimated.

At the outset of this dissertation, I summarized key literature related to school ground greening initiatives. I then presented and discussed the results of my own study on school ground greening initiatives within the Toronto District School Board, focusing particularly on who is involved in greening initiatives (Objective 1A), how they are involved (Objective 1C), the nature of the greening projects (Objective 1B), the impacts of greening initiatives (Objective 2), and the perceived barriers and enabling factors (Objective 3) in these initiatives. I now present a brief summary of the main study objectives.

School, Respondent, Interviewee and Project Profiles (Objective 1A and 1B)

The TDSB was an ideal site to perform my study given that approximately 20% of the more than 500 schools, from widely varying contexts, have begun the process of greening. My study included 45 school communities in Toronto, Ontario, Canada and was informed by an analysis of 149 questionnaires and 27 interviews with teachers, parents, administrators, as well as TDSB and Evergreen administrators. The study participants brought diverse experiences and voices to this research project, differing in terms of their age, gender and teaching experience, as well as their level of involvement and interest in greening initiatives. The schools varied as well: some schools had only 200 students, while others had more than 1500; and, some schools were located in Toronto’s wealthiest neighbourhoods, while others were located in its poorest. Working with such a large number of schools and diverse individuals under a single school board administration allowed me to understand trends across the schools.

Profile of Space Types (Objective 1B)

The school ground greening projects profiled in my questionnaires (N=45 projects) and interviews (N=5 projects) offered a diversity of circumstances and approaches for me to consider. For example, some of the greening projects were brand new, while others were more than ten

years old; some had budgets of only a few hundred dollars, while others had access to hundreds of thousands of dollars; and some had very complex designs including ponds, murals, outdoor classrooms, vegetable gardens, mazes and butterfly gardens, while others were much more modest and consisted of only a few trees.

Process of Greening School Grounds (Objective 1C)

My study revealed that a variety of stakeholders are involved in greening projects in the TDSB, including students, parents, teachers, principals and TDSB administrators. With respect to *students*, it appears that they are involved, to varying degrees, in the process of greening. I have argued that their involvement could certainly be more authentic, political, and active. I have also argued that the TDSB and Evergreen must assume a critical role in ensuring that young people become more involved in greening initiatives (e.g., advocacy work, training of teachers/parents/principal, curriculum development). Second, at all the schools profiled in the case studies, an individual or a group (either *teacher or parent*) is definitely taking the 'lead.' It appears that some one/group must assume a leadership role for a project to advance: someone to make the phone calls, organize the worker bees, have the big picture, maintain the momentum, etc. Third, the *principals* at all the schools profiled in this study have assumed an important role in supporting the initiatives. While their actual 'time in the garden' varies, it appears that their overall involvement is absolutely critical: their endorsement or resistance of a project can thus enable or block an entire initiative. Fourth, *SES* does appear to be a predictor for who is involved in the process of greening: at schools in higher SES communities, parents appear to be taking the leadership role whereas at schools in lower SES communities, teachers appear to be taking the leadership role. Fifth, the schools profiled in this study are *ephemeral*. Students, teachers, parents, and principals are constantly changing; these changes, although they are generally predictable, seem to wreak havoc on the projects. Finally, the *school board* is playing a role in some of the projects profiled in this research, but much of their involvement remains unrecognized.

Impacts of Green School Grounds (Objective 2)

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. These findings confirm that the benefits noted anecdotally and documented through research at a small number of schools (e.g., Bell, 2001a; R.C. Moore &

Wong, 1997) are being realized at a much larger and statistically relevant level. Study participants generally reported the following positive impacts of greening initiatives:

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

Of course there were areas where study participants felt the impacts could be improved – for example, they consistently reported that more teaching could and should be happening on the outdoor classroom; and they reported that some areas that are spatially isolated (e.g., front of school building) were not accessible for play.

What is 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 questionnaire respondents and interviewees associated with 45 different greening projects consistently reported positive impacts. Irrespective of the respondent’s characteristics (e.g., gender, age), the school’s characteristics (e.g., grade level, socio-economic status of the school catchment area), or the project’s characteristics (e.g., history, amount of funding), positive impacts were evident across the majority of areas investigated.

Limiting and Enabling Factors (Objective 3)

These positive impacts notwithstanding, the majority of study participants also expressed concerns about school ground greening projects, suggesting that many green school grounds had not reached their full potential. My study adds important information to our understanding of green school grounds and differs in important ways from some studies that report only the ‘good

news' stories of greening projects (see Chapter 1 and 2 for my concerns about some of the literature).

Key limiting factors that emerged in my study related to issues of:

- Student involvement
- Funding
- Ephemeral school communities
- Teacher training
- Curriculum links
- Design issues
- Socio-economic status

Again, what is striking is the fact 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.

Significance of Research

My study of adult perceptions of green school grounds in the TDSB adds to a growing body of research exploring the impacts of school ground greening projects; it also differs from much of the existing research for three main reasons. First, it adds to a small, but important, body of academic research (e.g., Bell, 2001a; Cheskey, 1994; Evergreen, 2003; Hutchison, 1998; Simone, 2002) and practitioner literature (e.g., Bell, 2001b; Evergreen, 2000a, 2000b, 2002; Grant & Littlejohn, 2001b) exploring these spaces from a Canadian perspective. (Much of the existing research has been performed in the Australia, Norway, South Africa, Sweden, the United Kingdom, and the United States.) Second, this research reports the perspectives of multiple stakeholders, including the voices of teachers who are not actively involved in school ground greening initiatives. This represents a departure from much of the existing research that presents the perspectives of only people who are interested in, and committed to, the school ground greening movement. Finally, this research differs from the majority of existing research that has operated solely within a qualitative paradigm (e.g., case studies of a single school initiative). This research used a quantitative approach, with questionnaires distributed to a large number of schools with a view to having a wider perspective of the impacts of green schools, as well as a qualitative approach, with the five case studies

Reflections on my Journey

Several additional findings/issues emerged for me that were not related to green school grounds, but instead were related to my research design decisions. Throughout the entire project (even today in writing this conclusion), I have struggled with my choice of methods, and wondered how commensurate they were with my methodological leanings. Like others who have used questionnaires, I felt “restricted by both questions and methods [that were] incapable of understanding the complexity” (P. Hart & Nolan, 1999, p.25), in this case, of school ground greening initiatives. Why did I use questionnaires and interviews? Why did I seek adult perceptions? Why didn’t I talk to the students? Did I move outside of the academy enough in my partnership with Evergreen to make my research “political” (Malone, 1999)? In the data analysis and writing phases of my research, I became increasingly aware of issues of legitimation and representation as I sought to interpret the words and honour the questionnaire respondents and interviewees. I realized how I would put on different ‘glasses’ to explore the data – some days these were rose-coloured glasses, sometimes these were grey glasses.

I was unprepared for and continuously struck by the differences between data that was gathered in the questionnaires versus the interviews, yet I found some solace in realizing that others have found these contradictions as well (see P. Hart & Nolan, 1999, p. 28). It is interesting to ponder, in reflection, how the questionnaire design influenced the ‘story’ that I heard. Questionnaire respondents were provided with a several closed answer questions that explored issues about the greening project. For example, they were asked to rank involvement of various individuals (e.g. “from the following list of individuals, pick the top three individuals and put 1-2-3” or “indicate the level of involvement of the individuals on a 4 point Likert scale” (1=very involved; 4=not at all involved)). This type of question allowed me to have insight into some aspects of who was involved, when they were involved, and how they were involved, but obviously my understanding was still quite limited given the nature of the questionnaire construction that forced respondents to answer within certain confines. I was glad to complement my findings from the questionnaires with my case study interviews because they allowed me to ask more in-depth questions about the process of greening. The apparent contradictions between the questionnaires and the case studies certainly reinforced the importance of having a mixed methods approach to research. Obviously, my understanding of school ground greening would have been limited had I chosen to only collect one form of data (and of course, had I added another type of method, such as ethnography, I would have another perspective on school ground greening, that might well in fact contradict my questionnaires and my case study interviews!).

Closely related, I felt continuous regret and even sadness at my decision to not include the voices of young people in this study. This decision was made for a number of reasons: but perhaps the biggest reason relates to the desire to understand trends of greening initiatives at a large number of schools. It would have been very challenging to simultaneously include the voices of students *and* gather information from such a large number of schools in the timeline that I set for myself as a doctoral student. Despite these ‘rationalizations’ that I offer to explain my research design decisions, I still feel tremendous regret – for my actions reinforce, to a certain extent, the poor degree to which children participate in the analysis, planning, design, management, and monitoring of school grounds. The act of *not* including students here is political and their non-inclusion will have ramifications through the ‘hidden curriculum’ of this very text.

These methodological doubts aside, I am nonetheless confident that I have provided a glimpse into the school ground greening initiatives in the TDSB, and addressed a gap in the literature.

Reflections on Critical Environmental Education

At the outset of this dissertation, in Chapter 2, I indicated that I would frame my study within a critical environmental perspective as it best reflected my theoretical and ideological perspectives. Throughout my dissertation, I have used this positioning to discuss many of my findings. In this final chapter of my dissertation, I offer reflections on if and how I believe school ground greening in the TDSB achieves the criterion of critical environmental education outlined by Fawcett, Bell and Russell (2002).

Resisting Anthropocentrism

I believe that many of the school ground greening initiatives profiled in my study successfully help students to disrupt anthropocentrism and the dichotomous relationship between humans and nature. When respondents and interviewees were asked to describe if and how students were given opportunities to develop environmental awareness, the overwhelming majority reported that the transformed school ground facilitated positive connections with the natural world. This was reported as being especially important in a large city like Toronto, where many young people have few opportunities to connect with the natural world. In my analysis, I was struck by how the green school ground allowed students to connect with nature in an intimate and embodied manner. Students were provided opportunities to overcome fears and misconceptions about nature. Learning opportunities happened not only via the formal

curriculum, but also during through the informal and nonformal curriculum in unstructured times such as recess and lunches. I suspect that the opportunity to resist anthropocentrism emerged not only for students, but also for teachers. Their enthusiasm for the green school ground and its effect on students suggests that they too are being affected by the space.

Ground Teaching and Learning in Student's Lives

Given that many questionnaire respondents and interviewees reported that that green school grounds were used so rarely for delivering curriculum, the possibilities to ground teaching and learning in the lives of students remains unrealized. It appears that students in the TDSB continue to be separated from their learning experience through curriculum standardization, textbooks, and power structures that exist in schools.

I suspect that competing and conflicting demands on the curriculum in the Ontario have created a series of tensions for the green school ground projects in the context of a school's curriculum. An initial tension which can be identified is that teaching and learning through green school grounds is not necessarily seen as legitimate or as readily assessed as indoor learning. Certainly, it now seems to be taken for granted that the bulk of teaching and learning in relation to the curriculum in Ontario takes place within the classroom, although clearly this has not always been the case, nor is it a settled matter. In my study, I noted the ascendance of a culture of inspection and accountability in the Ontario schools sector, which has tended to reinforce this classroom-based orientation towards the curriculum. In turn, this cultural shift in the education system has positioned many schools as docile, compliance-oriented and technicist in the face of increased centralization and curriculum control (see Hargreaves, 2003; Hargreaves & Fullan, 1988). As a consequence, outdoor learning that could occur on green school ground has been manoeuvred away from being regarded as essential to curriculum teaching and learning activities.

Thus, while there are distinct possibilities for grounding teaching and learning in students lives through the greening initiatives described in my study, the situation both within and outside of schools in terms of the policy framework means that the projects are, and remain, tangential to many of the targets and drivers of having to 'deliver' a curriculum within a school, its building and environs.

Attention to Place/Bioregionalism

Upon reflection, it appears that many of the school grounds profiled in this study are helping students to gain an understanding of their bioregion or homeplace. The large majority of questionnaire respondents and interviewees reported that students were able to learn about their

local environment on the green school ground. The green school ground thus provided a venue for allowing students to learn that nature is not separate from the city, a perception that is often encouraged (implicitly and explicitly) when students are taken on buses away from the city to nature for their environmental education lessons.

Arguably, opportunities for learning about students' homeplace and bioregion are (still) under realized in schools where little formal teaching happens on the green school ground. Students in these situations are left to make their own connections, through informal learning opportunities that emerge through playing on the school ground.

Action

Unlike many traditional environmental education programs that fail to provide a forum for students to act upon knowledge they have gained, school ground greening initiatives can provide students with opportunities to engage in real life environmental work. In the majority of greening projects profiled in my study, students are being encouraged, to a degree, to become involved in the process of greening. I have argued that at many of the schools their participation could certainly be more authentic, particularly in the early stage of greening - problem identification. Nevertheless, many students are involved in assisting with the design of the school grounds; many are helping with the actual plantings and maintenance. I expect that their involvement will allow them to learn skills related to democracy, citizenship, and participation. Clearly much more learning could happen if they were involved earlier on in the projects.

