Active by Design: Promoting Physical Activity through School Ground Greening

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Active by Design: Promoting Physical Activity through School Ground Greening

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ABSTRACT Green school grounds exhibit a greater diversity of landscaping and design features than conventional school grounds, thus enhancing the quantity and quality of physical activity among elementary school children. Through greening, school grounds diversify the play repertoire, creating opportunities for boys and girls of all ages, interests and abilities to be more physically active. This paper builds on a 2006 study (Bell and Dyment, 2006, Grounds for Action: Promoting Physical Activity through School Ground Greening in Canada, Toronto, Ontario: Evergreen) and explores factors related to school ground design and culture that both limit and enable opportunities for physical activity. Questionnaires (N = 105) were completed by teachers, parents, and administrators associated with 59 schools across Canada. Results indicate that in order to stimulate active play, school grounds should be designed to provide adequate space, diverse play opportunities and interaction with natural elements. Safety, comfort and maintenance issues also need to be taken into consideration at the design stage. With respect to school ground culture, children are more active when rules, policies and supervision allow for non-competitive, open-ended play, as well as opportunities to care for the garden or green space. The implications of these findings are discussed and recommendations are offered for policy makers.

Introduction

As health experts grapple with the overweight and obesity epidemic,¹ they are emphasizing the importance of broad societal strategies to address one of the root causes of the problem: environments that promote sedentary lifestyles. It is widely acknowledged that we need to modify the physical and social environments in which we live, work and play, so that they become more conducive to physical activity. Factors related to urban design, such as the negative health impacts of sprawl, the ‘walkability’ of neighborhoods and the presence of parks and open space, are under increasing scrutiny. Of particular importance to children’s physical activity levels are the presence, configuration and ‘playability’ of outdoor public spaces (Fjortoft, 2004; Frank and Niece, 2005;...
Active Healthy Kids Canada, 2006; Boldemann et al., 2006). One such outdoor environment where children spend a considerable amount of time on a regular basis is the school ground. How might this everyday setting be transformed to promote more physical activity?

This paper explores the potential of ‘greening’ to enhance school grounds in ways that promote active play. It is based on the results of a Canada-wide survey of 59 elementary schools. Under the umbrella term ‘greening’ we include a range of changes occurring on these and other school grounds across Canada, including naturalization, habitat restoration, tree planting, food gardening and similar efforts to bring nature back to school. Greening typically entails the transformation of both the design and the ‘culture’ of school grounds (e.g. the rules that govern play, the social dynamics among students, the role of supervisors). Indeed, an assumption underlying our discussion is that the two are inextricably linked: the design of a school ground expresses societal norms and objectives, guiding and orchestrating children’s outdoor activities at school (see Gagen, 2000, regarding playgrounds generally). In this sense, school grounds function as ‘moral geographies’ (Fielding, 2000, p. 230) embedded with codes (some explicit, some implicit) about how and where children ought to learn and play. Among other things, they can encourage particular forms of physical activity and limit others, depending on the mix of design features, school rules and social dynamics.

While all would perhaps agree that school grounds should be designed to promote children’s health, development and well-being, this purpose and the means of achieving it are open to interpretation. For many decades, the conventional approach to school ground design has favored flat, wide-open expanses of turf and asphalt with chain-link fencing, intended to contain and control students, facilitate supervision and promote competitive sports. There is a growing recognition, however, of the limitations of this perspective. Advocates of school ground greening, in particular, contend that school grounds should be designed to support and enrich classroom-based learning by providing a setting for hands-on, experiential learning across the curriculum (Adams, 1993; Malone and Tranter, 2003b; Dyment, 2005b). They also emphasize the importance of ‘softening’ the landscape and diversifying the play repertoire in order to create a safer, more inclusive play environment where there is less aggression, more civility and more cooperation (Moore, 1989a, b; Moore and Wong, 1997). The potential to design school grounds so that they serve important environmental functions is another recognized objective: with the addition of trees and other vegetation, school grounds can help to conserve energy, improve air and water quality, control runoff and provide habitat for urban wildlife (Cronin-Jones and Schaefer, 2001; Toronto District School Board, 2004).

