

Research Paper

The hidden value of in-between spaces for children's self-directed play within outdoor school environments

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ABSTRACT

Despite the important role of outdoor school environments in children's recess, school ground design does not often manage to support children's self-directed play. This paper argues for the value of so called 'in-between spaces' for children in outdoor school environments that has not been studied sufficiently from their perspectives. Employing a socio-ecological framework, this participatory qualitative study used three methods to identify the multiple environmental characteristics of in-between spaces that support children's self-directed play. Sixty behaviour mapping sessions, 78 walking tours, and 18 focus groups were completed with children aged 8–10 during school recess. The context-sensitive data were collected in three public primary school grounds in Sydney, Australia. Using inductive thematic analysis, the physical, social and organisational characteristics of children's chosen in-between spaces were identified. The results revealed that children's preferred in-between spaces included small enclosures, edges and natural settings with affordances supporting their self-directed play. These spaces offered children an opportunity to redress gender imbalance and mitigate the impact of overcrowding, problems that often inhibited children's self-directed play in the formal spaces of school grounds. Despite children's interest in in-between spaces, they were not valued in school grounds and were often characterised as out-of-bounds where children were not allowed during the recess time. The discussion argues for the value of in-between spaces where children can find the support of all the environmental characteristics to operate their self-directed play. School design and school policy should recognise these spaces for their spatial value for children's play in schools.

1. Introduction

In Australia, school grounds are traditionally designed to support children's play during recess and lunchtimes, the times when children can take a break from the classroom and structured learning (Kasali & Doğan, 2010). Currently, the design of Australian outdoor school environments largely supports formal games, such as basketball, handball and soccer – a design approach that is also common around the world (Dyment, Bell, & Lucas, 2009). However, this study reveals that this is a very narrow lens through which to view outdoor environmental provision for children and their self-directed play activities. Despite the benefits of self-directed play for children, current Australian schools are not often designed and managed to support this type of play, nor are the spaces where it often occurs valued within school grounds.

This paper discusses a little-known spatial type, valued by children for their self-directed play within outdoor school environments. The spatial type is described as 'in-between space', previously defined by Dee (2004, p. 174) as a small space that "allows different experience

and use than the dominant landscape of larger space". They occur between larger formal, and formally designed spaces (e.g. paved sporting courts, manufactured playground equipment, grassed areas, and Covered Outdoor Learning Areas (COLA)). Unlike the formal spaces of school grounds, designed with predetermined activities in mind, in-between spaces are not often the focus of the design team and are not currently considered by designers in advance for the purpose of play activities that take place in them. This paper reveals the key environmental characteristics of these spaces and their importance to children in three Australian school grounds. The key association between in-between spaces and children's preferred activities is discovered by this study, revealing that this spatial type plays an important role in supporting and providing for children's self-directed play at school.

The paper begins with a discussion of the socio-ecological framework it uses. This theoretical discussion aims to identify and describe the multiple environmental dimensions (social, physical and organisational) of in-between spaces and their interdependencies. It indicates that an in-between space might not work as expected if its physical

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characteristics are designed without taking into consideration the potential influence of social and organisational characteristics within and surrounding that space.

Secondly, this paper aims to establish the concept of 'in-between spaces' as places of great importance to children which are currently poorly recognised in school design. This paper shows that the unique opportunities of these spaces need to be understood in relation to the characteristics of formal spaces. This understanding can create a complete picture of children's preferred environmental opportunities and play behaviours in school grounds.

Finally, this paper aims to establish the environmental characteristics of in-between spaces from children's perspectives. It makes the case for completing more participatory research with children on their use and perception of school environments because they bring a unique insight into the effectiveness of school environment design which adult designers cannot have and should not work without.

1.1. Selecting a socio-ecological framework

To understand the nature of in-between spaces and their environmental characteristics, this study uses a socio-ecological framework (Bronfenbrenner, 1977; Stokols, 1992). Based on this framework, the concept of 'environment' includes physical, social and organisational characteristics that have both subjective and objective qualities to be defined and described. This comprehensive and holistic approach to the definition of 'environment' is used to explain the multiple environmental dimensions of in-between spaces, including the subjective qualities of these spaces as perceived by children. Moreover, this framework views the person–environment relationship as a dynamic interplay in which people and their environment have mutual influences. In Stokols (1992) socio-ecological model, the physical, social and organisational environments 'transact' and mutually influence one another and their occupants. This model is derived from Bronfenbrenner (1977) Ecological Systems Theory in which multiple dimensions constitute complex systems and are both interrelated and interdependent. These models provide an appropriate theoretical conceptualisation for the dynamic interaction between the physical, social and organisational environments observed in in-between spaces in this study.