While I was often critical of adult over-involvement in selected parts of my dissertation, I also realize that for many adults in my study, their involvement in the greening initiative was also an opportunity for them to learn skills about political action. Many of them reported that they had never been involved in such a large project and that they learned that they could make a difference and leave a professional legacy. Once again, the benefits are not just for students.

I remain unclear if the school ground greening initiatives profiled in my study encourage changes in personal behaviour and social and organizational practices to deliver the kinds changes in broad social, economic and physical infrastructure that some critical environmental educators envisage (e.g., Capra, 1999; Sterling, 2001). Rather than green school grounds initiatives being essentially sites of social reproduction and business-as-usual in terms of teaching and learning, I would like to see them become an integral part of environmental education. More clearly, I would like to see them assist changing the educational culture towards the realization of human potential and the interdependence of social, economic and ecological wellbeing, and hence lead to transformative learning. Based on my study though, I suspect that they are, perhaps, (still)

something ‘extra’ and ‘outside’ of the mainstream, and therefore doing little to change the social and pedagogical status quo in schools.

Diverse Voices and Resistance

Complexities emerged in my study regarding if and how green school grounds provided a venue for challenging the traditions of a homogenous environmental education community. On one hand, I heard countless reports that school grounds were inclusive and non-judgemental. Interviewees indicated that anyone was welcome to the ‘garden club.’ Evidently, school ground greening projects are welcoming of anyone, regardless of race, class, gender, or age.

On the other hand, I found consistent and troubling relationships between SES and school ground greening that suggested that schools in higher SES communities are far more likely to have successful initiatives than schools in lower SES communities. Access to and distribution of social and economic capital was clearly not equal. Schools in higher SES communities consistently had raised much more money for greening projects than their counterparts. These same schools almost always had an active parent group that drove the initiatives; while in lower SES schools, the projects were primarily teacher driven. I suppose it should not be a surprise that when questionnaire respondents were asked to evaluate the adequacy of their green school grounds, respondents from higher SES schools reported that their grounds were consistently more adequate.

Thus it appears that school ground greening projects challenge, in small ways, the homogenous environmental education community. But in many other ways, these projects serve to reinforce the status quo of environmental education being most accessible for primarily white, middle upper class schools. Upon reflection, I am sad to report that my original hope that “school ground greening initiative provide a possible venue for critical environmental educators to explore the full possibilities of socially just environmental education” (see Chapter 2), remains, for the most part, unrealized.

Priorities for Research on Green School Grounds

My research adds to our understanding of the potential of green school grounds. It also provides a springboard for identifying future research priorities. Reflecting upon this dissertation and my review of existing literature, it appears that there are many challenges that complicate the process of researching the impacts of school ground greening initiatives. Thus far, methodological approaches to the study of school ground greening have been fairly limited, and certainly do not reflect the diversity of possible approaches available to environmental education

(Russell & Hart, 2003; see also, Denzin & Lincoln, 2000) As well, the foci of study in school ground greening have also been somewhat limited, which is not surprising given it is a relatively new phenomenon. To conclude the dissertation, then, I offer the following priorities for research on school ground greening initiatives. Of course, I am sure readers will also envision other priorities; I offer these, then, as food for thought and, perhaps, inspiration.

A basic research priority is to use a **wide range of existing and “emerging genres” of inquiry** (Russell & Hart, 2003, p. 5) to explore green school grounds. While much of the research reported in this dissertation has been done in traditional quantitative and qualitative frameworks, additional research from emerging genres (e.g., feminist poststructuralist, narrative, participatory research, postphenomenology, etc.) must be done to enhance our understanding of green school grounds. The challenges inherent in each genre are significant and must be recognized. For example, within a quantitative genre, if a researcher hopes to acquire data through field-based observations, true experimentation on green school grounds is extremely difficult. While researching the impacts of green school grounds, it is difficult to assign subjects randomly to conditions, to control extraneous variables, and to have strong manipulations. Additional constraints include the challenges of conducting measurements unobtrusively. Further, if a true experimental design is employed that involves physical design modifications, additional constraints emerge, such as lack of time, funding, and other resources. (For a good example of quantitative experimental designs, see the work of the researchers at the Human Environment Research Laboratory at the University of Illinois (e.g., Faber-Taylor et al., 2001, 2002; Kuo, 2001; Kuo & Sullivan, 2001b)). Other challenges emerge for researchers working within qualitative and emerging genres of inquiry as well, especially around issues of legitimation and representation. (For an excellent discussion of various genres of environmental education research, see volume 8 of the *Canadian Journal of Environmental Education* (2003)). To sum, contributions from all genres help to deepen our understanding of green school grounds.

A second priority in the research on school grounds is to **increase the sample size** of those studies conducted using traditional methods. While in-depth case studies of single greening initiatives provide rich insights into the experiences at one school (e.g., Bell (2001a); R.C Moore (1997)), it is important to complement these studies with large scale studies that survey a large number of schools (e.g., Lieberman and Hoody, 1998; Harvey, 1989) or to combine the results of multiple case studies with a view to identifying patterns and trends across a large number of schools.

A third basic research priority is to understand the **longterm impacts** of greening initiatives. For example, do students and teachers become habituated to greening initiatives? Do

the impacts wear off with repeated/continuous exposure? What, if any, learnings do young people who attend schools with green grounds carry into their adolescence? Adulthood? Longitudinal studies must thus be performed to document the impacts over time. (For an example of longitudinal studies, see the work of R.C. Moore, 1986b, 1989a, 1989b, 1989c, 1995, 1996, 1997 and Wells, 2000).

A fourth basic priority in the research on the impacts of school ground greening initiatives is to **identify the range of factors** that are influenced by the greening initiative. While the research reviewed in this dissertation has pointed to the links between greening initiatives and student cognition, social behaviours, play, environmental values, health and safety, much remains to be understood about other possible impacts. For example, are students who attend schools with greening projects influenced in other ways? Are surrounding community members influenced by the presence of a green school ground? Does a green school ground contribute to the ecological functioning of a community watershed? Exploration of the impacts must extend beyond the evident causal relationships into less obvious impacts that are more difficult to name, describe and understand. For example, is it possible that students attending schools with green grounds hold expectations that these spaces should be available around their homes? And what happens if and when their expectations are not met? Do they react negatively to their caregivers who may be unable to provide similar spaces? Researchers must be thoughtful and creative in seeking to understand the full range of impacts of green school ground.

A fifth basic research priority is to understand if different greening initiatives have discrete **spheres of influence**. For example, is there a minimum size that a project must be to have influence? Are there a minimum number of elements (e.g., trees, ponds, murals) that must be present before a green school ground is effective? Do some elements have more of an effect than others?

A sixth basic research priority is to understand more about the **process** of school ground greening initiatives. While several researchers and practitioners have pointed to the importance of process (e.g., Hunter et al., 1998; Kenny, 1996), much of the literature on green school grounds (including the majority of this research project) points to the benefits that emerge *after* the school ground has been transformed. Yet, what are the benefits for students, teachers, parents, and administrators who are involved in the process of greening a school ground? What is the scope of their participation? Is student participation authentic (see Hart (1992; 1997))? Is the focus primarily on making the school ground 'green', or is there a focus on acknowledging the importance of problem solving, critical thinking, planning, empowerment, and democracy? How does the culture of schooling constrain/enable these processes?

A seventh basic research priority is to understand the impacts of school ground greening from an **international perspective**. Given that the large majority of literature described herein has been performed in English speaking industrialized worlds, much remains to be understood by reviewing the literature produced from other non-English speaking industrialized and developing countries.³⁷ Once such a review has been performed and research gaps identified, it would be interesting to consider comparative cross-site/country investigations of school grounds.

An eighth basic research priority is to understand how greening school grounds relate to the values and goals of the **wider educational system**, or, if and how these processes contribute to a ‘sustainable’ education, including the adoption of a systemic, rather than sector-specific, perspective to learning in and beyond schools. For example, how (if at all) do school ground greening initiatives contribute to the goals of the UN Decade of Education for Sustainable Development? How do these projects challenge dominant (and troubling) trends in the education system (e.g., increased centralization and curriculum control) that result in increasingly passive, compliance-oriented and docile students?

A final basic priority in the research on school ground greening is to **identify the underlying aspects** of the greening-outcome relationships. For example, *why* are social relationships improved on a green school ground as compared with an asphalt school ground? *Why* are students performing better academically when they attend green school grounds? While some theoretical explanations have been proposed (e.g., the Kaplans’ Attention Restoration Theory) for some of the relationships, further dialogue is warranted, particularly in the context of school ground greening initiatives. Furthermore, (how) do issues of class, race, and gender influence green(ing) school grounds? And, (how) do patterns of access to social/economic capital influence the projects?

Recommendations for Green School Grounds in the TDSB

My dissertation 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 poor or wealthy neighbourhoods, their

³⁷ In making such a research recommendation, I am not implying that no research has been done in non-English speaking developed or developing countries. In fact, I am confident that this is not the case. Rather, the literature used in this dissertation reflects Anglophonic works only. There are, thus, many other resources that likely remain to be accessed.

benefits are broad-ranging and encouraging. They influence in a positive manner 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 is probably 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 my study suggests is that this maturing process could be substantially enhanced if the key impediments to greening initiatives were addressed. Most of these impediments are institutional in nature, reflecting the dominant culture of schooling in Canada – a culture that does not adequately recognize or value the benefits of hands-on, outdoor learning. Unfortunately, green school grounds are often treated as something 'extra' or 'outside' the primary mandate of schools (see S. Barker, Slingsby, & Tilling, 2003; Fisher, 2001). My study also highlights the huge untapped potential of greening efforts. 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 fund-raising, grounds design and maintenance, and teachers' unfamiliarity with delivering the curriculum and managing classes outdoors. To meet these challenges, participants pointed to the need for professional development, curriculum resources and wider, more consistent institutional support for teachers who wish to use the school ground as an outdoor classroom.

In light of the challenges and opportunities identified, I offer the following specific recommendations regarding policy development, teacher training, curriculum resources and board initiatives:

1. **Policy Development.** As my study indicates, institutional endorsement of greening initiatives is crucial to their long-term success. High-level support, for example at the provincial policy level, 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 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. **School Board Initiatives.** As described in my 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 meaningful, engaging and sustainable design elements to facilitate outdoor learning.
 - School boards across the province should provide planning and design support for school ground projects to ensure that plans incorporate meaningful, engaging and sustainable design elements to facilitate outdoor learning.
 - School boards should elevate the importance of green school grounds in terms of funding priorities, given their many benefits and given the fact that schools located in poorer neighbourhoods have difficulty raising funds.
 - The TDSB should explore, understand, formalize and promote alternative school ground management structures with a view to increasing the efficiency of existing and emerging greening initiative committees.
 - The TDSB should promote increased student participation in greening initiatives throughout the analysis, planning, design, management, and monitoring of school grounds. This will require that parents, teachers, and principals understand how to include young people in more meaningful and authentic ways. The curriculum could also support increased youth participation.
3. **Teacher and Principal Education.** My study reveals that many teachers in the TDSB lack the confidence and skills to use the green school ground as an outdoor classroom. 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 training. Without adequate education to address such challenges as fund-raising, time management, maintenance and design, green school grounds will remain an underutilized resource. Faculties of Education and school boards across the province need to ensure that professional development opportunities are available to student teachers and practicing teachers. Similar opportunities must be available for principals so they can guide and support teachers in their schools.

Recommendations

- Faculties of Education should recognize the value of outdoor learning and provide professional development opportunities for student teachers and practicing teachers who wish to engage in greening initiatives and make full use of the outdoor classroom.
- The TDSB and school boards across the province should provide professional development opportunities for practicing teachers who wish to engage in greening initiatives and make full use of the outdoor classroom.
- The TDSB and school boards across the province should provide professional development opportunities for principals who wish to support greening initiatives.

4. **Curriculum Development.** The mandated Ontario curriculum does not explicitly endorse or support the use of school grounds for teaching. My study indicates that without such explicit endorsement and guidance, teachers are discouraged from using the school ground as an outdoor classroom.

Recommendations

- The Ontario Ministry of Education should ensure that curriculum policy documents explicitly recognize the value of learning in the outdoor classroom 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 in the outdoor classroom.

While my dissertation adds to the understanding of some of the impacts of green(ing) school grounds, we are far from understanding the complex relationships between green school grounds, 'nature,' and young people. My research and the other studies described throughout, however, have begun to articulate the important parameters on which to focus and set directions for future work. The continuation of research on green school grounds remains critical.