In addition to these better-known design objectives, research indicates that green school grounds can also help to promote children’s health and well-being. Recognized health benefits have to do with protection from the sun (Greenwood et al., 1998; Queensland Health, 2002; Evergreen, 2003; Ambrosii, 2006; Boldemann et al., 2006) and the elimination of pesticides (Daniel, 1991; World Health Organization, 2003). The potential of green school grounds to enhance children’s social and mental health has also received attention (Barbour, 1999; Malone and Tranter, 2003a; Dyment, 2005a; Maller and Townsend, 2005). Of particular relevance to this paper, emerging evidence suggests that green school grounds can also improve motor development (Fjortoft, 2004) and encourage more physical activity (Bell and Dyment, 2006; Boldemann et al., 2006). To fully appreciate the promise of school ground greening in this regard, however, we need first to revisit a common assumption about physical activity, especially as it relates to overweight and obesity. That assumption equates physical activity with running, competitive sports and other vigorous forms of activity. These, of course, are...
the kinds of activities that the turf playing fields and asphalt sport surfaces of conventional school grounds are meant to support.

Research indicates, however, that conventional school grounds have their limitations in promoting physical activity in large part because many children are not interested or able to play in such vigorous, rule-bound activities. In such cases, these children are relegated to the sidelines (Barbour, 1999; Dyment, 2005a; Bell and Dyment, 2006). Emerging in the health literature, moreover, is a call to increase the range of enjoyable, non-competitive physical activities for children (Kumanyika et al., 2002; Raine, 2004). The vigorous level of activity provided by competitive, rule-bound games is not in itself considered adequate to respond to the problem of overweight and obesity. Canada’s Physical Activity Guide for Youth recommends, for example, an increase in moderate activity as well as vigorous activity (Canadian Institute for Health Information, 2006). Recent studies suggest that moderate levels of physical activity, such as those achieved through cycling and walking, can reduce the risk of obesity (Frank and Niece, 2005). Various forms of leisure activity, such as dance and art, may also be of benefit (Tremblay and Willms, 2003).

There is an interesting convergence, in fact, between these health studies and research in environmental design that calls for public open space of sufficient interest to attract informal users (Giles-Corti et al., 2005) and for playgrounds with landscaping and facilities that invite open-ended play (Herrington, 1999). Both point to the importance of designing and managing outdoor public spaces in ways that offer more options and choices for physical activity in order to appeal more broadly to people of varying interests and abilities. With regard to school grounds in particular, they must satisfy children’s desires for natural, dynamic, complex and stimulating play environments (Moore and Wong, 1997; Stine, 1997; Fjortoft, 2004).

This is where green school grounds stand to make an important contribution. Many researchers have documented the changes in children’s play behaviors as a result of greening, noting in particular an increase in the diversity of play behaviors (Faber-Taylor et al., 1998; Tranter and Malone, 2004). On green school grounds, trees, shrubs, rocks and logs define a variety of places to jump, climb, run, hide, role-play and socialize. Moveable, natural materials such as sticks, branches, leaves and stones provide endless opportunities to engage in imaginative play, such as building shelters and huts—an appealing and almost universal experience of childhood (Cobb, 1977; Sobel, 1993). By their very design, green school grounds encourage children to get moving in ways that nurture all aspects of their health and development (Moore and Wong, 1997; Bell and Dyment, 2006). Through their culture, they can help to foster safer, more welcoming settings for a diversity of children to engage in active play (Evans, 1995, 2001; Bell and Dyment, 2006). It is these issues that we address in this paper: namely, how factors related to the ‘design’ and ‘culture’ of green school grounds influence the potential for children to be engaged in physical activity.

Methods

This paper draws on the results of a national survey that we conducted for the Canadian charitable organization Evergreen (Bell and Dyment, 2006) to explore the relationship between physical activity and green school grounds at elementary schools across Canada. Specifically, we examine responses to two survey questions (out of six original ones) that directly addressed issues of design and school ground culture and aimed to identify the factors affecting active play.

Data for this national study was gathered through a questionnaire that was designed to gather information from parents, teachers and administrators in order to understand trends across a large number of elementary schools across Canada. It comprised primarily
closed questions, each followed by an open-ended question aiming to elicit additional comments, insights and explanations.

Prior to distribution, the content validity of the questionnaire was judged by a panel of six experts who evaluated the pertinence of the items relative to the research questions. The panel consisted of academics and practitioners with expertise in health and physical education, physical education pedagogy and health promoting school programs. The questionnaire received very high overall ratings and demonstrated sufficient content validity evidence from the expert judges to proceed. It was then revised in light of the reviewers’ comments, pilot tested and further revised.

