

Guiding environmental dimensions for outdoor play

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Children's outdoor play is vital for a sustainable development. Studies show that children with access to spacious and varied green outdoor settings by their preschool have better physical and mental health. This article describes the application and development of environmental assessment for children's play areas (Outdoor Play Environment Categories), based on field observations of children's play in preschools. Discussed are the possibilities to develop tools for environmental assessment which are rapid, precise, transparent and useful, both for research and practice.

Introduction

Outdoor play in spacious and varied green environments is attractive to children of all ages, both boys and girls, and beneficial to their health. In this paper will be described the specific salutogenic qualities of outdoor play, how it evolves in interaction with the physical environment and to what extent a place and its design can promote it. This research on outdoor play lays the foundation for the OPEC (Outdoor Play Environment Categories) - tool, which in a number of cross-sectional studies has been linked to children's physical and mental health, some of which are described in this themed issue. A description of children's play related to these environmental categories is followed by a description of each environmental component and our experiences of using the tool. In our cross-sectional studies the outdoor

environments have been evaluated on site, but for assessment at a larger scale - as part of the regional health monitoring - we developed a more rapid strategy based on a questionnaire to preschools.

The configuration of environmental dimensions making up OPEC is also aimed to give a more general idea of what landscape quality can mean from a child's perspective. In planning it is important to know what types of ground is suitable for outdoor play and how existing play environments can be modified to become more useful.

Health promoting outdoor environment

In health promotion through the planning and design of the everyday environment, there is a need to ensure that

any measure that promotes health in one aspect also is favourable from another, and that both the physical and the mental health of children are taken into account. Of vital importance is the fact that preschool children who have access to outdoor environment with a high OPEC value, not only have been shown to be more physically active (Boldemann 2011), they are also able to concentrate better (Mårtensson et al. 2009), their general wellbeing is higher and they sleep better (Söderström 2012). Despite spending a lot of time outdoors, they seem to get the right amount of sun (Boldemann 2011), which indicates that they seek out leafy shade when needed. Such synergy between actions is crucial if research on health and environment is to be applicable. In most studies of physical activity and built environment, information is missing on what type of environment different sorts of activities require (Giles-Corti et al. 2005), as well as any analysis of what implications the actual quality of an activity has for children's health, wellbeing and development.

It is quite common to find playgrounds where, technically, there are many possibilities for physical activity, but where the overall design makes social interaction difficult, with the risk of causing interruptions, conflicts and exclusion of children. A lot of play equipment in a small area can create a high level of activity that involves some children, but that other children find difficult to join. Protective mats around the play equipment as a replacement for sand, give fewer possibilities for the children

to act and to successfully negotiate and solve problems within play situations. Fencing can bring a feeling of safety, but if placed inappropriately, they significantly reduce the possibilities for sequences of play that take advantage of the areas in between. Routine measures to make the environment more accessible and outdoor play an activity for everyone put the possibilities for play at risk. Any work on creating safe and inclusive outdoor play settings, needs to be based on an understanding of how outdoor play evolves in interaction between children and the surrounding landscape.

The place-related joyful movement

Children move about more when outdoors (Raustorp et al, 2012). Based on a study of children's outdoor play, I have described the *place-related joyful movement* which tends to occur in outdoor environments that are spacious, green and varied (Mårtensson 2004). It consists of children in intimate and playful interaction with the surroundings, being concurrently attentive to signals from their bodies and to what happens around them. A big part of it is physical activity but there is also lively "psychological movement", making it easier for them to fantasize, chat, make up stories and sing when in green settings. They can more easily adapt the situation so that various psychological, physical and social needs are met, for example switch between energetic, collective running games and contemplative recuperation in smaller groups. The mixed feelings of more risky play

are also developmentally important components common in outdoor play (Sandseter 2010). Children's interaction with the socio-physical context becomes a key to understanding the role of outdoor environments for children's health.

The flow of outdoor play

Activities outdoors take on an adventurous dimension more easily, due to the fact that the surroundings form part of "the big world". Rooms indoors have boundaries by definition and often have specific functions, whereas outdoor environments encourage the exploration of places yet undiscovered. One important quality is *extent*, which is when people experience the surroundings as part of a landscape continuing beyond the horizon (Kaplan and Kaplan 1989). The ever-changing and manifold character of the natural environment, contribute to social situations that are open and flexible (Dyment and Lucas 2007, Samborski 2010). In a previous issue of SMT, I described how boys and girls and children of different age and ability more easily can play together in such *play of flux and transformation* (Mårtensson 2012). My earlier documentation of children's play in preschools (Grahm m fl. 2007, Mårtensson 2004) provides a starting point for the description which follows, of how configurations of elements in the outdoor environment facilitate this mobile character of outdoor play.