REFERENCES

- Abram, D. (1996). *The spell of the sensuous*. New York, New York: Vintage Books.
- Adams, E. (1990). *Learning through landscapes: A report on the use, design, management, and development of school grounds*. Winchester, UK: Learning through Landscapes Trust.
- Adams, E. (1991). Back to basics: Aesthetic experience. *Children's Environments Quarterly*, 8(2), 19-29.
- Adams, E. (1993). School's out!: New initiatives for British school grounds. *Children's Environments*, 10(2), 180-191.
- Alerby, E. (2000). A way of visualising children's and young people's thought about the environment: A study of drawings. *Environmental Education Research*, 6(3), 205-222.
- Alexander, J., Wales North, M., & Hendren, M. D. K. (1995). Master gardener classroom garden project: An evaluation of the benefits to children. *Children's Environments*, 12(2), 256-263.
- Armstrong, J. B., & Impara, J. C. (1992). The impact of an environmental education program on knowledge and attitude. *The Journal of Environmental Education*, 22(4), 36-39.
- Bak, N. (1995). Green doesn't always mean 'go': Possible tensions in the desirability and implementation of environmental education. *Environmental Education Research*, 1(3), 345-352.
- Baker, R. L., & Mednich, B. R. (1990). Protecting the high school environment as an island of safety: Correlates of student fear of in-school victimization. *Children's Environments Quarterly*, 7(3), 37-49.
- Barbour, A. C. (1999). The impact of playground design on the play behaviours of children with differing levels of physical competence. *Early Childhood Research Quarterly*, 14(1), 75-98.
- Barker, R. (1994). School grounds as a community resource. *Streetwise*, 5(4), 11-16.
- Barker, S., Slingsby, D., & Tilling, S. (2003). *Teaching biology outside the classroom: Is it heading for extinction*. FSC Occasional Publication 72. Shrewbury, UK: Field Studies Council/British Ecological Society.
- Barrett, M. (forthcoming). Opening up spaces for agency by making visible the discursive production of teacher. In B. B. Jensen & A. Reid (Eds.), *Critical International Perspectives on Participation in Environmental and Health Education*. Copenhagen NV, Denmark: Research Centre for Environmental and Health Education, The Danish University of Education.
- Bell, A. C. (2000). *Storied experiences of school-based habitat restoration*. Unpublished doctoral dissertation, Faculty of Environmental Studies, York University, Toronto, Ontario.
- Bell, A. C. (2001a). Engaging spaces: On school-based habitat restoration. *Canadian Journal of Environmental Education*, 6, 209-224.
- Bell, A. C. (2001b). *Grounds for learning: Stories and insights from six Canadian school ground naturalization initiatives*. Toronto, ON: Evergreen.
- Bell, A. C. (2001c). The pedagogical potential of school grounds. In T. Grant & G. Littlejohn (Eds.), *Greening school grounds: Creating habitats for learning* (pp. 9-11). Gabriola Island, BC: New Society Publishers.
- Bell, A. C. (2003). A narrative approach to research. *Canadian Journal of Environmental Education*, 8, 95-110.

- Bell, A. C. (2004). *Providing shade, promoting health*. Toronto, Ontario: Evergreen.
- Bell, A. C., & Russell, C. L. (1999). Life ties: Disrupting anthropocentrism in language arts education. In J. P. Robertson (Ed.), *Teaching for a Tolerant World, Grades K-6: Essays and Resources* (pp. 68-88). Urbana, Illinois: National Council of Teachers of English.
- Bell, A. C., & Russell, C. L. (2000). Beyond human, beyond words: Anthropocentrism, critical pedagogy, and the poststructuralist turn. *Canadian Journal of Education*, 25(3), 188-203.
- Blyth, D. A., Smith-Thiel, K., Mitsch-Bush, D., & Simmons, R. G. (1980). Another look at school crime: Student as victim. *Youth and Society*, 11(3), 369-388.
- Bogner, F. X. (1998). The influence of short-term outdoor ecology education on long-term variables of environmental perspective. *The Journal of Environmental Education*, 29(4), 17-29.
- Bolund, P., & Hunhammar, S. (1999). Ecosystem services in urban areas. *Ecological Economics*, 29, 293-301.
- Borg, M. (1999). The extent and nature of bullying among primary and secondary school children. *Educational Research*, 41(2), 137-153.
- Boulton, M. J. (1999). Concurrent and longitudinal relations between children's playground behaviour and social preference, victimization, and bullying. *Child Development*, 70(4), 944-954.
- Bowers, C. A. (1996). The cultural dimensions of ecological literacy. *Journal of Environmental Education*, 27(2), 5-10.
- Bowers, C. A. (2002). Toward an ecojustice pedagogy. *Environmental Education Research*, 8(1), 21-34.
- Breiting, S. (2000). Sustainable development, environmental education and action competence. In B. B. Jensen, K. Schnack & V. Simovska (Eds.), *Critical environmental and health education research issues and challenges* (pp. 151-166). Copenhagen NV, Denmark: Research Centre for Environmental and Health Education, The Danish University of Education.
- Canaris, I. (1995). Growing foods for growing minds: Integrating gardening and nutrition education into the total curriculum. *Children's Environments*, 12(2), 264-270.
- Capra, F. (1999). *Ecoliteracy: The challenge for education in the next century*. Liverpool Schumacher Lectures, March 20, 1999. Berkeley, CA. Center for Ecoliteracy.
- Carr, W., & Kemmis, S. (1983). *Becoming critical: Education, knowledge and action research*. London: Falmer.
- Centre for Ecoliteracy. (1999). *The edible schoolyard*. Berkeley, CA: Learning in the Real World.
- Chapman, D. J. (1999). So you want to teach FOR the environment... *Environmental Education Research*, 5(3), 267-272.
- Chawla, L. (1986). The ecology of environmental memory. *Children's Environments Quarterly*, 3(4), 34-42.
- Chawla, L. (1992). Childhood place attachments. In *Place attachments* (pp. 63-86). New York: Plenum Press.
- Chawla, L. (2002a). Toward better cities for children and youth. In L. Chawla (Ed.), *Growing up in an urbanized world* (pp. 219-242). London, UK: UNESCO/Earthscan Publications Ltd.
- Chawla, L. (Ed.). (2002b). *Growing up in an urbanized world*. London, UK: UNESCO/Earthscan Publications Ltd.

- Cheskey, E. (1994, September/October). Habitat restoration: Changing the schoolyard changes behaviour. *FWTAO Newsletter*, 2-7.
- Cheskey, E. (2001). How schoolyards influence behaviour. In T. Grant & G. Littlejohn (Eds.), *Greening school grounds: Creating habitats for learning* (pp. 5-9). Gabriola Island, BC: New Society Publishers.
- Cobb, E. (1977). *The ecology of imagination in childhood*. New York, NY: Columbia University Press.
- Coley, R. L., Kuo, F. E., & Sullivan, W. C. (1997). Where does community grow: The social context created by nature in urban public housing. *Environment and Behaviour*, 29(4), 468-494.
- Comishan, K., Dymont, J. E., Potter, T., & Russell, C. L. (2004). The development and implementation of outdoor-based secondary school integrated programs. *Applied Environmental Education and Communication*, 3(1), 47-54.
- Cooke, B., & Kothari, U. (Eds.). (2001). *Participation: The new tyranny*. London/New York: Zed Books.
- Corcoran, P. B. (1999). Formative influences in the lives of environmental educators in the United States. *Environmental Education Research*, 5(2), 207-220.
- Cornwall, A. (2002). Participation in development: Tracks and traces. *Currents*, 28, 4-8.
- Craig, W. M., Pepler, D., & Atlas, R. (2000). Observations of bullying in the playground and in the classroom. *School Psychology International*, 21(1), 22-36.
- Creswell, J. W. (1998). *Qualitative inquiry and research design: Choosing among the five traditions*. Thousand Oaks, CA: Sage Publications, Inc.
- Cronin-Jones, L. (2000). The effectiveness of schoolyards as sites for elementary science instruction. *School Science and Mathematics*, 100(4), 203-211.
- Cunningham, C., & Jones, M. (1996). Play through the eyes of children: Use of cameras to study after-school use of leisure time and leisure space by pre-adolescent children. *Loisir et Societe/Society and Leisure*, 19(2), 341-361.
- Denzin, N. K., & Lincoln, Y. S. (1994). *Handbook of qualitative research*. Thousand Oaks, CA: Sage.
- Denzin, N. K., & Lincoln, Y. S. (2000). Introduction: The discipline and practice of qualitative research. In N. Denzin & Y. Lincoln (Eds.), *Handbook of Qualitative Research* (2nd ed.). Thousand Oaks, CA: Sage.
- Department of Education and Skills. (2003). *Growing schools garden: Teachers' resource pack*. United Kingdom: Department of Education and Skills, Learning Through Landscapes, The Federation of City Farms and Community Gardens.
- Deschler, D., & Selener, D. (1991). Transformative research: In search of a definition. *Convergence*, 24(3), 9-22.
- Dillon, J., Rickinson, M., Sanders, D., Teamey, K., & Benefield, P. (2003). *Improving the understanding of food, farming and land management amongst school-age children: A literature review*. Slough, UK: National Foundation for Educational Research and King's College London.
- Driskell, D. (2002). *Creating better cities with children and youth: A manual for participation*. United Kingdom: UNESCO/Earthscan Publishing.

- Dyment, J. E. (2001). [Review of the books: Creating habitats for learning and Natures nurtures: Investigating the potential of school grounds]. *Canadian Journal of Environmental Education*, 6(1), 251-254.
- Dyment, J. E. (2004). "At that age, you just accept what you have... You never question things": A case study of student participation in school ground greening projects. *Children, Youth and Environments*, 14(1), 130-152 (see also <http://cye.colorado.edu>).
- Dyment, J. E., & Reid, A. (forthcoming). Breaking new ground? Green school grounds as sites of ecological, pedagogical and social transformation.
- Eagles, P. F., & Demare, R. (1999). Factors influencing children's environmental attitudes. *The Journal of Environmental Education*, 30(4), 33-37.
- Education Development Centre. (2000). *Schoolyard learning: The impact of school grounds*. Boston, MA: Boston School Yard Funders Collaborative.
- Engel, S. (1991). The world is a white blanket: Children write about nature. *Children's Environments Quarterly*, 8(2), 42-45.
- Evans, J. (1995). Conflict and control in the school playground. *Changing Education: A Journal for Teachers and Administrators*, 2(1/2), 17-22.
- Evans, J. (1997). Rethinking recess: Sign of change in Australian primary schools. *Education Research and Perspectives*, 24(1), 14-27.
- Evans, J. (1998). School closures, amalgamations and children's play: Bigger may not be better. *Children Australia*, 23(1), 12-18.
- Evans, J. (2001). In search of peaceful playgrounds. *Educational Research and Perspectives*, 28(1), 45-56.
- Evergreen. (2000a). *All hands in the dirt: A guide to designing and creating natural school grounds*. Toronto, Ontario: Evergreen.
- Evergreen. (2000b). *Nature nurtures: Investigating the potential of school grounds*. Toronto, ON: Evergreen Foundation.
- Evergreen. (2002). *School ground greening: A policy and planning guidebook*. Toronto, ON: Evergreen.
- Evergreen. (2003). News from the environmental education front. *The Outdoor Classroom: The Learning Grounds Newsletter on School Ground Transformation*, 11, 2.
- Faber-Taylor, A., Kuo, F. E., & Sullivan, W. C. (2001). Coping with ADD: The surprising connection to green play settings. *Environment and Behaviour*, 33(1), 54-77.
- Faber-Taylor, A., Kuo, F. E., & Sullivan, W. C. (2002). Views of nature and self-discipline: Evidence from inner city children. *Journal of Environmental Psychology*, 22, 49-63.
- Faber-Taylor, A., Wiley, A., Kuo, F. E., & Sullivan, W. C. (1998). Growing up in the inner city: Green spaces as places to grow. *Environment and Behaviour*, 30(1), 3-27.
- Farnham, M., & Mutrie, N. (1997). The potential benefits of outdoor development for children with special needs. *British Journal of Special Education*, 24(1), 31-38.
- Fawcett, L., Bell, A. C., & Russell, C. L. (2002). Guiding our environmental praxis: Teaching and learning for social and environmental justice. In W. L. Filho (Ed.), *Teaching sustainability at universities: Towards curriculum greening: Environmental education, communication, and sustainability* (Vol. 11, pp. 223-238). New York: Peter Lang Scientific Publishers.

