Grounds for health: the intersection of green school grounds and health-promoting schools

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Grounds for health: the intersection of green school grounds and health-promoting schools

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Despite the growing body of research on green school grounds, relatively little has been written about their relationship with health promotion, particularly from a holistic health perspective. It is this relationship that we explore in this paper – the power and potential of green school grounds to promote health and well-being and to be an integral element of multifaceted, school-based health promotion strategies. Specifically, we bring together recent research to examine green school grounds as places where the interests of educators and children’s health advocates can meet, inform and support one another. By grounding our comments in recent thinking about health-promoting schools, we highlight the growing body of evidence that green school grounds, as a school setting, can contribute to children’s physical, mental, social and spiritual well-being.

**Keywords:** school grounds; children’s health; green design; health-promoting schools

Grounds for health

Evidence of the wide-ranging benefits of green school grounds is mounting. These benefits extend to student learning, environmental awareness, teacher motivation, social behaviour and relationships, safety and health (Dyment 2005a). School grounds can thus be considered and developed as sites to enhance these various dimensions of school life. They also represent an opportunity for environmental educators to reach out and collaborate with people working in other related educational fields and movements – be it around issues of achievement, citizenship, peace, safety or health.

Despite the growing body of research on green school grounds, relatively little has been written about their relationship with health promotion, particularly from a holistic health perspective. It is this relationship that we explore in this paper – the power and potential of green school grounds to promote health and well-being and to be an integral element of multifaceted, school-based health promotion strategies. We review the literature to examine green school grounds as places where the interests of educators and children’s health advocates can meet, inform and support one another. We begin with a general overview of recent thinking about health-promoting schools and green school grounds. We then consider, in order, how green school grounds can contribute to children’s physical, mental, social and spiritual well-being. Underlying our discussion are two key assumptions: first, that children’s readiness and ability to learn are closely tied to their physical, mental and social health (Action for Healthy Kids 2004; McCall 2003; Symons et al. 1997) and second, that school settings can have a significant impact on both learning and health (World Health Organization 2003).
Health-promoting schools

The health-promoting schools movement is a growing international phenomenon with organizations and networks in Europe, North America, Latin America, southern Africa, South-East Asia and the Western Pacific. It is based on a holistic understanding of health, including its physical, mental, social and spiritual dimensions, and is thus in accordance with the World Health Organization’s (WHO) long-standing internationally accepted definition of health as ‘a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity’. The health-promoting schools movement recognizes that there is a broad spectrum of interacting factors affecting health, one of which is the settings within which people live, work, play and learn. The ‘setting’ approach to health promotion is characterized by a focus on the social determinants of health in addition to health factors related to individual lifestyle. From this perspective, promoting health is understood to involve promoting healthy settings, including healthy school settings (McCall 2003). WHO describes a health-promoting school as ‘a school that is constantly strengthening its capacity as a healthy setting for living, learning and working’ (World Health Organization 2003, 2).

Health-promoting schools require a new approach to school health, one that no longer relies solely on classroom-based health education (Deschene, Martin and Hill 2003). Instead, the school setting itself – the way it is run, the way individuals interact, its physical condition – becomes a target of intervention (Canadian Institute for Health Information 2006; Ronson and MacDougall n.d.).

Health-promoting schools are generally striving to:

1. Provide a healthy physical and social environment.
2. Engage parents and the broader community.
3. Provide equal access to multiple education opportunities.
4. Foster empowerment and the ability to take action, cope and generate change.
5. Ensure that the curriculum is relevant to the needs of students, linking the curriculum with the school and the community.

These aims reflect the recognized importance of providing a healthy physical and psychosocial environment: ‘The environment becomes an invaluable resource for effective health promotion, through the nurturing of policies and practices that promote well-being’ (Ronson and MacDougall n.d., 4). Seen in this light, school grounds, including their design and physical features, the rules that govern them, their role in school and community life, and the types of play and social interactions that they invite and support, become a site of purposeful intervention for promoting health.