The lowest common denominator for outdoor play is children's unison interest in the concrete details of their sur-

roundings. In a good outdoor environment, there are plenty of affordances offering children the opportunity to manipulate, sit, jump and run, slide and climb e t c. (Kyttä 2004). The morphology of the outdoor environment contributes with its variety in texture, soil structure and with vegetation containing different types of trunks, branches, leaves and fruits. The importance of loose material is also well documented (Moore 1989) and illustrated by the universal attraction of the sand pit (Wood 1993). Places are sought out for specific physical activities where there is a chance of experiencing interesting sensory effects. The children swing or spin themselves high up in the air on swings, or balance and sway in branches of shrubs and trees. They roll objects or their bodies down hills or over grassy plains. They slide and climb on rocks and slides, alternating letting go with regaining control, for optimal excitement.

Loose material and a plenitude of play functions give children the emotional footholds they need to involve themselves in rapid play sequences. Children constantly make places in the outdoor environment their own – for a day, a few weeks or as part of a relation lasting throughout their childhood. They build dens from scratch, but more common are slight modifications of a place adjacent to various fixed elements combining trees and stones, fences and bushes, ramps and buildings, e t c. Using these *play bases* as starting points, they can act out the game by moving through the landscape. They aim for specific places and move in dif-

ferent ways through areas of different character. Over an open area, it might be a quick dash. Through a sparsely populated tree area they might zigzag with their hands outstretched. Once up on a hill, they take a moment of rest while running down a slope becomes a fight against the high speed.

The open areas between the play bases or the more short lived *play nodes* are vital for the children's ability to navigate during more rapid collective games. The overview gives the children respite to plan and to coordinate their actions in relation to what is happening around them. The visual contact this allows gives them a chance to communicate their next step by gesticulating and moving around. During pretend play, the same movements can take on a more specific meaning. Going around the corner might symbolise going on a journey and being on top of a rock or a snow mound give the status of a queen or a winner. Sometimes they actively use the dynamics between different places to elaborate on important themes in their development. As an example, they might be occupied with the theme of dependence – independence when moving away from the buildings and playing horse taming in a natural setting of a more wild character (Skantze 1989). Also, when the older children of a preschool still get the urge to run across the yard as fast as they can – in spite of them having been playing there for several years - I see this as an indication of a high quality environment.

Play behaviour also changes with cli-

mate, weather condition and season. A poor outdoor environment becomes more useful in rain or snow and a comfortable micro climate makes a site more attractive e.g. where the snow has started to melt or where there is leafy shade on a hot day. The many effects of seasonal variations on play behaviour in different types of landscapes are still left to explore.

A landscape configuration with potential for play

The environmental categories that make up the OPEC (Outdoor Play Environment Categories) tool are based on documented knowledge on how outdoor play tends to start and evolve in a preschool setting, as described above. How the specific environmental categories are associated with this outdoor play behaviour is further summarized below (See figure 1):

The first dimension, *the total size of the outdoor area (A)*, is a measure of the area that the children have access to outdoors. A spacious setting gives the children the overview they need to coordinate their interaction in more vigorous games involving many children. It also makes the place intriguing by conveying a sense that there is a lot to explore. If a large space contains a lot of vegetation, the area is also more likely to withstand the wear and tear of children's use. The second dimension, *proportion of area with shrubs, trees or hilly terrain (B)* is a measurement of the proportion of the total outdoor area that contains areas of vegetation or more natural ground, not including plain

lawns. A natural surrounding and the loose elements of nature allow children more options in play, facilitating their negotiations and conflict resolution. The third dimension, *integration between vegetation, open areas and play areas* (C) measures if there is a good mix of different types of settings well distributed over the site and if open spaces are placed in between play areas, and not in separate parts of the environment. This also contributes to open-ended and flexible play sequences and to children's dynamic movement over

the yard at large.