- Fisher, J. A. (2001). The demise of fieldwork as an integral part of science education in schools: A victim of cultural change and political pressure. *Pedagogy, Culture and Society*, 9(1), 75-96.
- Fjortoft, I., & Sageie, J. (2000). The natural environment as a playground for children: Landscape description and analyses of a natural playscape. *Landscape and Urban Planning*, 48, 83-97.
- Flogaitis, E. (2000). The contribution of environmental education in sustainability. In A. Jarnet, B. Jickling, L. Sauve, A. E. J. Wals & P. Clarkin (Eds.), *A colloquium on: The future of environmental education in a postmodern world?* (pp. 97-99). Whitehorse, Yukon: Yukon College.
- Freeman, C. (1995). Planning and play: Creating greener environments. *Children's Environments*, 12(3), 381-388.
- Frumkin, H. (2001). Beyond toxicity: Human health and the natural environment. *American Journal of Preventive Medicine*, 20(3), 234-240.
- Gamson Danks, S. (2000). Ecological schoolyards. *Landscape Architecture*, 90(11), 42-47.
- Gamson Danks, S. (2001). Schoolyard ponds: Safety and liability. In T. Grant & G. Littlejohn (Eds.), *Greening school grounds: Creating habitats for learning* (pp. 87-88). Gabriola Island, BC: New Society Publishers.
- Glover, T. D. (2004). Social capital and the lived experience of community gardeners. *Leisure Sciences*, 26, 143-162.
- Gough, A. (1999a). Kids don't like wearing the same jeans as their Mums and Dads: So whose 'life' should be in significant life experiences research? *Environmental Education Research*, 5(4), 383-394.
- Gough, A. (1999b). Recognizing women in environmental education pedagogy and research: Toward an ecofeminist poststructuralist perspective. *Environmental Education Research*, 5(2), 143-161.
- Gough, N. (2002). Ignorance in environmental education research. *Australian Journal of Environmental Education*, 18(1), 19-26.
- Grahn, P., Martensson, F., Lindblad, B., Nilsson, P., & Ekman, A. (1997). *Ute pa dagis. Stad and Land, nr. 145 [Outdoor daycare. City and country]*. Hassleholm, Sverige: Norra Skane Offset.
- Grant, T., & Littlejohn, G. (2001a). Introduction. In T. Grant & G. Littlejohn (Eds.), *Greening school grounds: Creating habitats for learning* (pp. vi). Gabriola Island, BC: New Society Publishers.
- Grant, T., & Littlejohn, G. (Eds.). (2001b). *Greening school grounds: Creating habitats for learning*. Gabriola Island, BC: New Society Publishers.
- Green, S. B., & Salkind, N. J. (2003). *Using SPSS for Windows and Macintosh: Analyzing and understanding data*. Upper Saddle River, New Jersey: Prentice Hall.
- Greenwood, J. S., Soulos, G. P., & Thomas, N. D. (1998). *Undercover: Guidelines for shade planning and design*. Sydney, NSW: NSW Cancer Council and NSW Health Department.
- Guba, E., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of Qualitative Research* (1st ed.). Thousand Oaks, CA: Sage.

- Gump, P. V. (1988). Ecological psychology and issues of play. In M. N. Bloch & A. Pellegrini (Eds.), *The ecological context of children's play* (pp. 35-56). Norwood, NY: Ablex Publishing Corporation.
- Gurevitz, R. (2000). Affective approaches to environmental education: Going beyond the imagined worlds of childhood. *Ethics, Place and Environment*, 3(3), 253-268.
- Hall, G. E., & Hord, S., M. (2001). *Implementing change: Patterns, principles, and potholes*. Boston, MA: Allyn and Bacon.
- Haluza-Delay, R. (1999). The culture that constrains: Experience of 'nature' as part of a wilderness adventure program. *Journal of Experiential Education*, 22(3), 129-136.
- Ham, S. H., & Sewing, D. R. (1988). Barriers to environmental education. *Journal of Environmental Education*, 19(2), 17-24.
- Han, K. T. (2003). A reliable and valid self-rating measure of the restorative quality of natural environments. *Landscape and Urban Planning*, 64, 209-232.
- Hansen-Moller, J., & Taylor, G. (1991). Creative nature interpretation for children. *Children's Environments Quarterly*, 8(2), 30-37.
- Harding, S. (1986). *The science question in feminism*. Ithica, NY: Cornell University Press.
- Hargreaves, A. (2003). *Teaching in the knowledge society: Education in the age of insecurity*. New York: Teachers' College Press.
- Hargreaves, A., Earl, L., Moore, S., & Manning, S. (2001). *Learning to change: Teaching beyond subjects and standards*. San Francisco: Jossey-Bass.
- Hargreaves, A., & Fullan, N. (1988). *What's worth fighting for out there?* Toronto, Ontario: Ontario Elementary School Teachers' Federation,.
- Hart, P. (1990). Environmental education in Canada: Contemporary issues and future possibilities. *Australian Journal of Environmental Education*, 6, 45-66.
- Hart, P. (2000). Searching for meaning in children's participation in environmental education. In B. B. Jensen, K. Schnack & V. Simovska (Eds.), *Critical environmental and health education research issues and challenges* (pp. 7-28). Copenhagen NV, Denmark: Research Centre for Environmental and Health Education, The Danish University of Education.
- Hart, P., & Kool, R. (2000). Starting points: Questions of quality in environmental education. In A. Jarnet, B. Jickling, L. Sauve, A. E. J. Wals & P. Clarkin (Eds.), *A colloquium on the future of environmental education in a postmodern world* (pp. 218-226). Whitehorse, Yukon: Yukon College.
- Hart, P., & Nolan, K. (1999). A critical analysis of research in environmental education. *Studies in Science Education*, 34, 1-69.
- Hart, R. (1987). *Children's experience of place*. New York, NY: Irvington Publishers.
- Hart, R. (1992). *Children's participation: From tokenism to citizenship - Innocenti Essays #4*. New York: UNICEF Publication.
- Hart, R. (1997). *Children's participation: The theory and practice of involving young citizens in community development and environmental care*. London: Earthscan.
- Hartig, T., Bowler, P., & Wolf, A. (1994). Psychological ecology: Restorative-environments research offers important conceptual parallels to ecological restoration. *Restoration and Management Notes*, 12(2), 133-137.
- Hartig, T., Mang, M., & Evans, G. W. (1991). Restorative effects of natural environment experiences. *Environment and Behaviour*, 23(1), 3-26.

- Harvey, M. R. (1989a). Children's experiences with vegetation. *Children's Environments Quarterly*, 6(1), 36-43.
- Harvey, M. R. (1989b). The relationship between children's experiences with vegetation on school grounds and their environmental attitudes. *Journal of Environmental Education*, 21(2), 9-15.
- Heisler, G. M., Grant, R. H., Grimmond, S., & Souch, C. (1995). *Urban forests: Cooling our communities?* Paper presented at the Proceedings of the 7th National Urban Forest Conference: Proceedings of the Chicago Urban Forest Climate Project, New York, NY.
- Herrington, S. (1997). The received view of play and the subculture of infants. *Landscape Journal: Design Planning and Management of the Land*, 16(2), 149-160.
- Herrington, S., & Studtmann, K. (1998). Landscape interventions: New directions for the design of children's outdoor play environments. *Landscape and Urban Planning*, 42, 191-205.
- Heshusius, L. (1994). Freeing ourselves from objectivity: Managing subjectivity or turning toward a participatory mode of consciousness. *Educational Researcher*, 23(3), 15-22.
- Honeyman, M. (1992). Vegetation and stress: A comparison of varying amounts of vegetation in countryside and urban scenes. In D. Relf (Ed.), *The role of horticulture in human well being and social development: A national symposium* (pp. 143-145). Portland, OR: Timber Press.
- Horwood, B. (1995). Energy and knowledge: The story of integrated curriculum. *Pathways: The Ontario Journal of Outdoor Education*, 7(4), 14-18.
- Houghton, E. (2003). *A breath of fresh air: Celebrating nature and school gardens*. Toronto, Ontario: Sumach Press, Toronto District School Board, Learnxs Foundation.
- House, F. (1996). Restoring relations: The vernacular approach to ecological restoration. *Restoration and Management Notes*, 14(1), 57-61.
- Hsu, S. J., & Roth, R. E. (1998). An assessment of environmental literacy and analysis of predictors of responsible environmental behaviour held by secondary teachers in the Hualien area of Taiwan. *Environmental Education Research*, 4(3), 229-249.
- Huckle, J. (2000). Locating environmental education between modern capitalism and postmodern socialism: A reply to Lucie Sauve. In A. Jarnet, B. Jickling, L. Sauve, A. E. J. Wals & P. Clarkin (Eds.), *A colloquium on the future of environmental education in a postmodern world* (pp. 71-75). Whitehorse, Yukon: Yukon College.
- Huckle, J., & Sterling, S. (Eds.). (1997). *Education for sustainability*. London: Earthscan.
- Hunter, J., Layzell, J., & Rogers, N. (1998). *School landscapes: A participative approach to design*. Winchester, UK: Hampshire County Council.
- Hutchison, D. (1998). *Growing up green: Education for ecological renewal*. New York, NY: Teachers College Press.
- Huttenmoser, M. (1995). Children and their living surroundings: Empirical investigations into the significance of living surroundings for the everyday life and development of children. *Children's Environments*, 12(4), 403-413.
- Hynes, H. P. (1996). *A patch of Eden: America's inner city gardeners*. White River Junction, VT: Chelsea Green.
- Jensen, B. B. (2000). Participation, commitment and knowledge as components of pupils' action competence. In B. B. Jensen, K. Schnack & V. Simovska (Eds.), *Critical environmental and health education research issues and challenges* (pp. 219-238). Copenhagen NV,

- Denmark: Research Centre for Environmental and Health Education, The Danish University of Education.
- Jensen, B. B. (forthcoming). From levels to categories: Addressing the contextual parts of participatory education. In B. B. Jensen & A. Reid (Eds.), *Critical International Perspectives on Participation in Environmental and Health Education*. Copenhagen NV, Denmark: Research Centre for Environmental and Health Education, The Danish University of Education.
- Jensen, B. B., & Schnack, K. (1997). The action competence approach in environmental education. *Environmental Education Research*, 3(2), 163-178.
- Jickling, B. (2001). Environmental thought, the languages of sustainability, and digital watches. *Environmental Education Research*, 7(2), 167-179.
- Jickling, B., & Spork, H. (1998). Education for the environment: A critique. *Environmental Education Research*, 4(3), 309-327.
- Johnson, B. N. (1982). Education as environmental socialization: Classroom spatial patterns and the transmission of sociocultural norms. *Anthropological Quarterly*, 55(1), 31-43.
- Kahn Jr., P. H. (2002). Children's affiliations with nature: Structure, development, and the problem of environmental generational amnesia. In P. H. Kahn (Jr.) & S. R. Kellert (Eds.), *Children and nature: Psychological, sociocultural, and evolutionary investigations* (pp. 93-116). Cambridge, MA: The MIT Press.
- Kahn Jr., P. H., & Kellert, S. R. (Eds.). (2002). *Children and nature: Psychological, sociocultural and evolutionary investigations*. Cambridge, Massachusetts: The MIT Press.
- Kaplan, R. (1984). Impact of urban nature: A theoretical analysis. *Urban Ecology*, 8, 189-197.
- Kaplan, R. (1985). Nature at the doorstep: Residential satisfaction and the nearby environment. *Journal of Architecture Planning Research*, 2, 115-127.
- Kaplan, R. (2001). The nature of the view from home: Psychological benefits. *Environment and Behaviour*, 33(4), 507-542.
- Kaplan, R., & Kaplan, S. (1989). *The experience of nature: A psychological perspective*. New York: Cambridge University Press.
- Kaplan, R., & Kaplan, S. (2002). Adolescents and the natural environment: A time out? In P. H. Kahn (Jr.) & S. R. Kellert (Eds.), *Children and nature: Psychological, sociocultural, and evolutionary investigations* (pp. 227-258). Cambridge, MA: The MIT Press.
- Kellert, S. R. (2002). Experiencing nature: Affective, cognitive, and evaluative development in children. In P. H. Kahn (Jr.) & S. R. Kellert (Eds.), *Children and nature: Psychological, sociocultural, and evolutionary investigations* (pp. 117-151). Cambridge, MA: The MIT Press.
- Kenny, K. (1996). *Grounds for learning: A celebration of school site development in Scotland*. Winchester, UK: Learning through Landscapes.
- Kerby, B., & Egana, J. (2001). Greening highschoools: Leaping subject barriers. In T. Grant & G. Littlejohn (Eds.), *Greening school grounds: Creating habitats for learning* (pp. 34-36). Gabriola Island, BC: New Society Publishers.
- Kirby, S. L., & McKenna, K. (1989). *Experience research social change: Methods from the margins*. Toronto, ON: Garamond Press.
- Kirkby, M. A. (1989). Nature as refuge in children's environments. *Children's Environments Quarterly*, 6(1), 7-12.