Green school grounds

School ground greening is an umbrella term used here to refer to a range of changes occurring on school grounds including gardening, naturalization, habitat restoration, tree planting and other collaborative efforts to bring nature back to the school ground. It addresses the design, use and culture of school grounds, with a view to improving the quality of children’s play and learning experiences. Schools around the world have embraced school ground greening and are transforming hard, flat, barren expanses of turf and asphalt into gentler, more welcoming places that include a diversity of natural and built elements, such as trees, shrubs, wildflower gardens, ponds, grassy berms, food gardens, shelters, seating areas and rock amphitheatres. School ground greening is particularly prominent in Canada, the US, Australia, New Zealand, the UK, Scandinavia and South Africa.

Researchers across a range of disciplines (e.g., education, psychology, sociology, landscape design) have noted the impacts of these spaces. Studies indicate that students attending schools
with green grounds benefit from increased play opportunities (Malone and Tranter 2003; Moore 1996), enhanced social relations (Dyment and Bell forthcoming; Titman 1994), unique opportunities to become engaged and reflexive citizens (Dyment 2004; Mannion 2003), safer and less hostile outdoor environments (Cheskey 1994; Evans 2001), enhanced relationships with the natural world (Bell 2000, 2001; Nabhan and Trimble 1994; Tranter and Malone 2004), heightened environmental stewardship (Bell 2001; Harvey 1989), increased learning opportunities (Centre for Ecoliteracy 1999; Dyment 2005b) and improved academic performance (Ernst and Monroe 2004; Lieberman and Hoody 1998; Simone 2002). Teachers working at schools that have been greened report unique curriculum development (Evergreen 2000; Moore and Wong 1997) and reduced classroom management problems (Lieberman and Hoody 1998).

The relationship between green school grounds and health has been noted by some researchers, but to a lesser degree. When designing and implementing green school grounds, the most frequently considered health concerns are often the immediate physical ones, such as providing sun protection (Boldemann et al. 2006; Evergreen 2003, 2006; Greenwood, Soulos and Thomas 1998; Queensland Health 2002). Other recognized health issues on school grounds revolve around the elimination of pesticides (Daniel 1991; World Health Organization 2003), the promotion of physical activity (Bell and Dyment 2006; Boldemann et al. 2006) and the potential of food gardens to raise awareness of food production and healthy food choices (Canaris 1995; Dillon et al. 2003; Graham and Zidenger-Cherr 2005; Morris, Briggs and Zidenberg-Cherr 2002). The social, mental and physical dimensions of health have also been discussed by researchers investigating the relationship between the type, quality and diversity of play spaces and the type, quality and diversity of play behaviours (Barbour 1999; Bell and Dyment 2006; Boldemann et al. 2006; Fjortoft 2004; Kirkby 1989; Malone and Tranter 2003). Few if any of these studies are informed, however, by a holistic, health-promoting schools perspective.

While the intersection of green school grounds and health has received some attention, we believe that it merits much more. School grounds are an important part of the school setting that affect all dimensions of children’s health. When thoughtfully designed, they can become an integral component of holistic approaches to promoting health in schools.

Physical health

School ground greening can result in many physical health benefits, some of which are relatively straightforward. When schools eliminate pesticides and increase shade, for example, they are creating healthier settings by reducing students’ exposure to harmful chemicals and ultraviolet radiation. With respect to both issues, medical research indicates that children are a vulnerable population (Canadian Association of Physicians for the Environment n.d.; Toronto Public Health 2002; Wigle 2003) and health organizations point to schools as key settings for limiting exposure and promoting awareness (World Health Organization 2003). The provision of shade on school grounds, for instance, is an important structural change to the school setting that makes it easier and more likely for children to protect themselves from the damaging impacts of ultraviolet radiation (Ambrosii 2006; Boldemann et al. 2006; Girgis et al. 1993; Payne 1999). As John Greenwood (1998) notes, providing shade is a more effective health strategy than trying to force teenagers to wear hats.

In addition to these obvious benefits, greening can enhance physical health in more subtle ways as well. To appreciate these, however, we must address two common misconceptions about school ground design. The first is the belief that the uniform, wide-open spaces of conventional school grounds minimize physical risk and maximize student safety because there is little that students can fall down from and little to block the sight lines of the adults on yard duty. From this perspective, it may be feared that school ground greening increases the risk of injury – for example, by
having students fall from rocks or trees, slip into ponds, or get stung by insects attracted to the vegetation or compost. In addition, there may be concern that bushes, trees and other natural features will impair supervision and invite hidden misbehaviour and even criminal activity.