The OPEC value of a play environment is calculated by taking the average of the three dimensions. The outdoor environment is graded 1 – 3 in each of the dimensions and then divided by 3. No outdoor environment can be graded lower than 1 in any of the dimensions. For preschools where the children spent a lot of time in other outdoor environments such as the woods, assessments were made both of the school ground and the other

Outdoor Play Environment Categories (OPEC)	
A. Total size of the outdoor area:	
1 point	< 1200m ²
2 points	1200-3000 m ²
3 points	> 3000 m ²
<i>alternative</i>	
1 point	< 2000m ²
2 points	2000-6000 m ²
3 points	> 6000m ²
B. Proportion of surfaces with trees, shrubbery or hilly terrain:	
1 point	Little/non-existent
2 points	< half of the area
3 points	≥ half of the area
C. Integration between vegetation, open areas and play areas:	
1 point	No integration. Open spaces, vegetation and play areas in separate parts of the environment.
2 points	Either of the following characteristics a) trees or shrubbery are adjacent to play areas b) the open spaces are located in between the play areas
3 points	Both 2a and 2b above is full-filled
Note. The two alternative ways of evaluating the size of the area is adjusted to the variation of environmental quality in the regions where studies have been carried out.	

Figure 1. Outdoor Play Environment Categories, OPEC. Environmental categories used to evaluate the play potential of outdoor settings from 1 point to 3 points, with 1 point for settings with the lowest quality and 3 points for the ones with highest quality.

environment and the results were then weighted to achieve a joint figure.

In cross-sectional studies of preschool settings, we have worked with a combination of aerial photographs and inventories on site, which served the purpose of checking for hilly terrain and play areas under the trees. On one occasion, questionnaires by mail were used in order to collect material for the evaluation. 100 preschools were invited and the response rate was 50%. This complemented the aerial photographs well, with the exception of a small number of preschools whose coordinates were not correct on the maps. The preschools were given an aerial photograph of the school and an accompanying letter containing questions and instructions. They were also given a template of how the aerial photographs should be filled out and asked to mark hills, play areas, the location of different age groups, gates, fences and other type of boundaries. To facilitate the assessment of the third dimension of integration, a number of statements were given alternatives of “yes” and “no”. In this study as well as in later ones, the information was entered into a program that handles geographical information (GIS), to facilitate assessments and calculations.

When it comes to the size of the outdoor area (A) the assessments were adjusted to regional circumstances; the first alternative to the Stockholm region (see Mårtensson et.al. 2009) the other to the Malmö region and to Raleigh in North Carolina, USA (see Boldemann et al. 2011). The bounda-

ries of the site and the buildings were marked on the maps. The area of the buildings was subtracted from the total area that the children could access when playing outdoors, based on information from the on-site visit or the questionnaire.

To calculate the proportion of area with shrubbery, trees or hilly terrain (B), these areas were summed up and divided with the total outdoor area. Information of trees and shrubbery were mainly based on aerial photographs, but complemented with information from on-site visits and questionnaires, especially for hilly terrain but also for shrubbery. To differentiate between the scores “some/non-existent” (1 point) and “less than half” (2 points), 15% of the total area was the lower limit for scoring 2 points. This differentiation resulted in a lot of 2s and few 1s.

When it comes to the integration between vegetation, open areas and play areas (C), a setting needs to fulfil both sub-category 2a and 2b in order to score 3 points in total. A typical 1 point yard contains shrubbery along the edges, some clusters of play equipment with no greenery in the surroundings, and possibly some parts containing trees and bushes in the edge of the outdoor environment. Also scoring 1 point is a setting which lacks the necessary components for assessing the level of integration, for example when dominated by open areas. For very small yards the applicability and reliability between assessors need special attention when it comes to this category.

Note that play areas include areas with play equipment and other areas specifically intended for certain activities, but not plain lawns of more general use.

Environmental assessment in planning

In any future development, we intend to keep the OPEC-tool simple with few environmental dimensions that can be easily summarized and kept in mind. We have refrained from adding another important dimension for the quality of outdoor play, namely the opportunity for children to easily move between their indoor and outdoor play environment. The OPEC-tool is not only intended to provide technical instructions for rigid evaluation of play settings in research, but to convey the characteristics of outdoor play and its environmental conditions, to be used for more general assessment in planning. However, any digital techniques to evaluate the configurations of elements in aerial photos of landscapes developed for this area, for sure make it possible to combine precision and more intuitive use.

Where children have access to outdoor environments of high play potential and where there are good chances of coming into contact with nature, this can have significant impact on their health, both long term and short term. It lays the foundation for an active lifestyle with more time spent outdoors also when adults. Finding ways to document landscape configurations in our surroundings important for children's play, can hopefully make it

easier to take decisions on how to use and develop urban ground to make it part of a sustainable community development.

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