- Kuo, F. E. (2001). Coping with poverty: Impacts of environment and attention in the inner city. *Environment and Behaviour*, 33(1), 5-34.
- Kuo, F. E., Bacaicoa, M., & Sullivan, W. C. (1998). Transforming inner-city landscapes: Trees, sense of safety, and preference. *Environment and Behaviour*, 30(1), 28-59.
- Kuo, F. E., & Sullivan, W. C. (2001a). Aggression and violence in the inner city: Effects of environment via mental fatigue. *Environment and Behaviour*, 33(4), 543-571.
- Kuo, F. E., & Sullivan, W. C. (2001b). Environment and crime in the inner city: Does vegetation reduce crime? *Environment and Behaviour*, 33(3), 343-367.
- Kuo, F. E., Sullivan, W. C., Coley, R. L., & Brunson, L. (1998). Fertile ground for community: Inner city neighborhood common spaces. *American Journal of Community Psychology*, 26(6), 823-851.
- Kweon, B. S., Sullivan, W. C., & Wiley, A. R. (1998). Green common spaces and the social integration of inner-city older adults. *Environment and Behaviour*, 30(6), 832-858.
- Kylin, M. (2003). Children's dens. *Children, Youth and Environments*, 13(1), Retrieved June 30, 2003 from <http://cye.colorado.edu>.
- Lambert, A. (1999). Shifting paradigms: The heart in restoration education. *Ecological Restoration*, 17(3), 126-135.
- Lather, P. (1991). *Getting smart: Feminist research pedagogy with/in the postmodern*. New York, NY: Routledge.
- Lather, P. (1993). Fertile obsession: Validity after poststructuralism. *Sociological Quarterly*, 34(4), 673-693.
- Learning Through Landscapes. (2003). *National school grounds survey*. Winchester, UK: Learning Through Landscapes.
- Lefebvre, D. (2000). Sustainability education evaluation tool. In A. Jarnet, B. Jickling, L. Sauve, A. E. J. Wals & P. Clarkin (Eds.), *A colloquium on the future of environmental education in a postmodern world* (pp. 234-244). Whitehorse, Yukon: Yukon College.
- Lewis, C. A. (1992). Effects of plants and gardening in creating interpersonal and community well-being. In D. Relf (Ed.), *The role of horticulture in human well being and social development: A national symposium* (pp. 55-65). Portland, OR: Timber Press.
- Lewis, C. A. (1994). *People-plant relationships past and future*. Paper presented at the Healing dimensions of people-plant relationships: Proceedings of a research symposium, Davis, CA.
- Lieberman, G. A., & Hoody, L. L. (1998). *Closing the achievement gap: Using the environment as an integrated context for learning*. Ponway, CA: Science Wizards.
- Lindholm, G. (1995). Schoolyards: The significance of place properties to outdoor activities in schools. *Environment and Behaviour*, 27(3), 259-293.
- Lousley, C. (1999). (De)Politicizing the environmental club: Environmental discourses and the culture of schooling. *Environmental Education Research*, 5(3), 293-304.
- Lucas, B., & Mountfield, A. (1995). *A guide to fundraising for school grounds*. UK: Learning Through Landscapes.
- Malone, K. (1999). Environmental education researchers as environmental activists. *Environmental Education Research*, 5(2), 163-177.
- Malone, K. (2001). Children, youth and sustainable cities. *Local Environment*, 6(1), 5-12.

- Malone, K., & Tranter, P. J. (2003a). Children's environmental learning and the use, design and management of school grounds. *Children, Youth and Environments*, 13(2), Retrieved February 15, 2004 from <http://cye.colorado.edu>.
- Malone, K., & Tranter, P. J. (2003b). School grounds as sites for learning: Making the most of environmental opportunities. *Environmental Education Research*, 9(3), 283-303.
- Mannion, G. (2003). Children's participation in school grounds developments: Creating a place for education that promotes social inclusion. *International Journal of Inclusive Education*, 7(2), 175-192.
- Martil-de Castro, W. (1999). Grounding environmental education in the lives of urban students. *Pathways: The Ontario Journal of Outdoor Education*, 11(2), 15-17.
- McClaren, M. (1997). Reflections on "alternatives to national standards for environmental education: Process-based quality assessment". *Canadian Journal of Environmental Education*, 2, 35-46.
- McCutcheon, N., & Swanson, A. (2001). Tips and tricks for taking kids outside. In T. Grant & G. Littlejohn (Eds.), *Greening school grounds: Creating habitats for learning* (pp. 127-129). Gabriola Island, BC: New Society Publishers.
- McKenzie, M. (in press). The 'willful contradiction' of poststructural socio-ecological education. *Canadian Journal of Environmental Education*, 8.
- Merriam, S. B. (1998). *Qualitative research and case study applications on education*. San Francisco: Jossey Bass.
- Miles, I., Sullivan, W. C., & Kuo, F. E. (1998). Ecological restoration volunteers: The benefits of participation. *Urban Ecosystems*, 2, 27-41.
- Miles, I., Sullivan, W. C., & Kuo, F. E. (2000). Psychological benefits of volunteering for restoration projects. *Ecological Restoration*, 18(4), 218-227.
- Miles, J. (1991). Teaching in wilderness. *Journal of Environmental Education*, 22(4), 5-9.
- Moore, E. O. (1981). A prison environment's effect on health care service demands. *Journal of Environmental Systems*, 11, 17-34.
- Moore, G. T. (1986). Effects of the spatial definitions of behavior settings on children's behavior: A quasi experimental field study. *Journal of Environmental Psychology*, 6, 205-231.
- Moore, R. C. (1986a). *Childhood's domain: Play and place in child development*. London, UK: Croom Helm.
- Moore, R. C. (1986b). The power of nature orientations of girls and boys toward biotic and abiotic play settings on a reconstructed schoolyard. *Children's Environments Quarterly*, 3(3), 52-69.
- Moore, R. C. (1989a). Before and after asphalt: Diversity as an ecological measure of quality in children's outdoor environments. In M. N. Bloch & A. Pellegrini (Eds.), *The ecological context of children's play* (pp. 191-213). Norwood, NJ: Ablex Publishing Corporation.
- Moore, R. C. (1989b). Plants as play props. *Children's Environments Quarterly*, 6(1), 3-6.
- Moore, R. C. (1989). Playgrounds at the crossroads: Policy and action research needed to ensure a viable future for public playgrounds in the United States. In E. Altman & E. H. Zube (Eds.), *Public places and spaces* (pp. 83-119). New York, NY: Plenum Press.
- Moore, R. C. (1995). Children gardening: First steps towards a sustainable future. *Children's Environments*, 12(2), 222-232.

- Moore, R. C. (1996). Outdoor settings for playing and learning: Designing school grounds to meet the needs of the whole child and whole curriculum. *North American Montessori Teacher's Association Journal*, 21(3), 97-120.
- Moore, R. C., & Wong, H. H. (1997). *Natural learning: The life history of an environmental schoolyard*. Berkeley, CA: MIG Communications.
- Morris, J. L., Briggs, M., & Zidenberg-Cherr, S. (2002). Nutrition to grow on: A garden-enhanced nutrition education curriculum for upper-elementary schoolchildren. *Journal of Nutrition Education and Behavior*, 34(3), 175-176.
- Mutton, M., & Smith, D. (2001). A step-by-step planning guide. In T. Grant & G. Littlejohn (Eds.), *Greening school grounds: Creating habitats for learning* (pp. 25-28). Gabriola Island, BC: New Society Publishers.
- Nabhan, G. P., & Trimble, S. (1994). *The geography of childhood: Why children need wild spaces*. Boston, MA: Beacon Press.
- Nabors, L., Willoughby, J., Leff, S., & McMenamin, S. (2001). Promoting inclusion for young children with special needs on playgrounds. *Journal of Developmental and Physical Disabilities*, 13(2), 179-190.
- National Wildlife Federation. (2001). *Survey of Schoolyard Habitats*. Unpublished Report, Reston, VA.
- Nundy, S. (1999). The fieldwork effect: The role and impact of fieldwork in the upper primary school. *International Research in Geographical and Environmental Education*, 8(2), 190-198.
- Nundy, S. (2001). *Raising achievement through the environment: A case for fieldwork and field centres*. Peterborough, UK: National Association of Field Studies Officers.
- O'Donoghue, R., & Lotz-Sisitka, H. (forthcoming). Participation, practical reason and situated culture. In B. B. Jensen & A. Reid (Eds.), *Critical International Perspectives on Participation in Environmental and Health Education*. Copenhagen NV, Denmark: Research Centre for Environmental and Health Education, The Danish University of Education.
- Olds, A. R. (1989). Nature as healer. *Children's Environments Quarterly*, 6(1), 27-32.
- Olwig, K. R. (1991). Childhood, artistic creation, and the educated sense of place. *Children's Environments Quarterly*, 8(2), 4-18.
- Ortiz, F. I. (1994). *Schoolhousing: Planning and designing educational facilities*. Albany, NY: State University of New York Press.
- Orr, D. W. (1992). *Ecological literacy: Education and the transition to a postmodern world*. Albany, NY: State University of New York.
- Orr, D. W. (2002). Political economy and the ecology of childhood. In P. H. Kahn (Jr.) & S. R. Kellert (Eds.), *Children and nature: Psychological, sociocultural, and evolutionary investigations* (pp. 279-305). Cambridge, MA: The MIT Press.
- Owens, P. E. (1988). Natural landscapes, gathering places, and prospect refuges: Characteristics of outdoor places valued by teens. *Children's Environments Quarterly*, 5(2), 17-24.
- Owens, P. E. (1994). Teen places in Sunshine, Australia: Then and now. *Children's Environments*, 11(4), 292-299.
- Palmer, J. A., Suggate, J., Bajd, B., Hart, P., Ho, R., Ofwono-Orecho, K. P., et al. (1998). An overview of significant influences and formative experiences on the development of

- adults' environmental awareness in nine countries. *Environmental Education Research*, 4(4), 445-464.
- Palmer, J. A., Suggate, J., Bajd, B., & Tsalaki, E. (1998). Significant influences on the development of adults' environmental awareness in the UK, Slovenia, and Greece. *Environmental Education Research*, 4(4), 429-444.
- Palmer, J. A., Suggate, J., Robottom, I., & Hart, P. (1999). Significant life experiences and formative influences on the development of adults' environmental awareness in the UK, Australia and Canada. *Environmental Education Research*, 5(2), 181-200.
- Pivnick, J. (1994). A piece of forgotten song: Recalling environmental connections. *Holistic Education Review*, 10(4), 58-63.
- Pivnick, J. (2001). Sowing a school garden: Reaping an environmental benefit. In T. Grant & G. Littlejohn (Eds.), *Greening school grounds: Creating habitats for learning* (pp. 12-14). Gabriola Island, BC: New Society Publishers.
- Pooley, J. A., & O'Connor, M. (2000). Environmental education and attitudes: Emotions and beliefs are what is needed. *Environment and Behaviour*, 32(5), 711-723.
- Puk, T., & Behm, D. (2003). The diluted curriculum: The role of government in developing ecological literacy as the first imperative in Ontario secondary schools. *Canadian Journal of Environmental Education*, 8, 217-232.
- Pyle, R. M. (2002). Eden in a vacant lot: Special places, species, and kids in the neighbourhood of life. In P. H. Kahn (Jr.) & S. R. Kellert (Eds.), *Children and nature: Psychological, sociocultural, and evolutionary investigations* (pp. 305-328). Cambridge, MA: The MIT Press.
- Queensland Health. (2002). *Creating shade at public facilities: Policy and guidelines for local government*. Retrieved August 15, 2004, from www.health.qld.gov.au
- Rahnema, M. (1992). Participation. In W. Sachs (Ed.), *The development dictionary* (pp. 116-131). London: Zed Books.
- Raymund, J. F. (1995). From barnyards to backyards: An exploration through adult memories and children's narratives in search of an ideal playscape. *Children's Environments*, 12(3), 362-380.
- Rhydden-Evans, Z. (1993). *Math in the school grounds*. Winchester, Hants, England: Learning through Landscapes Trust.
- Rickinson, M. (2001). Learners and learning in environmental education. *Environmental Education Research*, 7(1), 207-320.
- Rickinson, M., Dillon, J., Teamey, K., Morris, M., Choi, M. Y., Sanders, D., et al. (2004). *A review of research on outdoor learning*. Slough, UK: National Foundation for Educational Research and King's College London.
- Rickinson, M., Sanders, D., Chillman, B., Doyle, P., & Jameson, N. (2003). *Grounds for improvement secondary action research program: Year 2 report*. Hampshire, UK: Learning Through Landscapes.
- Rivkin, M. S. (1995). *The great outdoors: Restoring children's rights to play outside*. Washington, DC: National Association for the Education of Young Children.
- Rivkin, M. S. (2000). *Outdoor experiences for young children*. (ERIC Document Reproduction Service No. EDO-RC-00-7).