A purposeful sampling protocol was used to determine which schools would be invited to participate in the survey (de Vaus, 1996). Specifically, the research team identified candidate schools that met the following criteria:

1. the greened site was sufficiently developed and defined so that a comparison could be made with its prior/ungreened state,
2. children had access to the greened site during their free time (before and after school, at recess),
3. diversity of socio-economic status of schools (schools from a wide variety of neighborhoods),
4. diversity of grade levels (kindergarten to grade eight), and
5. diversity of urban, suburban, small town and rural schools across Canada.

The first criterion was intended to ensure that survey participants would be able to respond to questions tracking change with respect to physical activity levels and patterns—something that would have been impossible if projects were only partially completed or simply too small. The second criterion was intended to exclude schools where children were not allowed to use the greened areas of the school ground during their free time. These two criteria no doubt shaped the results in important ways, selecting only for schools where there was a possibility for greening projects to have had an impact on physical activity and for survey participants to have noticed and been able to comment on change, if it had occurred. The final three criteria were intended to ensure that a broad range of schools was represented.

A package of three questionnaires was distributed to 145 schools in the Canadian provinces of British Columbia, Alberta, Manitoba, Ontario, Quebec, Nova Scotia and Newfoundland (total of 435 questionnaires), thus ensuring geographic representation. At each school, the questionnaires were to be completed by up to three individuals, including if possible a parent, a teacher and an administrator in order to provide a variety of perspectives.

The results discussed in this paper emerged from two (out of a total of six) questions from the questionnaire. These two questions explored issues related to design and culture (e.g. the rules that govern play, the role of supervisors, the social dynamics of students) and the degree to which they limit or enable physical activity on school grounds. In order to examine these factors more closely, the questionnaire included a list of conditions that could potentially limit or enable the number of children engaging in physical activity on green school grounds.

The first question asked survey participants to consider their school ground after the greening initiative and to rate the extent to which any of the factors listed encouraged active play/physical activity (see Table 1). Choices for the rating included: not applicable; does not encourage physical activity; encourages physical activity; or greatly encourages physical activity. Participants were then asked to identify the top three enabling factors at their school. The second question asked participants to rate the factors that limited active
play/physical activity after the greening initiative (see Table 2), and then to identify the top three limiting factors. Choices for the rating included: not applicable; greatly limits physical activity; limits physical activity; or does not limit physical activity. Structurally the questions were almost identical, although there were four more factors listed in the second question. In both questions, study participants were asked to add any additional factors that were not listed.

The questionnaires were analyzed using a statistical analysis program (Statistics Program for the Social Sciences, SPSS Version 12) to understand basic trends in participants’ responses (i.e. frequency counts). Results appearing in Tables 1 and 2 were generated by determining the percentage of participants who indicated that a factor had ‘encouraged’ or ‘greatly encouraged’ physical activity or ‘limited’ or ‘greatly limited’ physical activity. The data that were generated from participants identifying three factors that encouraged or limited physical activity on school ground were collated to generate a total number of responses and then a frequency of factors was determined. We decided to analyze data at the individual participant level, as opposed to the school level, because in many cases individuals from the same school had different perceptions of the same phenomenon.

Response Rates and Demographics

Out of the 145 schools invited to participate, 59 returned at least one questionnaire (41% response rate). As expected, given the range of schools originally contacted, the schools from which responses were received were very diverse. They included 27 urban, 21 suburban and 11 rural schools, located across Canada, with small to large staff and student populations. The ethnicity of the student population at individual schools varied widely, from almost entirely Caucasian at about half the schools, to largely Aboriginal,
Afro-Canadian, Indo-Canadian, Arabic and/or Asian at others. The greening projects at the schools were also varied—having been in place for between 1 and 26 years.

In total, 105 questionnaires were completed and returned from 28 parents, 48 teachers and 29 administrators. These individuals differed in terms of their age, gender and teaching experience, as well as their level of interest in greening initiatives. The number of respondents varied from school to school, varying between one and three.

Results and Discussion

The overall survey results clearly indicated that green school grounds can play a significant role in promoting physical activity (see Bell and Dyment, 2006). According to the vast majority of participants, green school grounds are encouraging more active play, supporting a wider variety of play activities and promoting a better integration of physical activity into school life generally.