To begin to describe the interrelationship between the characteristics of in-between spaces and children's behaviour in these spaces, this paper draws on Gibson (1979) theory of affordances and Barker (1968) theory of behaviour settings. Both theories have been extensively used by environment-behaviour researchers and environmental psychologists, researching children's environments (Cosco, Moore, & Islam, 2010; Smith et al., 2016). Gibson (1979) theory of affordances is used in this study to identify the physical and sensory cues of in-between spaces and their value as perceived by children. As interpreted more recently by Heft (2003, p. 155), this theory defines affordances as physical characteristics with perceptual qualities that motivate a particular course of action corresponding to the perceiver's specific intention. This theory offers an explanation as to how the affordances of in-between spaces invite children's use and guide their action if their perceptual quality responds to children's internal motivation for play.

Barker (1968) behaviour setting theory is used to define the potential relationship between the social and organisational dimensions of the environment of in-between spaces with the physical and sensory environments. In Barker's theory, individuals' activities in a setting are influenced by the physical characteristics of the setting, the occupants' collective behaviours (i.e. the social environment) and the organisational rules (i.e. the organisational environment) governing the use of a setting (Barker, 1968). This theory is used to explain the influence of school rules and the dynamics of children's collective behaviours in school grounds on children choice of in-between spaces. Behaviour settings may indicate and condition behaviour but people themselves take an active role in regulating the setting and their own action (Wicker, 1984). As indicated by both affordance theory and behaviour

setting theory, individuals act as agents and take steps to influence and restructure their surroundings according to their needs and intentions (Gibson, 1979; Wicker, 1984). These theories help to explain the relationship between the settings of in-between spaces and children's use and choice of activities.

1.2. Defining in-between spaces and their role in school grounds

Recent studies on the physical, social and organisational characteristics of school grounds show that these spaces do not provide children with sufficient play opportunities (Caro, Altenburg, Dedding, & Chinapaw, 2016; Dymont et al., 2009; Kasalı & Doğan, 2010). Formal spaces of school grounds and traditional sporting courts offer affordances that only support a limited type of children's play and result in a lack of variation in space type and play type which makes children bored (Caro et al., 2016; Hyndman & Lester, 2015; Pawlowski, Andersen, Troelsen, & Schipperijn, 2016; Stanley, Boshoff, & Dollman, 2012). Children express their need for safe equipment, well-maintained ground surfaces (Caro et al., 2016; Hyndman & Telford, 2015), and a desire for natural environments to have more play opportunities (Tranter & Malone, 2004).

Children also feel that school grounds are too crowded to enable them to play freely (Kasılı & Doğan, 2010; Ozdemir & Yilmaz, 2008). The dynamics of children's play in the sports court areas dominates other children's possible activities in the same spaces (Parrish, Yeatman, Iverson, & Russell, 2012). More particularly, children ask for assistance from staff with the management of conflicts between the genders (Parrish et al., 2012; Pawlowski et al., 2016; Pawlowski, Tjørnhøj-Thomsen, Schipperijn, & Troelsen, 2014; Stanley et al., 2012).

The other limitation to children's use of the available space in school grounds is the restrictive organisational rules imposed on their play activities (Parrish et al., 2012). Children are not often allowed in areas classified as out-of-bounds during recess because these spaces are hidden from staff's regular view, making it difficult for them to consistently supervise children.

The review of these studies indicates that there are physical, social and organisational constraints in outdoor school environments which often inhibit children from taking full possible advantage of formal recreational spaces of school grounds for their play. In response to these problems that children face, so called 'in-between spaces' can contribute significantly to support their recreational opportunity. They are both a social and a physical opportunity in school environments for children's play.

A few studies of children's favourite spaces in school grounds imply where in-between spaces occur in outdoor school environments. Mårtensson et al. (2014) observational study with children shows that their popular spaces include green edges of school grounds including big pine trees and shrubbery, areas immediately outside the classrooms and cosy spaces next to the buildings used to build cubby houses. Other studies, based on observational research methods, reveal that small and quiet enclosures and natural settings away from large motor activities provide necessary affordances for dramatic play (Drown & Christensen, 2014; Maxwell, Mitchell, & Evans, 2008). Through the use of mixed methods, Shamsuddin, Bahauddin, and Aziz (2012) indicate that children use peripheral spaces with visibility to other areas of school playgrounds to enjoy watching physical play activities of their peers.