- Robbottom, I., & Sauve, L. (2003). Reflecting on participatory research in environmental education: Some issues for methodology. *Canadian Journal of Environmental Education*, 8(111-128).
- Rosenthal, J., & Dymont, J. E. (2002). Designing a system of urban protected areas: An evaluative case study of Peterborough, Ontario. *Environments*, 30(1), 51-69.
- Roth, R. E. (1997). A critique of "alternatives to national standards for environmental education: Process-based quality assessment". *Canadian Journal of Environmental Education*, 2, 28-34.
- Ruffin, J. D. (1996). The terrain of exclusion: Reflections of an African American woman in environmental studies. *Race, Poverty and the Environment*, 6(2/3), 35-37.
- Running-Grass. (1996). The four streams of multicultural environmental education. *Race, Poverty and the Environment*, 6(2/3), 1-2.
- Russell, C. L. (1999). Problematizing nature experience in environmental education: The interrelationship of experience and story. *Journal of Experiential Education*, 22(3), 123-128, 137.
- Russell, C. L. (2003). Minding the gap between methodological desires and practices. In D. Hodson (Ed.), *OISE Papers in STSE Education, Volume 4* (pp. 125-134). Toronto, Ontario: Imperial Oil Centre for Studies in Science, Mathematics, and Technology Education.
- Russell, C. L., & Bell, A. C. (1996). A politicized ethic of care: Environmental education from an ecofeminist perspective. In K. Warren (Ed.), *Women's voices in experiential education*. Dubuque, IA: Kendall Hunt.
- Russell, C. L., Bell, A. C., & Fawcett, L. (2000). Navigating the waters of Canadian environmental education. In T. Goldstein & D. Selby (Eds.), *Weaving connections: Educating for peace, social and environmental justice* (pp. 196-217). Toronto, Ontario: Sumach Press.
- Russell, C. L., & Burton, J. (2000). A report on an Ontario integrated environmental studies program. *Canadian Journal of Environmental Education*, 5, 287-304.
- Russell, C. L., & Hart, P. (2003). Exploring genres of inquiry in environmental education research. *Canadian Journal of Environmental Education*, 8, 5-8.
- Sanoff, H. (1994). *School design*. New York, NY: Van Nostrand Reinhold.
- Sauve, L. (2000). Environmental education between modernity and postmodernity: Searching for an integrating educational framework. In A. Jarnet, B. Jickling, L. Sauve, A. E. J. Wals & P. Clarkin (Eds.), *A colloquium on the future of environmental education in a postmodern world* (pp. 44-56). Whitehorse, Yukon: Yukon College.
- Schleifer, M. (1990). The universal playground. *Exceptional Parent*, 20, 26-29.
- Schneekloth, L. H. (1989). "Where did you go?" "The forest." "What did you see?" "Nothing." *Children's Environments Quarterly*, 6(1), 14-17.
- School Garden Resource Network. (1999). *School and Youth Garden Survey: A project of the school garden resource network*. Retrieved June 21, 2002, from http://cesonoma.ucdavis.edu/4H/Youth/SGRN_report.html
- Scott, W., & Gough, S. (Eds.). (2003). *Sustainable development and learning: Framing the issues*. London, UK: Routledge Falmer.

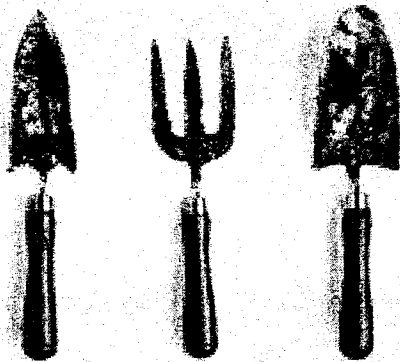
- Scott, W., Reid, A., & Jones, N. (2003). *Growing Schools: The innovation fund projects (2002-2003): An external evaluation*. Bath, UK: Council for Environmental Education and University of Bath.
- Sebba, R. (1991). The landscapes of childhood: The reflections of childhood's environment in adult memories and in children's attitudes. *Environment and Behaviour*, 23(4), 399-422.
- Selby, D. (2001). The signature of the whole: Radical interconnectedness and its implications for global and environmental education. *Encounter*, 14(4), 5-16.
- Shapiro, E. (1995). Restoring habitats, communities, and souls. In J. Roszak, S. Homes & P. Kanner (Eds.), *Ecopsychology: Restoring the earth, healing the mind*. San Francisco, CA: Sierra Club.
- Sheppard, P. (1982). *Nature and madness*. San Francisco: Sierra Club.
- Shuman, D., & Ham, S. H. (1997). Model of environmental commitment. *Journal of Environmental Education*, 28(25-32).
- Simmons, D. (1996). Teaching in natural areas: What urban teachers feel is most appropriate. *Environmental Education Research*, 2(2), 149-157.
- Simmons, D. (1998). Using natural settings for environmental education: Perceived benefits and barriers. *Journal of Environmental Education*, 29(3), 23-31.
- Simone, M. F. (2002). *Back to the basics: Student achievement and schoolyard naturalization*. Unpublished masters thesis, Faculty of Arts and Science, Trent University, Peterborough, Ontario.
- Simovska, V. (2000). Exploring student participation within health education and health promoting schools. In B. B. Jensen, K. Schnack & V. Simovska (Eds.), *Critical environmental and health education research issues and challenges* (pp. 29-45). Copenhagen NV, Denmark: Research Centre for Environmental and Health Education, The Danish University of Education.
- Smith-Sebasto, N. J. (1995). The effects of an environmental studies course on selected variables related to environmentally responsible behavior. *The Journal of Environmental Education*, 26(4), 30-34.
- Sobel, D. (1990). A place in the world: Adults' memories of childhood's special places. *Children's Environments Quarterly*, 7(4), 5-12.
- Sobel, D. (1993). *Children's special places: Exploring the role of forts, dens, and bush houses in middle childhood*. Tuscon, Arizona: Zephyr Press.
- Sorte, G. (1995). *The value of nature and green spaces to the urban resident: Homo urbaniensis*. Paper presented at the Proceedings of the IFPRA World Congress, Antwerp.
- St. Maurice, H. (1996). Nature's nature: Ideas of nature in curricula for environmental education. *Environmental Education Research*, 2(2), 141-148.
- Stanley, L., & Wise, S. (1993). *Breaking out again: Feminist ontology and epistemology*. New York: Routledge.
- Stapp, W. B. (1998). The concept of environmental education. In H. R. Hungerford, W. J. Bluhm, T. L. Volk & J. M. Ramsey (Eds.), *Essential readings in environmental education* (pp. 33-35). Champaign, Illinois: Stipes Publishing L.L.C.
- State of New Hampshire Fish and Game Department. (2000). *Project HOME survey results*. Unpublished report.
- Sterling, S. (2001). *Sustainable education: Revisioning learning and change*. Totnes: Green Books.

- Stine, S. (1997). *Landscapes for learning: Creating outdoor environments for children and youth*. Toronto, ON: John Wiley & Sons.
- Stout, B. (2001). Discouraging vandalism in school yard habitats. In T. Grant & G. Littlejohn (Eds.), *Greening school grounds: Creating habitats for learning* (pp. 89-92). Gabriola Island, BC: New Society Publishers.
- Stowell, S. (2001). Maximizing participation: Go team! In T. Grant & G. Littlejohn (Eds.), *Greening school grounds: Creating habitats for learning* (pp. 16-18). Gabriola Island, BC: New Society Publishers.
- Susa, A. M., & Benedict, J. O. (1994). The effects of playground design on pretend play and divergent thinking. *Environment and Behaviour*, 26(4), 560-579.
- Taylor, J. (1997). *Share-Net: A case study of environmental education resource material development in a risk society*. Unpublished doctoral dissertation, Rhodes University, South Africa.
- Tennessen, C. M., & Cimprich, B. (1995). Views to nature: Effects on attention. *Journal of Environmental Psychology*, 15, 77-85.
- The Intergovernmental Conference on Environmental Education. (1977). *The Tbilisi Declaration: UNESCO and UNEP*.
- Thomashow, C. (2002). Adolescents and ecological identity: Attending to wild nature. In P. H. Kahn (Jr.) & S. R. Kellert (Eds.), *Children and nature: Psychological, sociocultural, and evolutionary investigations* (pp. 259-278). Cambridge, MA: The MIT Press.
- Thomashow, M. (1995). *Ecological identity: Becoming a reflective environmentalist*. Cambridge, MA: The MIT Press.
- Thomson, G., & Arlidge, S. (2000). *Five-minute field trips: Teaching about nature in your schoolyard*. Calgary, Alberta: Global Environmental and Outdoor Education Council of the Alberta Teacher's Association and the Calgary Zoo.
- Thomson, J. L., & Philo, C. (2004). Playful spaces? A social geography of children's play in Livingston, Scotland. *Children's Geographies*, 2(1), 111-130.
- Titman, W. (1994). *Special places, special people: The hidden curriculum of schoolgrounds*. Surrey, UK: World Wildlife Fund, UK.
- Titman, W. (1999). *Grounds for concern: A report on secondary school grounds*. Winchester, UK: Learning Through Landscapes.
- Toronto District School Board. (2000). *Transforming the schoolyard: How local communities design and build their playground learning environments*. Toronto, ON: Toronto District School Board.
- Toronto District School Board. (2003a). *Ecoschools: Energy conservation guide*. Toronto, Ontario: Toronto District School Board.
- Toronto District School Board. (2003b). *Ecoschools: Introduction to Ecoschools and the five-step process guide*. Toronto, Ontario: Toronto District School Board.
- Toronto District School Board. (2003c). *Ecoschools: Waste minimization guide*. Toronto, Ontario: Toronto District School Board.
- Toronto District School Board. (2004). *Ecoschools: School ground greening designing for shade and energy conservation*. Toronto, Ontario: Toronto District School Board.
- Toronto Public Health. (2002). *Sun safety information guide for schools*. Toronto: Toronto Public Health.

- Tranter, P. J., & Malone, K. (2004). Geographies of environmental learning: An exploration of children's use of school grounds. *Children's Geographies*.
- Trust for Public Land. (1995). Healing America's Cities: How urban parks can make cities safe and healthy. *Children's Environments*, 12(1), 65-70.
- Ulrich, R. S. (1984). View through a window may influence recovery from surgery. *Science*, 224, 79-86.
- Ulrich, R. S., & Parsons, R. (1992). Influences of passive experiences with plants on individual well-being and health. In D. Relf (Ed.), *The role of horticulture in human well being and social development. A national symposium* (pp. 93-105). Portland, OR: Timber Press.
- Ulrich, R. S., Simons, R. F., Losito, B. D., Fiorito, E., Miles, M. A., & Zelson, M. (1991). Stress recovery during exposure to natural and urban environments. *Journal of Environmental Psychology*, 11, 210-230.
- UNCED. (1992). Chapter 36. In *Agenda 21, the Planetary Vision Green Plan*: Rio De Janeiro.
- UNESCO/UNEP. (1976). The Belgrade Charter. In *Connexion*: First year, No. 1, EE Bulletin, January.
- UNESCO/UNEP. (1987). Moscow '87. UNESCOP-UNEP International Conference on Training and Environmental Education. In *Connexion*, Vol. XII: No. 3, EE Bulletin, September.
- UNICEF. (1990). *Convention on the Rights of the Child*. New York: UNICEF.
- van Kamp, I., Leidelmeijer, K., Marsman, G., & de Hollander, A. (2003). Urban environmental quality and human well-being: Towards a conceptual framework and demarcation of concepts: A literature study. *Landscape and Urban Planning*, 52, 5-18.
- Verderber, S. (1986). Dimensions of person-window transactions in the hospital environment. *Environment and Behaviour*, 18(450-466).
- Walker, K. E., Corcoran, P. B., & Wals, A. (2004). Case studies, make our case, and case stories: A critique of case study methodology in sustainability in higher education. *Environmental Education Research*, 10(1).
- Walker, K. E., Corcoran, P. B., Wals, A. E. J., Scott, W., & Gough, S. (2003, April 23-25). *Case study methodology in sustainability in higher education: Advancing critical research model*. Paper presented at the American Educational Research Association (AERA) Annual Meeting, Ecological and Environmental Education Special Interest Group, Chicago, Illinois.
- Wals, A. E. J. (1992). Young adolescents' perceptions of environmental issues: Implications for environmental education in urban settings. *Australian Journal of Environmental Education*, 8, 45-58.
- Wals, A. E. J. (1994a). Nobody planted it, it just grew! Young adolescents' perceptions and experiences of nature in the context of urban environmental education. *Children's Environments*, 11(3), 177-193.
- Wals, A. E. J. (1994b). *Pollution stinks: Young adolescents' perceptions of nature and environmental issues with implications for education in urban settings*. De Lier, Netherlands: Academic Book Centre.
- Wals, A. E. J., & Jickling, B. (2000). Process-based environmental education: Seeking standards without standardizing. In B. B. Jensen, K. Schnack & V. Simovska (Eds.), *Critical environmental and health education research issues and challenges* (pp. 127-150). Copenhagen NV, Denmark: Research Centre for Environmental and Health Education, The Danish University of Education.