The degree to which a green school ground can be effective in this regard, however, will depend on a number of factors related to design and school ground culture, as Tables 1 and 2 illustrate, in order of prevalence, how participants rated the various factors encouraging or limiting the number of children engaging in physical activity on their green school ground. Table 1 highlights in particular the perceived importance of diverse play opportunities (open-ended play, exploration of nature) and related design considerations such as the definition of space and the diversity of landscape features. Another cluster of prevalent factors (culture of participation, opportunities to care for the green space, culture of stewardship) suggests a strong association between physical activity and one of the common objectives of school ground greening: heightened student involvement and sense of ownership in the school ground.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Limiting factor</th>
<th>% of participants who felt that this factor limited physical activity at their school</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Maintenance concerns</td>
<td>48</td>
</tr>
<tr>
<td>2</td>
<td>Lack of shade</td>
<td>46</td>
</tr>
<tr>
<td>3</td>
<td>Social dynamics among students</td>
<td>40</td>
</tr>
<tr>
<td>4</td>
<td>Lack of moveable parts (e.g. sand, sand toys, sticks, stones, dirt, tools, etc.)</td>
<td>38</td>
</tr>
<tr>
<td>5</td>
<td>Safety concerns (e.g. about water features, sight lines, climbing, etc.)</td>
<td>36</td>
</tr>
<tr>
<td>6</td>
<td>Lack of play equipment (e.g. toys, balls, etc.)</td>
<td>32</td>
</tr>
<tr>
<td>7</td>
<td>Lack of adequate space</td>
<td>32</td>
</tr>
<tr>
<td>8</td>
<td>Inability to supervise students in green spaces</td>
<td>30</td>
</tr>
<tr>
<td>9</td>
<td>Lack of diverse landscape features (e.g. trees, hills, gardens, seating areas, etc.)</td>
<td>29</td>
</tr>
<tr>
<td>10</td>
<td>Bullying</td>
<td>27</td>
</tr>
<tr>
<td>11</td>
<td>Green spaces do not meet student needs</td>
<td>27</td>
</tr>
<tr>
<td>12</td>
<td>School rules that prohibit active play</td>
<td>26</td>
</tr>
<tr>
<td>13</td>
<td>Lack of physical education classes</td>
<td>24</td>
</tr>
<tr>
<td>14</td>
<td>Green spaces are off limits to students during their free time</td>
<td>24</td>
</tr>
<tr>
<td>15</td>
<td>Lack of manufactured play structures</td>
<td>22</td>
</tr>
<tr>
<td>16</td>
<td>Playground supervisors do not encourage active play</td>
<td>20</td>
</tr>
<tr>
<td>17</td>
<td>Space is poorly defined (e.g. by vegetation, seating, play areas, etc.)</td>
<td>18</td>
</tr>
<tr>
<td>18</td>
<td>Lack of school policy promoting active play</td>
<td>16</td>
</tr>
<tr>
<td>19</td>
<td>Playground supervisors discourage active play</td>
<td>16</td>
</tr>
</tbody>
</table>

Table 2. Design and culture factors that limit physical activity
Note that in Table 1, 50% or more of the participants felt that 13 out of the 15 factors listed encouraged physical activity on their green school ground. In contrast, none of the limiting factors presented in Table 2 was reported by even half of the participants. This discrepancy suggests a certain level of satisfaction with the impact that green school grounds are having. As Table 2 indicates, however, there are significant challenges that need to be addressed in order to better promote physical activity on green school grounds. Issues related to maintenance and safety evidently represent a common hurdle, one that should be addressed at the design stage to the extent possible. Lack of shade and lack of moveable parts are also prevalent factors limiting physical activity, even after greening, again underlining the importance of these design considerations.

Also of interest is the mix, in terms of prevalence, of the design factors (e.g. definition of space, diversity of landscape features, shade) and the school ground culture factors (e.g. social dynamics, opportunities for non-competitive play, supervision) identified in both lists. Clearly, school grounds can be designed with the explicit goal of promoting active play, but there are many strong social influences that need to be considered at the same time, if the goal is to be realized. For example, through design elements such as logs, boulders, gardens, wildlife feeding stations and nature trails, spaces can be defined in ways that promote non-competitive, open-ended play; such forms of play are more likely to occur, however, if they are well suited to the social dynamics defining relationships among students and between adults and students.