Recent research helps to correct the imbalance in this perspective. A study of 45 schools in Toronto, Canada, indicates that school ground greening actually calms student traffic and softens play surfaces so that there are, in fact, fewer ‘knock-and-bump’ injuries (Dyment 2005a). With proper planning, furthermore, vegetation can be placed and pruned so that adequate sight lines are maintained. And while a small percentage of schools in the study (12%) experienced a rise in crime (vandalism, graffiti, trespassing) after greening, most reported either no change (55%) or a decrease (33%) in crime. The study thus suggests that greening has the potential to increase safety on school grounds, a finding supported by research in the US documenting the positive impact of ‘greener’ surroundings on levels of crime and aggression in urban residential areas (Kuo and Sullivan 2001a, b; Trust for Public Land 1995).

Moreover, by equating student safety with barren landscapes that facilitate supervision, schools may be placing excessive limitations on children’s experiences. John Evans (1995) explains:

… in many schools, the concern for safety, and the perceived need for stringent supervision, is having far-reaching effects on children’s play patterns to the point where opportunities for children to engage in activities of their own making, which might involve elements of risk, challenge, adventure, creativity and so on, are diminishing. (Evans 1995, 22)

Like Evans, Sharon Stine (1997) contends that school ground design should allow students to explore, create and take risks within the limits of safety:

… by taking risks, by facing a challenge, we learn about our competence and our limitations. Trying to exist in a world without some measure of risk is not only impossible but inhibits our lives and denies a child’s need for challenge. It is important for children to be able to risk without physical danger. (Stine 1997, 28–9)

Indeed, the two of us would argue that the sterile landscapes of conventional school grounds present a much greater health risk than rocks and trees – the risk of depriving children of the quality and variety of experience that are crucial to their healthy development. This risk is greatest for the growing numbers of children who have little access to the natural environment outside school hours (McKendrick, Bradford and Fielder 2000; Rivkin 1995; Thomson and Philo 2004).

A second health-related misconception about school ground design is the belief that flat turf and asphalt provide ideal surfaces for burning off excess energy and engaging in team sports, and are therefore best suited to promoting physical activity. Again, recent studies offer a more balanced perspective. They indicate that physical activity is best supported on school grounds comprised of a diversity of landscape features that respond to a wide variety of student interests and capabilities (Bell and Dyment 2006; Boldemann et al. 2006). A Canada-wide survey of 59 elementary schools suggests that 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 (Bell and Dyment 2006). Complementing the rule-bound, competitive games supported by asphalt and turf playing fields, greened areas on school grounds invite children to jump, climb, dig, lift, rake, build, role-play and generally get moving in ways that nurture all aspects of their health and development. Of particular significance is the potential to encourage moderate and light levels of physical activity by increasing the range of enjoyable, non-competitive, open-ended forms of play at school.

A study from Sweden supports these findings, indicating that the physical qualities of outdoor preschool environments (their size, the presence of trees and shrubs, the proximity of play structures to vegetation) are an important trigger of physical activity (Boldemann et al. 2006). Using
pedometry to measure and compare children’s movement at 11 different preschools, the Swedish researchers found that children were taking a significantly higher number of steps in spacious play environments with trees, shrubbery and broken ground. Seen in this light, green school grounds stand to be an important intervention to promote physical activity.

Similarly, an American study investigating the impact of design on children’s physical activity at three childcare centres indicates that the size and diversity of the play areas are among the most important variables predicting physical activity (Cosco 2006). Using accelerometry, behaviour mapping and video-tracking of individual children, Nilda Cosco found that the most active play area among the three schools contained vegetation, pathways and manufactured items.

The diversity of natural features on school grounds can also have a positive influence on motor development. Ingunn Fjortoft (2004) compared the physical fitness of five, six and seven year old children playing in a natural playscape (a forest) adjacent to their school and children playing in a more conventional playground. Those playing in the natural playscape showed a statistically significant increase in motor fitness and showed greater improvements in balance and fitness than those in the other group. According to Fjortoft, landscape features ‘influence physical activity and motor development in children’ (21) and play activities ‘increase with the complexity of the environment and the opportunities for play’ (24).