- WCED. (1993). *Agenda 21-Sustainable development action program: Rio declaration on the environment and development*. New York: United Nations.
- Weinstein, C. S. (1979). The physical environment of the school: A review of the research. *Review of Educational Research, 49*(4), 577-610.
- Weinstein, C. S., & Pinciotti, P. (1988). Changing a schoolyard: Intentions, design decisions, and behavioural outcomes. *Environment and Behaviour, 20*(3), 345-371.
- Wells, N. M. (2000). At home with nature: Effects of 'greenness' on children's cognitive functioning. *Environment and Behaviour, 32*(6), 775-795.
- Wells, N. M., & Evans, G. W. (2003). Nearby nature: A buffer of life stress among rural school children. *Environment and Behaviour, 35*(3), 311-330.
- Weston, A., 35-46. (1996). Deschooling environmental education. *Canadian Journal of Environmental Education, 1*, 35-46.
- Whitehouse, H. (2001). Not greenies at school: Discourses of environmental activism. *Australian Journal of Environmental Education, 17*, 71-76.
- Wigle, D. T. (2003). *Child health and the environment*. Oxford: Oxford University Press.
- Wilson, E. O. (1983). *Biophilia*. Cambridge, MA: Harvard University Press.
- World NGO Forum. (1993). *Treaty: Environmental Education for Sustainable Societies and Global Responsibilities*. Retrieved July 15, 2002, from <http://www.igc.apc.org/habitat/treaties/educati.html>
- Wyzga, M. C. (2001). Fundraising for schoolyard projects. In T. Grant & G. Littlejohn (Eds.), *Greening school grounds: Creating habitats for learning* (pp. 19-22). Gabriola Island, BC: New Society Publishers.
- Yin, R. K. (1989). *Case study research: Design and method*. Newbury Park, CA: Sage Publications, Inc.

Appendix A Involved Teacher Questionnaire



Your school is invited to participate in the School Ground Greening Survey, a partnership initiative of the T.D.S.B., Evergreen and Lakehead University.

This survey should take about 20 minutes to complete.

Please complete and return this survey, in the envelope provided, to your principal by **February 7, 2003**.

All schools that return surveys will be entered in a draw to win a copy of Lorraine Johnson's *"100 Easy to Grow Native Plants"* or their choice of one of Evergreen's books or videos.

Thank you for participating!

January 16, 2003

Dear Participant,

Thank you for participating in a study concerning school ground greening in your school board. You have been asked to complete the survey because of your school's efforts to green its school ground. Greening your school ground, in this case, is meant to describe a collaborative effort to improve the school grounds through the introduction and addition of trees and shrubs, gardens, art, gathering areas, etc. You are being asked to respond to this survey because of your active involvement in the greening project at your school. We hope you take the time to complete the questionnaire as we look forward to hearing about how you think the project has influenced teachers and students at your school.

I am a doctoral student at Lakehead University and I am working with Evergreen and the Toronto District School Board to conduct a study entitled "An evaluation of school ground greening in an urban Southern Ontario school board: Current status, best practices, and future directions." Both the T.D.S.B. and Evergreen are aware of and endorse my research and this questionnaire. If you want to confirm this with either organization, please contact Richard Christie, District wide coordinator of Environmental Education at the T.D.S.B. at (416) 571-0374 or Cam Collyer, Program Manager for Evergreen's Learning Grounds Program at (416) 596-1495 x 28.

I am conducting this study to investigate the scope of change on T.D.S.B. school grounds and to better understand their potential. Very little is understood about the general trends or overall effects of green school grounds in Canada and my research will add to a growing body of literature that explores the potential of these important spaces. It is appropriate to perform research in your school board because approximately 30% of the schools have green school grounds, making this area an ideal location to investigate the effects of a large number of green school grounds. The purpose of the present research project, then, is to determine teacher/administrator/parent perceptions of school ground greening and to generate a status report on the state of existing green school grounds in your board, focusing on salient characteristics and limiting or enabling factors of school ground greening projects.

As a participant in this study, you will be asked to complete the following questionnaire related to school ground greening. All information gathered in this research project will remain confidential and securely stored at Lakehead University for seven years. While you will be asked to identify your school on this questionnaire, no individual or school will ever be identified in any report of the results. You may withdraw from this study at any time. The findings of this project will be made available to you, at your request, upon completion of the project.

Please return the completed questionnaire **to your principal** in the enclosed envelope by **Friday, February 7, 2003**.

Thank you for your cooperation.

Sincerely,

Janet E. Dymont, Research Associate
TDSB and Evergreen School Ground Research Initiative

Dr. Constance Russell, Thesis Supervisor
c/o Faculty of Education, Lakehead University
955 Oliver Road
Thunder Bay, ON P7B 5E1
Telephone: (807)343-8049

248

PART 1: ABOUT YOURSELF*

- a.** Gender: Female Male
- b.** Age: <30 30-40 40-50 >50
- c.** Please indicate your highest level of education completed:
 Undergraduate College Diploma Masters Doctorate Other
- d.** If you completed post-secondary studies, what were your major areas of study?
(Please describe) _____
- e.** First language: _____
- f.** Country of citizenship: _____
- g.** If you were not born in Canada, how many years have you been living in Canada? _____
- h.** How many years have you been teaching in the public/private education field? _____
- i.** How many years have you been working at your present school? _____
- j.** Rate your level of **involvement** with the school ground greening project at your school:
- | | | | |
|---------------------|-------------------|-----------------|---------------|
| 1 | 2 | 3 | 4 |
| Not at all involved | Not very involved | Fairly involved | Very involved |
- k.** Rate your level of **interest** in the school ground greening project at your school:
- | | | | |
|-----------------------|---------------------|-------------------|-----------------|
| 1 | 2 | 3 | 4 |
| Not at all interested | Not very interested | Fairly interested | Very interested |
- l.** How many years have you been involved in school ground greening projects?
(i.e., include the current project and other projects) _____
- m.** Please briefly describe how you have been involved in the school ground greening project at your school.

* PLEASE NOTE THAT ALL INFORMATION PROVIDED IS CONFIDENTIAL. NO INDIVIDUAL OR SCHOOL NAMES WILL EVER BE IDENTIFIED IN THE SURVEY REPORT OR SUBSEQUENT DOCUMENTATION THAT EMERGES FROM THE RESULTS OF THE STUDY

PART 2: ABOUT YOUR SCHOOL

- a.** Name of school: _____
- b.** Number of staff: _____
- c.** Number of students: _____
- d.** Estimate the percentage of the following ethnicities represented in the student body at the school:
- i.** Caucasian _____%
 - ii.** African Canadian _____%
 - iii.** Aboriginal _____%
 - iv.** Asian _____%
 - v.** Latino/Hispanic _____%
 - vi.** Other (please name) _____ %
- e.** Estimate the average time, per day, that students spend on the school yard during the following times:
- i.** Before school: _____ minutes/day
 - ii.** Morning recess: _____ minutes/day
 - iii.** Lunch hour: _____ minutes/day
 - iv.** Afternoon recess: _____ minutes/day
 - v.** After school: _____ minutes/day
 - vi.** Other times: _____ minutes/day
- f.** Estimate the average time per week that **your** students spend on the **green** school ground as part of formal classes:
- i.** Time in classes _____ hours/week
- g.** Time that your school timetable officially starts: _____
- h.** Time that your school timetable officially ends: _____
- i.** Estimate the number of teachers who instruct lessons on the green school ground: _____

PART 3: ABOUT YOUR GREENING PROJECT

3.1 Initial Motivation

a. Please select the **one** individual or group who, in your estimation, provided the **initial motivation** to start the project/process of greening at your school (*Please check only one*).

- | | |
|--|---|
| <input type="radio"/> Students | <input type="radio"/> Teachers |
| <input type="radio"/> Principal | <input type="radio"/> School Board |
| <input type="radio"/> Parent teacher committee | <input type="radio"/> Individual parents |
| <input type="radio"/> Neighbours | <input type="radio"/> Other (<i>please describe</i>): |
-

b. Please indicate the **top 2 reasons** why you think the individual who you selected above was **motivated** to transform the school ground (*Rank 1 and 2*).

Rank top 2 reasons

- _____ To enhance the *curricular opportunities* for teaching outdoors
 - _____ To meet the *learning styles* of a wide number of students
 - _____ To enhance the *social* environment for students
(*e.g., reduce bullying, provide more small group gathering areas*)
 - _____ To enhance the *environment* for flora and fauna (*e.g., wildlife habitat*)
 - _____ To increase *contact with the natural world* for students
 - _____ To create a *safer* school environment (*e.g., less vandalism, less accidents, less fighting*)
 - _____ To improve *play* opportunities for students (*e.g., less hard surface, more play options*)
 - _____ To create a *healthier* school ground environment for students
(*e.g., provide increased shade, reduced exposure to pesticides*)
 - _____ To create a *peaceful* space (*i.e., where people can rest, contemplate, and cool down*)
 - _____ To create a more *inclusive* school ground space, with respect to gender, socio-economic status, ethnicity, ability
 - _____ Others (*please describe*): _____
-

3.2 History

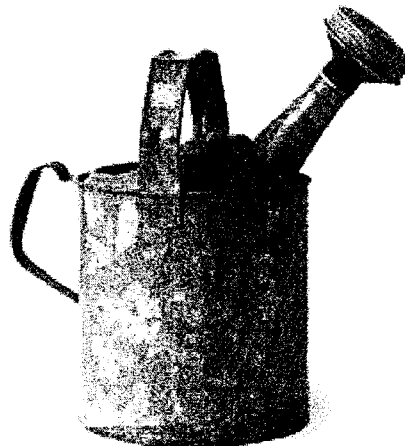
- a. What year was school ground greening **first initiated** at your school? _____
- b. Since the project was first initiated at your school, have there ever been periods of inactivity? Yes No

If you responded **YES**, please explain:

3.3 Elements

Please indicate **all** the elements that are now found on your school ground (*Check all that apply*).

- Butterfly garden
- Nesting structures for birds
- Composting stations
- Vermicomposter (*worms*)
- Coniferous trees
- Deciduous trees
- Woodland
- Hedge rows
- Berms
- Rocks/Boulders
- Sand
- Sand and water element together
- Pond/Wetland/Water element
- Vegetable garden
- Wildflower meadow
- Bird feeders
- Greenhouse
- Seating for class (*e.g. log circle, amphitheatre*)
- Signage/Interpretive displays
- Public art (*murals, painting on walls/ground*)
- Nature trail
- Other (*please describe*):



3.4 Physical site profile

Please complete this chart using the following two scales:

How **important** do you think the spaces described in the middle column are on an **ideal** or **exemplary** school ground?

How **adequate** are the spaces that are described in the middle column on **your** school ground?

ESSENTIAL	VERY IMPORTANT	FAIRLY IMPORTANT	NOT VERY IMPORTANT	NOT AT ALL IMPORTANT	TYPES OF SPACES/ELEMENTS	VERY ADEQUATE	FAIRLY ADEQUATE	NOT VERY ADEQUATE	NOT AT ALL ADEQUATE	NOT PRESENT
5	4	3	2	1	Grass field/yard/pitch	5	4	3	2	1
5	4	3	2	1	Hard surface play spaces for sports and games <i>(e.g., court, rink, pavement, tarmac, walls)</i>	5	4	3	2	1
5	4	3	2	1	Manufactured equipment and play structures <i>(e.g., jungle gyms)</i>	5	4	3	2	1
5	4	3	2	1	Loose parts play elements <i>(e.g., balls, portable play equipment brought from inside school)</i>	5	4	3	2	1
5	4	3	2	1	Sand play area	5	4	3	2	1
5	4	3	2	1	Elements that support creative play <i>(e.g., musical installations, theatrical stages, playhouse)</i>	5	4	3	2	1
5	4	3	2	1	Small group gathering spaces <i>(i.e., 2 - 10 students)</i>	5	4	3	2	1
5	4	3	2	1	Meet and greet spaces <i>(e.g., entrance seating and garden beds)</i>	5	4	3	2	1
5	4	3	2	1	Places for individual/pairs to find refuge for play, learning and reflection	5	4	3	2	1
5	4	3	2	1	Class sized gathering spaces	5	4	3	2	1
5	4	3	2	1	Large group gathering spaces <i>(i.e., larger than one class)</i>	5	4	3	2	1
5	4	3	2	1	Built elements to support learning <i>(e.g., weather station, composter)</i>	5	4	3	2	1
5	4	3	2	1	Natural elements to support learning <i>(e.g., food gardens, habitat areas)</i>	5	4	3	2	1
5	4	3	2	1	Shaded areas <i>(e.g., groves of trees, built shade shelters, seating in shade)</i>	5	4	3	2	1
5	4	3	2	1	Areas sheltered from the wind	5	4	3	2	1
5	4	3	2	1	Areas sheltered from the rain and snow	5	4	3	2	1
5	4	3	2	1	Other:	5	4	3	2	1

3.5 Roles and responsibilities

	1	2	3	4		1	2	3	4
	Not at all involved	Not very involved	Somewhat involved	Very involved		Not at all involved	Not very involved	Somewhat involved	Very involved
How involved were each of the following in the initial phases of the project? <i>(e.g., designing, fundraising, visioning, initial planting)</i>					How involved are each of the following in the on-going maintenance ? <i>(e.g., harvesting, watering in the summer, weeding)</i>				
Students	1	2	3	4	Students	1	2	3	4
Teachers	1	2	3	4	Teachers	1	2	3	4
Individual parents	1	2	3	4	Individual parents	1	2	3	4
Parent teacher committee	1	2	3	4	Parent teacher committee	1	2	3	4
Community members	1	2	3	4	Community members	1	2	3	4
Principal	1	2	3	4	Principal	1	2	3	4
Custodial staff	1	2	3	4	Custodial staff	1	2	3	4
School board ground maintenance staff	1	2	3	4	School board ground maintenance staff	1	2	3	4
Other school board staff or trustees	1	2	3	4	Other school board staff or trustees	1	2	3	4
Other (please name): _____	1	2	3	4	Other (please name): _____	1	2	3	4

3.6 Volunteers

In your opinion, who are the 3 individuals/groups that have donated the most **volunteer time** throughout the entire project? *(Please rank 1, 2 and 3)*

- _____ Students
- _____ Teachers
- _____ Individual parents
- _____ Parent teacher committee
- _____ Community members
- _____ Principal
- _____ Custodial staff
- _____ School board ground maintenance staff
- _____ Other school board staff or trustees
- _____ Other (please name): _____

PART 4: WHAT IS HAPPENING ON YOUR GREEN SCHOOL GROUND?