Previous studies also discuss the social opportunities of in-between spaces as indicated in children's use of 'sub-spaces' around the school grounds. They suggest that these spaces can offer children privacy and facilitate the play activities of a greater variety of individuals, genders and age groups (Shamsuddin et al., 2012; Smith et al., 2016). Girls find that these spaces have a "temporary gendered collective unity" that extends their playing territory which can be limited in formal spaces by the boys' play (Rönnlund, 2015, p. 95). They can exercise more control over informal spaces which they do not have to share with other age groups or boys (Caro et al., 2016; Paechter & Clark, 2007; Pawlowski

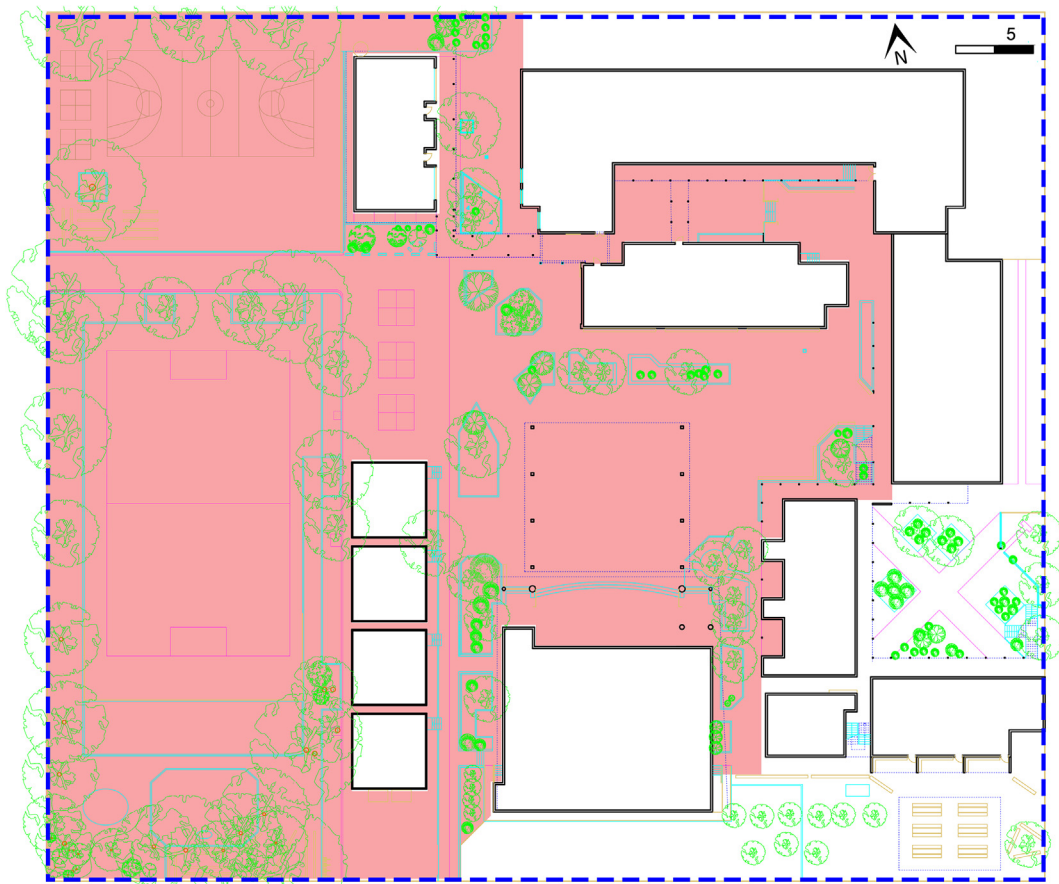


Fig. 1. School 1.

et al., 2014; Samborski, 2010).

This paper has a significant contribution to the literature on in-between spaces by elaborating on the *dynamic interrelationship* between the physical, social and organisational characteristics of these spaces. The use of a socio-ecological framework enables an in-depth discussion of the *combined* influence of these multiple environmental characteristics on children's self-directed play.

1.3. Self-directed play

To understand the value of school ground spaces from children's perspectives, there is a need to identify what inspires their use of outdoor school environments and their selection of preferred play settings. Play activities are recognised as the main motivation for children's use of outdoor school environments during recess (Kasali & Doğan, 2010) and self-directed play, in particular, is very popular amongst school-age children (Fromberg & Bergen, 2012; Frost, Wortham, & Reifel, 2001; Hughes, 2010). Through understanding the broad range of children's self-directed play, we can begin to identify the type of spaces that accommodate and support this type of play.