Another physical health benefit offered by green school grounds is the opportunity to promote better nutrition through student participation in food gardening. Rates of obesity are rising among children in Canada, the US and other industrialized nations, with significant physical, mental and social health impacts (Action for Healthy Kids 2004; Raine 2004; Symons et al. 1997). Health officials are therefore striving to improve dietary behaviours and are calling upon schools to support healthy eating choices (Action for Healthy Kids 2004). While attention is focused on the food choices offered in school cafeterias and vending machines, food gardening offers a complementary means of supporting nutrition programs through the design and use of the school ground. By planting, tending, harvesting and eating a variety of vegetables and fruits, children can gain hands-on knowledge about nutritious food and its production (Bell and Dyment 2006; Evergreen 2006; Gottlieb and Azuma n.d.). Incorporating a vegetable garden into health programming can thus have a positive effect on children’s eating preferences, habits and nutrition knowledge (Morris, Briggs and Zidenberg-Cherr 2002; Morris, Neustadter and Zidenberg-Cherr 2001; Morris and Zidenberg-Cherr 2002).

It is generally recognized that environmental factors are an important determinant of physical health. The global obesity epidemic, for example, is largely related to environments that promote sedentary lifestyles and the over-consumption of high fat foods (Raine 2004). Since the design of the built environment ‘can facilitate or constrain physical activity’ (Transportation Research Board of the Institute of Medicine of the National Academies 2005, 5), there is increasing emphasis on the need to create more ‘walkable’ and more ‘playable’ environments (Raine 2004). School ground greening is one means of doing just that.

Social health

Green school grounds, like all school grounds, are an important environment for social learning and development (Evans 1995, 1997). By their design and culture, they influence social behaviours and relationships (Titman 1994). Green school grounds can play an important role in enhancing social health by providing a more diverse environment that better responds to the needs and interests of more children and by creating opportunities for students, staff and parents to work together towards shared goals. In so doing, green school grounds promote social inclusion and equality and can foster greater civility, cooperation and communication among children and between children and adults (Dyment 2005a; Dyment and Bell forthcoming).
In her influential work on children and school ground design, Wendy Titman (1994) found a positive correlation between the conditions of the school ground and the behaviours and attitudes of children. She revealed how school grounds, in themselves, function as a ‘hidden curriculum’, a ‘form of mass communication’ with a ‘vocabulary and grammar’ of their own (16–17). Children in her study considered school grounds to be inextricably connected to the school buildings and believed that those who were responsible for the design of the school ground ‘made it like that’ for a reason (57). Thus when school grounds failed to meet the needs of children, thereby making time in the school ground unenjoyable, they believed that this was a conscious decision by people in positions of authority who did not care.

Building on the work of Titman, others have examined the relationship among school ground design, play opportunities and social hierarchies and interactions (Barbour 1999; Cheskey 2001a; Moore and Wong 1997). American researcher Ann Barbour (1999) compared play behaviours on two school grounds: one that provided primarily opportunities for physical play, and 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 socially excluded. Conversely, at schools where a diversity of play opportunities were afforded, students who were less physically competent could still engage in types of play that were more in line with their abilities and interests.

Conventional school grounds, by their design, provide a limited range of play opportunities that privilege certain individuals. Expanses of pavement and manicured grass offer opportunities primarily for large group, competitive, rule-bound games. They satisfy some children, but provide few choices for those who prefer to play in smaller groups, who do not wish or are not able to compete, or who prefer different kinds of games (e.g., more open-ended, creative). Research suggests, for example, that conventional playgrounds cater to only a portion of the student population – primarily boys, older students and students with high physical competence who tend to dominate large open spaces and play equipment (Cunningham and Jones 1996; Dyment 2005a; Nabhan and Trimble 1994; Ridgers et al. 2005).

Given these limited play opportunities, it is not surprising that many students are bored on conventional school grounds, a situation which results in frustration, annoyance and even aggression (Evans 2001; Moore 1986; Ridgers et al. 2005; Rivkin 1995; Titman 1994). Some students direct their energies into unhealthy behaviours, such as bullying, violence, thievery and vandalism (see Baker and Mednick 1990; Blyth, Smith-Thiel et al. 1980; Boulton 1999; Craig et al. 2000). To deal with these behaviours, schools are increasingly adopting a culture of surveillance and control on school grounds. Management strategies include increasing the number of teachers on duty, enforcing stricter rules and anti-bullying policies, segregating playgrounds, and reducing or even eliminating recess (Evans 1997, 2001; S. Thomson 2005).