Not surprisingly, what is considered a factor that encourages physical activity at one school can prove to be a limiting factor at another (or even the same school). For example, the social dynamics among students are seen as an enabling factor by 74% of participants, but a limiting factor by 40%. Similarly, the provision of shade is a frequently noted enabling factor (63%), while the lack of shade is the second most commonly cited limiting factor (46%).

Identification of Enabling and Limiting Factors

Working from the lists of encouraging and limiting factors, study participants identified the top three factors that encouraged or limited physical activity on their green school ground. In this process, participants mentioned design factors about twice as often as culture factors, suggesting that design factors are perceived to be the more important determinant of physical activity on school grounds.

Figures 1–4 present the top three encouraging and limiting factors that were identified by participants. In some cases there is a high level of consistency between the prevalence of a particular factor (i.e. how often it is identified as a factor by survey participants, as illustrated in Tables 1 and 2) and its perceived importance at individual schools. In other cases, however, the relative importance of enabling and limiting factors shifts as a consequence of identifying the top three factors. In such cases, a factor may be less widespread than others (i.e. identified by fewer participants), and yet may be highly significant at individual schools. For instance, the diversity of landscape features is the most significant design factor encouraging physical activity according to the listing of the top three factors at individual schools (Figure 1), but figures ninth on the list according to prevalence (Table 1).

In the discussion that follows, the lists of enabling and limiting factors are explicitly divided along the lines of design and culture. Admittedly, this division is somewhat arbitrary, since several factors are related to both design and culture. The division is useful, however, in characterizing and analyzing the types of opportunities and challenges that are at play.
School Ground Design

Figures 1 and 2 represent the design factors that encourage or limit physical activity on green school grounds. They signal the importance of designing school grounds to provide adequate space, diversity and interest to stimulate active play. They also underline the need to address issues of safety and comfort as well as maintenance, since these factors influence the number of children who are being physically active.

Diversity of both landscape features and play opportunities stands out as the primary design factor influencing physical activity. This finding is supported by a number of studies. Simple design elements such as stepping stones and vegetation, for instance, help to define and diversify a play space and can dramatically shape the way that children move and interact with each other (Moore, 1989a, b; Herrington and Studtmann, 1998; Herrington, 1999). More diverse outdoor play environments have been shown to improve motor fitness (Fjortoft and Sageie, 2000; Iltus and Steinhagen, 2003; Fjortoft, 2004), stimulate movement such as rolling, crawling, sliding, balancing, jumping and
climbing (Moore, 1996), and nurture all aspects of children’s development—social, emotional, cognitive and physical (Moore, 1989a, b; Herrington and Studtmann, 1998; Heerwagen and Orians, 2002).

To diversify the school ground, natural elements are of critical importance. Survey participants indicated that opportunities to explore nature, observe wildlife and care for the green space or garden all help to encourage physical activity on the school ground. A Swedish study of preschool playgrounds supports this finding. Using pedometry to measure and compare children’s movement at 11 different preschools, the researchers found that children were taking a significantly higher number of steps in spacious play environments with trees, shrubbery and broken ground (Boldemann et al., 2006).

The developmental benefits of including natural design features in children’s play spaces are well documented. Alive and ever-changing, natural elements such as trees, bushes, flowers and insects have a very high play value. Stones, sand, earth and branches further enhance the complexity and plasticity of these play environments, inviting manipulation and movement. They stimulate the imagination, encouraging children to participate in ‘world-shaping,’ ‘meaning-making’ and problem-solving activities (Cobb, 1977; Moore, 1986; Moore, 1989a,b; Sobel, 1993; Moore and Wong, 1997; Chawla, 2002; Kellert, 2002; Malone and Tranter, 2003a). Thus, there is a strong synergy between the developmental and health benefits of school ground greening and its more traditional purposes, such as promoting hands-on experiential learning and bringing nature back into children’s everyday experiences.

As survey participants indicated, however, these benefits can be undermined if other design factors are not taken into consideration. The top limiting design factor was the lack of adequate space. This finding is open to different interpretations, including the most obvious, which is that some school grounds are simply too small to allow adequate opportunities for physical activity. Again, this finding is supported by the Swedish study which found that the size of preschool playgrounds was an important determinant of the number of steps taken by children (Boldemann et al., 2006). Although options for addressing this issue at existing schools may be limited, where new schools are being built, it is a factor that could and should be addressed through policy governing school ground design and development.