Rate the following statements using the scales provided. Circle the number that best corresponds with your opinion.

Curriculum

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

	NEVER	RARELY	SOMETIMES	OFTEN	REGULARLY
1. Language arts	1	2	3	4	5
2. Mathematics	1	2	3	4	5
3. Physical education	1	2	3	4	5
4. Geography	1	2	3	4	5
5. Science	1	2	3	4	5

Comments:

Effect on Teaching Practices

	NOT APPLICABLE	STRONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE
6. I use an interdisciplinary approach when I am teaching on the school ground.	0	1	2	3	4	5
7. Other teachers support my use of the school ground for teaching.	0	1	2	3	4	5
8. My administrators (e.g., principal, vice-principal) support my use of the school ground for teaching.	0	1	2	3	4	5

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

	NOT APPLICABLE	DECREASED GREATLY	DECREASED SOMEWHAT	NOT CHANGED	INCREASED SOMEWHAT	INCREASED GREATLY
9. My motivation for teaching has	0	1	2	3	4	5
10. My willingness to use innovative instructional strategies has	0	1	2	3	4	5
11. The amount of team teaching I do has	0	1	2	3	4	5
12. My ability to maintain class control has	0	1	2	3	4	5
13. My need for assistance (e.g., parent helpers, volunteers) has	0	1	2	3	4	5
14. The amount of time I spend preparing lessons has	0	1	2	3	4	5

Comments:

Student Learning and Academic Achievement

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

	NOT APPLICABLE	DECREASED GREATLY	DECREASED SOMEWHAT	NOT CHANGED	INCREASED SOMEWHAT	INCREASED GREATLY
15. My ability to meet the learning styles of a diversity of students has	0	1	2	3	4	5
16. Student enthusiasm and engagement for learning has	0	1	2	3	4	5
17. Student ability to retain knowledge and skills has	0	1	2	3	4	5
18. Student ability to think more creatively has	0	1	2	3	4	5
19. Student academic learning, as measured by performance on standardized tests and improved mastery of curriculum standards, has	0	1	2	3	4	5

Comments:

Student Behaviour and Social Development

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:

	DECREASED GREATLY	DECREASED SOMEWHAT	NOT CHANGED	INCREASED SOMEWHAT	INCREASED GREATLY
20. The level of positive and civil behaviour amongst students has	1	2	3	4	5
21. The amount of effective communication between students has	1	2	3	4	5
22. Cooperation among students has	1	2	3	4	5
23. Student discipline problems have	1	2	3	4	5
24. Positive social interactions between teachers and students have	1	2	3	4	5
25. Overall student pro-social behaviour (<i>cooperation, respectful, non-violent</i>) has	1	2	3	4	5

Comments:

Environmental Awareness and Stewardship

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:

	MUCH LESS	LESS	THE SAME	MORE	MUCH MORE
26. Students are likely to explore _____ widely.	1	2	3	4	5
27. Students are able to learn _____ about their local environment.	1	2	3	4	5
28. Students show _____ care and respect for the school ground.	1	2	3	4	5

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

29. Provides _____ stimulation of students' curiosity and "sense of wonder."	1	2	3	4	5
30. Provides opportunity for students to have _____ interaction with the natural environment.	1	2	3	4	5
31. Fosters _____ environmental awareness in students.	1	2	3	4	5
32. Fosters _____ environmental stewardship in students.	1	2	3	4	5
33. Provides _____ opportunities for students to have something to care about.	1	2	3	4	5
34. Provides _____ opportunities for students to understand their relationship to the natural world and to understand that they are a part of nature.	1	2	3	4	5

Comments:

Safety/Health

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

	DECREASED GREATLY	DECREASED SOMEWHAT	NOT CHANGED	INCREASED SOMEWHAT	INCREASED GREATLY
35. The likelihood of "knock and bump" injuries has	1	2	3	4	5
36. Aggressive behaviour amongst students has	1	2	3	4	5
37. The incidence of crime (e.g., vandalism, graffiti, trespassing) on the school ground has	1	2	3	4	5
38. Pesticide use has	1	2	3	4	5
39. The amount of shaded space has	1	2	3	4	5

Comments:

Play

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

	MUCH LESS	LESS	THE SAME	MORE	MUCH MORE
40. Promotes _____ cooperative and collaborative play.	1	2	3	4	5
41. Promotes _____ diversity in the types of play.	1	2	3	4	5
42. Encourages students to be _____ bored.	1	2	3	4	5
43. Promotes _____ negative and aggressive play.	1	2	3	4	5

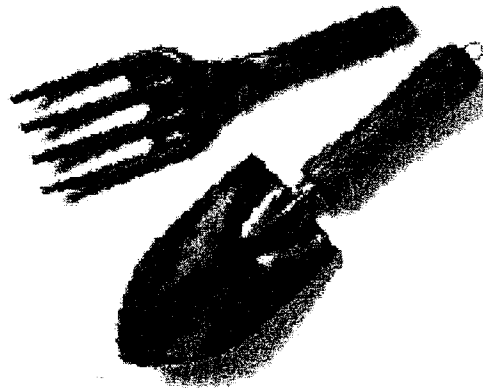
Comments:

Inclusivity

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

	MUCH LESS	LESS	THE SAME	MORE	MUCH MORE
44. _____ inclusive with regard to gender.	1	2	3	4	5
45. _____ inclusive with regard to socio-economic status.	1	2	3	4	5
46. _____ inclusive with regard to ability.	1	2	3	4	5
47. _____ inclusive with regard to ethnicity.	1	2	3	4	5

Comments:



PART 5: OVERALL IMPRESSIONS

a. Overall, what impacts do you feel the efforts to green your school ground have had on your school community?

- Very negative
 Negative
 Neutral
 Positive
 Very positive

Please explain: _____

b. In your opinion, what are the **top 3** factors that have **limited** the success of the school ground greening project at your school? *(Please rank 1, 2 and 3)*

- | | |
|--|---|
| _____ Availability of funding | _____ Availability of training opportunities |
| _____ Student involvement | <i>(e.g., workshops)</i> |
| _____ Teacher involvement | _____ Difficulty in maintenance |
| _____ Parental involvement | _____ Key organizer moved on |
| _____ Community involvement | _____ Access to expertise |
| _____ Principal's involvement | <i>(e.g., designers, books, videos)</i> |
| _____ School board support | _____ Access to physical materials |
| _____ Other demands on my time | <i>(e.g., native plants, soil, machinery)</i> |
| <i>(e.g., preparing classes, attending</i> | _____ Vandalism |
| <i>other meetings)</i> | _____ Other: _____ |

Please explain: _____

c. In your opinion, what are the **top 3** factors that, **in the past**, have **enabled** the success of the school ground greening project at your school? *(Please rank 1, 2 and 3)*

- | | |
|--|---|
| _____ Availability of funding | _____ Availability of training opportunities |
| _____ Student involvement | <i>(e.g., workshops)</i> |
| _____ Teacher involvement | _____ Access to expertise |
| _____ Parental involvement | <i>(e.g., designers, books, videos)</i> |
| _____ Community involvement | _____ Access to physical materials |
| _____ Principal's involvement | <i>(e.g., native plants, soil, machinery)</i> |
| _____ School board support | _____ Other: _____ |
| _____ Availability of curriculum materials | |

Please explain: _____

d. In your opinion, what are the **top 3** factors that, **in the future**, will **enable** the success of the school ground greening project at your school? *(Please rank 1, 2 and 3)*

- | | |
|--|--|
| _____ Availability of funding | _____ Availability of training opportunities <i>(e.g., workshops)</i> |
| _____ Student involvement | _____ Access to expertise <i>(e.g., designers, books, videos)</i> |
| _____ Teacher involvement | _____ Access to physical materials <i>(e.g., native plants, soil, machinery)</i> |
| _____ Parental involvement | _____ Other: _____ |
| _____ Community involvement | |
| _____ Principal's involvement | |
| _____ School board support | |
| _____ Availability of curriculum materials | |

Please explain: _____

**Thank you very much for your help in completing this survey.
Your responses will help us to have a greater understanding of the influence
of green school grounds in the Toronto District School Board.**

1
Additional comments are appreciated,
either here or in a separate envelope.

2
Please return your completed questionnaire
by **Friday, February 7, 2003** in the
envelope provided to your principal.

3
We may wish to follow up with you to further
discuss your school ground naturalization
project. Please indicate if this interests you.

Yes No

Name: _____

Phone Number: _____

E-Mail: _____

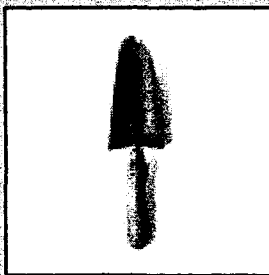
4
Would you like to receive a summary
copy of the project results?

Yes No

Name: _____

Mailing Address: _____

E-Mail: _____



Appendix A Involved Teacher Questionnaire



**FOR VERY
INVOLVED TEACHERS**



SCHOOL GROUND SURVEY

An Evaluation of School Ground Greening in the Toronto District School Board:
Current Status, Best Practices, and Future Directions



Appendix B Interview Schedule

1. Could you please tell me about the history of your green school ground (e.g., when did it get started, by whom, funding, ...)
2. What is the main purpose of the green school ground? Why did the project happen (e.g., for environmental reasons? Health reasons? Social reasons?, etc.)
3. Do you have children attending the school? Will you stay involved when they leave the school?
4. Involvement/Support/Participation of (during initial and ongoing):
 - a. Teachers
 - b. Administrators
 - c. Parents
 - d. Students
 - e. Community
 - f. School board
 - g. Heidi
 - h. Custodial staff
 - i. External support from organizations like Evergreen or local community groups/organizations
 - j. Other partnerships?
5. What are the impacts on students:
 - a. Learning and academic achievement
 - b. Behaviour and social development
 - c. Environmental awareness and stewardship
 - d. Safety/health
 - e. Play
 - f. Inclusivity
6. Please discuss issues of participation with the students? Clarify their involvement in problem identification?
7. Please describe how the school ground fits into the overall school philosophy? Is it incorporated into the school mission? The school council?
8. Is the school ground used for teaching? What subjects? How many teachers? By whom?
9. What are the key barriers? Key enabling factors?
10. How do you evaluate your green school ground initiative? Internal/external evaluations? Summative vs. formative evaluation?
11. Do you work with any other schools? Horizontal/vertical integration?
12. Does the location of the school (e.g., suburban vs. urban) influence the success of the school ground initiative?
13. What is the significance of the green school ground in your life? Where does it fit in with the rest of your life? Geographies of place?
14. What do you envision for the future of your green school ground?

Appendix C Thematic Codes used to Analyze Interviews

- Barriers
- Demographics of school
- Designing for sustainability
- Design like a home garden
- Designs: Trees/Rocks/Mulch
- Enablers: Tips/Advice
- Fads Reform
- Funding/Funders
- Future
- History
- Impacts
 - Aesthetics
 - Behaviours
 - Community outreach
 - Empowerment
 - Environmental awareness
 - Hidden curriculum
 - Inclusivity
 - Meeting new people
 - Peaceful
 - Personal significant
 - Play
 - Safety/health
 - Social transformation
 - Student learning/academic achievement
 - Teachers
 - Teaching/curriculum
 - Waste/energy
- Involvement
 - Community
 - Custodial staff
 - Ephemeral
 - Evergreen
 - Grounds staff
 - Heidi, Richard, Bruce, TDSB
 - Landscape architect
 - Other partners in community
 - Parent
 - Principal
 - School council
 - Students
 - Teachers
- Issues
 - Bad design stories
 - Balance with other school priorities
 - Environmental amnesia
 - Ethics

- Evaluation
- Maintenance
- Native plants
- School mission statement
- Socio-economic status
- Suburban/urban split
- Trampling
- Vandalism
- Original motivations
- Original motivators
- Pollinator schools
- TDSB
 - Organizational structure
 - Ecoschools
 - Playground removal
- Policy/curriculum