In contrast, green school grounds present the possibility of alternative, less oppressive approaches to dealing with these issues, in large part by satisfying the desires and needs of a wider variety of children. In their study of a green school ground in Berkeley California, for example, Robin Moore and Tony Wong (1997) found that young people were able to ‘expand the play repertoire’ (91), engaging in less organized play and more unorganized ‘free’ play. On the green school ground, they observed an increase in active play, creative play, pretend play, exploratory play, constructive play and social play, compared to 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. (Moore and Wong 1997, 91)
The diversity of play opportunities is key. Citing a study of over 4000 children in 21 Brisbane (Australia) primary schools, Evans (1998) notes: ‘the most active playgrounds with the happiest children were those containing the greatest variety of play areas’ (15).

In the Toronto study mentioned above, participants indicated that when school grounds had been greened, they tended to become more peaceful, harmonious and socially inclusive (Dyment 2005a). They reported, for example, an increase in cooperative play (73% of study participants), a decrease in boredom (74%) and a decrease in negative and aggressive play (66%). They noted that students were being more civil (72%), communicating more effectively (63%) and being more cooperative (69%). They also reported that discipline problems had decreased (44%) or remained the same (40%) and that incidents of aggressive behaviour had likewise decreased (45%) or remained the same (53%). About half of the study participants felt that green school grounds were more inclusive with respect to gender (54%), class (42%), race (46%) and ability (52%), while the other half reported no change. Of note is the fact that these improvements were identified across the school board, regardless of the study participants’ characteristics (age, gender), the schools’ characteristics (grade level, socio-economic status of the school catchment area), or the greening projects’ characteristics (history, amount of funding).

Gardening activities in particular seem to provide ongoing opportunities to build positive relationships among students, staff and parents, a key element in establishing a healthy school culture (Maller 2005). Some have argued that these benefits can be even more dramatic if children are involved in the full process of greening, from planning and design, to implementation and maintenance (Hynes 1996; Lewis 1992; Trust for Public Land 1995). In such cases, children typically have opportunities to work with a range of individuals from both within and outside the school. They are able to share interests, values and time with their other students, teachers, parents and community members as they work towards common goals. They also learn important social life skills, such as team work, cooperation and persistence (Alexander et al. 1995).

Because greening projects tend to encourage broad community involvement, the social benefits can extend beyond the immediate school setting, affecting the social health of the broader community (Barker 1994; Herrington 1999; Maller 2005; Maller and Townsend 2005). School ground greening provides a process and a place where people can meet, make friends and build a sense of community and purpose (Dyment 2005a; Lewis 1992). As projects evolve, and grounds become greener and more inviting, they embody the effort, care and vision of those involved, sending a powerful message to the broader community. (Of course if projects are untended or abandoned, the opposite is also true.) According to a recent Australian study, students who were involved in greening initiatives felt a greater sense of commitment to and from the broader school community as well as more links with other schools, other parents and the local community (Maller 2005).

Community involvement is an important principle guiding the health-promoting schools movement: as students, parents, teachers and community members work in partnership, they create powerful momentum for positive change and active citizenship (Australian Health Promoting Schools Association n.d.; Ronson and MacDougall, n.d.). School ground greening presents a prime opportunity to invite community participation in school life and to realize these social health benefits.

Mental health

It has been long acknowledged across a range of cultures that plants, gardens and gardening can have positive impacts on the mental health and well-being of humans (Ulrich 1999). The tradition of using landscapes as a therapeutic healing tool has endured since ancient Egypt, when court physicians would prescribe walks in palace gardens for royalty who were mentally disturbed.
A growing body of literature points to the therapeutic role of nature, particularly as this relates to mental health (Kaplan 2001; Olds 1989; Ulrich 1984, 1999; Ulrich and Parsons 1992; Ulrich et al. 1991). A basic premise is that contact with the natural world can provide relief from stress. Much of this research has been conducted with adults, although there is an emerging body of research that suggests similar benefits for children.