Another interpretation of the adequate space issue is that, in many cases, greened areas on school grounds are off limits during children’s free time. This may be as a result of safety concerns (e.g. where water features are involved), maintenance concerns (e.g. where features are vulnerable to trampling or erosion) or supervision issues (e.g. where shrubs or trees impair sight-lines; where greened areas are located at the front of schools). All of these conditions received a high ranking by survey participants as factors limiting physical activity and should be taken into account in the design process.

Despite these potential limitations, however, greening can also improve the adequacy of space available on the school ground for active play. Often, through greening, under-used areas of the school ground become more desirable as play spaces, and consequently help to spread the student population throughout the yard. Whether an area is adequately shaded, for example, is a strong determinant of whether it will be used for active play, according to survey participants. Shade provides protection from the sun, increasing the safety and comfort of the school ground, two important design considerations. One way that greening could further enhance the adequacy of available space at many schools would be to better accommodate the needs of users with physical disabilities, for example by including raised flowerbeds or pathways suitable for people using wheelchairs or walkers (Dyment and Bell, in press).
School Ground Culture

Figures 3 and 4 present the school ground culture factors that encourage or limit physical activity on green school grounds. They signal the importance of a school ground culture that fosters positive social dynamics and provides opportunities for non-competitive, open-ended play and stewardship. They also point to the need for rules, policies and approaches to supervision that explicitly support active play on the school ground.

Social dynamics on the school ground stand out as the number one culture factor influencing physical activity. This is especially true of relationships among students, and to a
lesser degree of the relationships between students and adults. It is helpful to interpret this finding in light of studies exploring the dominant cultural beliefs and values that shape the design and culture of school grounds.

One such belief is the ‘surplus energy theory’, according to which school grounds serve primarily as places for children to ‘let off steam’ (Evans and Pellegrini, 1997). Conventional school ground design embodies this belief, with its emphasis on wide-open expanses of turf and asphalt that favor vigorous, rule-bound, competitive play. Closely related to the surplus energy theory are the ‘military’ and ‘factory’ models of school ground design and culture (Stine, 1997). The military model values containment, control and surveillance. Children must be in sight and under control at all times—hence the chain-link fencing, flat play surfaces and absence of hiding places, reminiscent of the military drill yard. The factory model emphasizes efficiency and production: children move on predictable schedules and engage in physical activity during breaks to improve intellectual production; turf and asphalt are preferred as the lowest-cost design option.

This suite of beliefs and values, at play to varying degrees on school grounds across Canada, implicitly supports a hierarchical social dynamic of exclusion and dominance: there are those who can compete and/or command the playing field and those who cannot (or will not). It is also very much in line with the view that behavioral problems on the school ground should be addressed by strengthening control and enforcement—for instance, by increasing the number of supervisors on duty, enforcing stricter rules, having segregated playgrounds, enforcing anti-bullying policies, reducing the length of recess, and even totally eliminating recess (Evans, 1997, 2001). Some of these strategies clearly work against the hope of increasing physical activity, since they reduce the amount of time spent outdoors. Others reinforce the power of school ground supervisors, a move unlikely to alleviate social tensions that might exist between students and adults.

Conversely, rather than building on the social dynamics of control and dominance, greening has the potential to temper them, by diversifying play opportunities, providing opportunities for non-competitive, open-ended play and fostering more civil and cooperative behavior. In so doing, greening can help to create a more welcoming environment, inviting more children to participate in physical activity.

Using design interventions to deliberately and positively influence the social dynamics among children on the school ground makes sense, given the findings from this study. In addition, school rules and policy are needed to ensure that the culture of the school ground is explicitly targeted as a means of promoting physical activity. The importance of encouraging diverse play activities, of raising awareness about the benefit of moderate and light levels of physical activity, and of maintaining or increasing the amount of time that children spend outdoors (both free time and class time) should be acknowledged and supported through school rules and policy.

A related issue identified by participants and frequently discussed in the literature is the insufficiency of health and physical education classes. Many Canadian children have limited health and physical education classes (Active Healthy Kids Canada, 2005, 2006; Heart and Stroke Foundation of Canada, 2006), a fact that highlights a serious weakness in the dominant culture of schooling: children are expected to be seated and still while learning; physical education, and indeed physical modes of education are often seen as an ‘add on’ to the core academic subjects. This division of the cerebral and the physical is unfortunate, given the positive relationship that has been unequivocally demonstrated between students’ health and their academic performance (Etnier et al., 1997; Symons et al., 1997).