To illustrate, Wells and Evans (2003) found that the presence of natural elements moderated the impacts of stressful life events on children aged 6 through 12 who lived in a rural context. The authors discuss the policy and design implications of their findings, noting that ‘natural areas closer to housing and schools are essential features in an effort to foster resilience of children and perhaps to promote their healthy development’ (327). This assertion is particularly relevant for health-promoting schools and the school ground greening movement. Stressful events negatively influence children’s disposition for learning, rendering them less able to concentrate, overly anxious and lacking in self-esteem. If nature can play a restorative role, then potentially it can also enhance children’s ability to learn.

Indeed, research indicates that contact with nature supports attentional functioning (Faber-Taylor, Kuo and Sullivan 2001; Kuo and Taylor 2004; Wells 2000) and can enhance human effectiveness and make life’s demands seem manageable (Kuo 2001). A study focusing on children with attention deficit disorder (ADD) examined the relationship between children’s exposure to nature through leisure activities and their attentional functioning (Faber-Taylor, Kuo and Sullivan 2001). Parents were surveyed regarding their child’s attentional functioning after activities in several settings. Results indicate that children with ADD function better than usual after activities in green settings. Further, the ‘greener’ a child’s play area, the less severe his or her attention deficit symptoms tend to be. Thus, contact with nature may benefit a population of children who desperately need attentional support.

A survey of 90 Australian schools in the Melbourne area suggests that hands-on contact with nature at school can enhance many aspects of children’s mental (and social) health, in particular, their ability to work with others, their self confidence, their care for living things, their attitude towards school, their relationships with their peers and their relationships with adults (Maller 2005). On green school grounds, participation in gardening and greening activities has tangible results, creating opportunities for students to feel good about their accomplishments and to gain a sense of pride, responsibility and self-confidence (Dyment 2005a; Maller 2005; Moore and Wong 1997). The broader body of horticultural therapy literature supports this contention and identifies a number of children’s health benefits from working with plants. These include improved interpersonal relationships, constructive channelling of energy, heightened sense of productivity, improved self-esteem and an improved disposition for learning (Pentz and Strauss 1998; Relf 1998).

**Spiritual health**

Although spiritual health is recognized within the health-promoting schools movement, it is not easily defined or discussed. For our purposes here, we turn to a conceptualization of spiritual health offered by Heintzman and Manell (2003) who define spiritual well being/health as:

> … a high level of faith, hope, and a commitment in relation to a well-defined worldview or belief system that provides a sense of meaning and purpose to existence in general, and that offers an ethical path to personal fulfillment which includes a connectedness with self, others, and a higher power or larger reality. (Heintzman and Manell 2003, 6)
In light of this definition, it makes sense to consider how green school grounds can foster a sense of connectedness, a sense of hope and commitment and a sense of purpose and meaning, and how it might offer an ethical path to being in a more-than-human world.

To begin, a common purpose of green school grounds is to create a place for other life at school where young people will have regular, on-going opportunities for interaction with plants and animals and for understanding and experiencing themselves as interconnected with the whole (Bell 2001; Cheskey 2001b). As they listen or watch for birds, follow animal tracks or explore for caterpillars or ladybugs, children become attuned to the comings and goings of other beings and to their purposeful existence. As they plant seeds, fill bird feeders or mulch trees they assume a nurturing role and develop a sense of relationship and intimacy with a living world in which they can actively participate (Bell 2001; Pivnick 2001). Gardening in particular can provide an opportunity to deal with losses and failures, and to experience the responsiveness of plants to care and nurturing. As Charles Lewis (1992) explains: ’from a human perspective, the strength of gardening lies in nurturing. Caring for another living entity is a basic quality of being human’ (58).

The Toronto study cited above indicates that these potential benefits are being widely realized on green school grounds. Questionnaire respondents indicated that students were more likely to explore widely (90%), to learn about their local environment (91%), and to have a greater sense of wonder and curiosity (92%) after their school ground had been greened. Over 90% of respondents also indicated that student environmental awareness and stewardship had increased on the green school ground.

As environmental awareness and stewardship increase, there is reason to believe that students’ sense of hope and commitment to the school and to the living world around them is also enhanced. Through hands-on involvement with the human and natural communities of which they are a part, students learn that barren patches of pavement and manicured grass can be successfully transformed into diverse and welcoming places that better respond to their own needs as well as those of other living beings. Depending on their level of involvement in the greening project, they can also learn that they have a right to participate in decisions that affect their quality of life (Dyment 2004; Hart 1997). Research shows that students, when given the opportunity, are able to critically evaluate their play spaces, identify alternatives and evaluate the outcomes (Hart 1997; Jensen 2002). When fully involved in the greening process, young people can acquire skills related to democracy, participation and citizenship that they can potentially carry forward into adulthood (Dyment 2004; Hart 1997).

These opportunities dovetail nicely with the importance that health-promoting schools assign to hands-on involvement, empowerment and action competence. As Ronson and MacDougall (n.d.) explain, health-promoting schools aim to ‘improve young people’s abilities to take action, cope and generate change’ and to provide a setting where they can work with others to ‘gain a sense of achievement’ (4).

Ultimately, green school grounds can help to nurture a deeper sense of purpose and meaning. As Robin Moore (1999) contends, gardening, working and playing with plants allow children to ‘participate in the processes of life’ (326) and to foster a sense of identity and belonging. Through personal, ongoing and caring engagement, they can develop a stronger sense of place attachment, a benefit described in the horticultural therapy literature and associated with public involvement, altruistic behaviours, stress reduction, reduced crime and a sense of coherence and health (Hill and Vigo 1992).

Conclusion: promoting health through school ground design
It is widely recognized that health promotion must extend beyond interventions that target individual behaviour to a more comprehensive and ecological model that addresses the settings where
people live, work and play. With regard to children’s health specifically, the school setting clearly represents an important site for intervention. Typically, health promotion strategies related to the physical school environment focus on contaminants (e.g., pesticides, indoor/outdoor air pollution), diseases, injuries and poisoning, with some (minor) recognition that outdoor play areas should be designed to engage children in regular physical activity. The emphasis, however, is squarely on accident/illness prevention.

While this approach is understandable, we believe that it is missing a key component: acknowledgement of the positive effects of exposure to and engagement with the natural world. Howard Frumkin drew attention to this important aspect of health promotion with an article in the American Journal of Preventive Medicine in 2001. He noted then that ‘the field of environmental health needs to extend beyond toxicity to consider possible health benefits’ (238). He also underlined the need to act on the evidence:

As we learn more about the health benefits of particular environments, we need to act on these findings. On this clinical level, this may have implication for patient care. Perhaps we will advise patients to take a few days in the country, to spend time gardening, or to adopt a pet. … Perhaps we will build hospitals in scenic locations, or plant gardens in rehabilitation centres. Perhaps the employers and managed care organizations that pay for health care will come to fund such interventions. (Frumkin 2001, 239)

Like Frumkin, our intent, with this paper, has been to highlight the growing body of evidence of the relationship between human health and the natural environment, specifically as this relates to school grounds and children’s physical, social, mental and spiritual health. We believe that the existing evidence is compelling, but recognize the need to further build the evidence base in order to more fully understand the relationship and to influence public policy. Generally speaking, the area is under-researched, and is comprised primarily of isolated case studies and a few broad surveys. To support policy decisions, this early, exploratory stage of the research should be followed up with further studies based, for example, on direct observation, measurement and the involvement of child participants (i.e., in order to hear and understand their perspectives, concerns and motivations). Longitudinal studies, comparative studies (i.e., contrasting ‘green’ school grounds and conventional school grounds in different demographic situations) and studies involving high schools would also make important contributions to this area of research.

Additional and potentially rich questions to be explored should link school ground design with other health-related issues of interest to parents, administrators and advocates of health-promoting schools. What sort of influence does greening have, for example, on bullying and safety, on discipline, on learning and academic achievement, and on community involvement in school life?

Green school grounds can, as this paper indicates, make a significant contribution to multiple health objectives. In particular, greening represents an opportunity for health-promoting schools to move beyond the traditional focus on health-related curriculum and to adopt an approach that addresses the physical and social school environment as well as the need for community participation in health promotion. To date, these are strategies that have been lacking in efforts to realize the goals of health-promoting schools (Deschene, Martin and Hill 2003).

Notes

2. See Ronson and MacDougall as well as the Australian Health Promoting Schools Association regarding guiding principles for health promoting schools at: www.hlth.qut.edu.au/ph/ahpsa/about.jsp
3. What is particularly interesting about this study is that they did not simply code nature dichotomously as present or absent; rather, they coded nature as a continuous variable.
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