Increasingly, the need to offer daily physical activity in a variety of ways across the curriculum is being recognized (Active Healthy Kids Canada, 2006). Green school grounds
represent a promising means of supporting such active learning and thus of reuniting mind and body at school. Implementing, caring for and studying aspects of the green school ground present many opportunities to deliver the curriculum across a range of subject areas while being physically active. Subjects such as math, language arts, drama, geography and science can be taught outside (e.g. Rhydden-Evans, 1993; Cronin-Jones, 2000), and green school grounds in particular can provide an enriched environment for such experiential learning.

In addition, food gardens provide an excellent opportunity to teach and learn about nutrition through direct experience (Canaris, 1995; Desmond et al., 2002; Dillon et al., 2005). According to the majority of participants in this study, food gardens at their school provide important opportunities for moderate physical activity and encourage physical activity among students who tend to be less physically inclined (Bell and Dyment, 2006).

To exploit the benefits of outdoor learning, however, it is important that the official curriculum explicitly endorse and support the use of school grounds as sites for curriculum delivery. This is seldom the case in Canadian schools where attention is focused almost exclusively on indoor, text-centered learning. The situation is compounded by the fact that teachers receive little, if any, training regarding the benefits of or approaches to teaching outdoors. Consequently, teachers lack the knowledge, confidence and motivation to teach outside the classroom (Dyment, 2005b).

If this situation is to change, a shift in the culture of schooling is needed. This shift can be facilitated through the development of school policies and curriculum that provide clear direction and examples about using school grounds as sites for outdoor, experiential learning. Professional development opportunities for teachers are also needed to ensure that teachers have the confidence and competence to teach outdoors.

**Conclusion and Recommendations**

This paper presents clear evidence that the design and culture of school grounds and their inter-relationship influence children’s physical activity. It is easy to understand how conventional school grounds, designed with fences and barren, flat surfaces that support a culture of confinement and control, can limit opportunities for physical activity. In contrast, green school grounds, with their purposefully complex designs and participatory culture, can assume an important role in promoting physical and social health amongst students.

Given their potential, it stands to reason that green school grounds should figure prominently within comprehensive school-based strategies to promote health generally and physical activity specifically. Despite the acknowledged importance of environmental interventions, however, green school grounds rarely if ever figure among these strategies. Their potential thus remains largely unrecognized and unrealized.

To better meet the challenges and pursue the opportunities that green school grounds present, policy is needed across a range of sectors to influence the cultural, institutional and environmental factors that affect children’s physical activity. High-level political direction (i.e. at the federal, provincial and territorial levels) is key to ensuring that local interventions are adequately resourced and integrated into existing programs and structures. In the United States, for example, federal legislation requires each local educational agency to establish a school wellness policy including goals for physical activity, nutrition education and other school-based activities to promote student well-being. Under each school wellness policy, a plan must be developed to measure implementation of the policy and to ensure the involvement of the local school community.5
In Canada, several policy options have been proposed to address overweight and obesity in the school setting. These focus on health and physical education requirements, school food policies, and safe and active routes to schools (Raine, 2004). Such policy proposals should be expanded to include interventions that address the design, use and culture of school grounds. For example, policies could explicitly require approaches to school ground design and supervision that promote a variety of physical activities, including enjoyable, non-competitive, open-ended forms of play. High-level policy commitments are needed to guide education ministries, school boards and schools in setting their priorities, budgets, curriculum, school ground design standards, and supervision policies so that they foster and support opportunities for physical activity on school grounds. In the absence of these commitments, school grounds stand to remain barren, shade-deprived, uninviting spaces with a dominant culture that favors only children who are willing and able to engage in rule-bound, competitive play.

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Notes

1. We are aware that there is some debate and critique around the existence of the overweight and obesity epidemic; however, we align ourselves with scholars and health experts who do think there is an epidemic.
2. Although this study focused entirely on elementary schools (children in Kindergarten to Grade 8; approximately ages 4–13), we believe there are important connections to be made with secondary schools, where the design and culture of school grounds undeniably influence the physical activity of older children and young adults.
3. Not all participants identified three factors; hence the total number of responses is less than the number of participants multiplied by three.
4. Despite using a purposeful sampling approach that sought to include schools where children had access to the greened site during their free time (see methods section), it became clear during the analysis that some schools that participated limited the access of children to the green areas of the school ground.

References

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Promoting Physical Activity through School Ground Greening