Self-directed play is a type of autonomous play that evolves when children freely choose what to play and make up their own rules for how to play based on their own self-led, intrinsically motivated interests (Hughes, 2010; Juster, 2015; Vygotsky, 1980). This type of play is broadly valued in childhood sociology as it enhances children's problem-solving skills while they are experiencing the joy of self-discovery and without the fear of failure (Hoffmann & Russ, 2016; Riley & Jones, 2010).

The major types of self-directed play include physical play, cognitive play and social play. Examples of self-directed *physical* play are gymnastics, dancing, tag, hopscotch and rough and tumble games

(Frost et al., 2001). Sports are not included since their rules are not created by children. A very popular type of *cognitive* play among children aged 8–12 years is constructive play, such as building a 'house', which includes a sequence of activities with a goal in mind (Mårtensson et al., 2014). Children's play at these ages is often *social* and organised into peer groups with various levels of social engagement which ranges from onlooker play to parallel play, associative play and cooperative or competitive play (Frost et al., 2001; Hughes, 2010). Social play can have dramatic themes in which children negotiate with others about who takes the social roles and how they need to act them (Fromberg & Bergen, 2012; Riley & Jones, 2010; Saracho & Spodek, 2003). This study investigates in-between spaces that support such a broad range of self-directed play activities.

Although sociological studies inform a broad range of children's self-directed play at school ages, environment-behaviour studies of school grounds mainly focus on the investigation of spaces that accommodate formal games e.g. basketball, soccer and handball (Caro et al., 2016; Dymont et al., 2009; Stanley et al., 2012). Play provision should not be limited to formal games in schools and we need to know more about spaces that support children's self-directed play as it is a type of play fundamental to children's development. Children's self-directed play in this study has been used as a *vehicle* to understand the value of in-between spaces and their supportive environmental characteristics.

2. Methodology and methods

Understanding the children's intrinsic motivations for selecting in-between spaces as their sites for self-directed play was the focus of this study. As a result, this study used a qualitative, child-centred participatory methodology supplemented by behaviour mapping. The

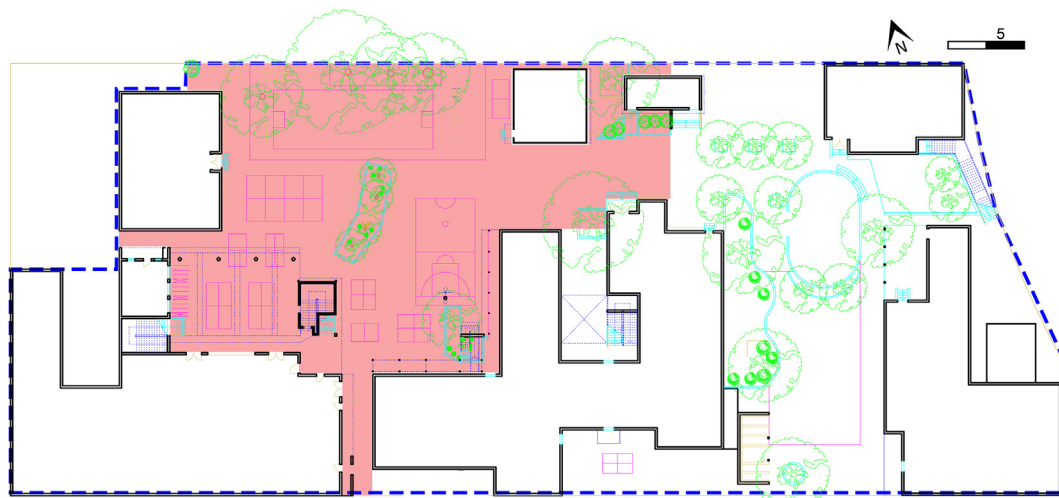


Fig. 2. School 2.

participatory methods that were selected, explored children's perspectives of outdoor school environments. The qualitative methodology enabled the in-depth study of the dynamic relationship between multiple environmental dimensions and the transaction between children and their environment, fundamental to the theoretical framework of this study (Corbin & Strauss, 2008).

2.1. Settings and participant recruitment

The research settings included three co-educational public primary schools in Sydney, for students aged 8–12 years. The schools were all urban schools, selected on the basis of the variety in their physical environment to maximise the value of the study. The selected primary schools featured both similar and contrasting physical characteristics spanning: the spatial arrangement of their school buildings, the volume and types of natural settings, and their overall size (6909 m², 1979 m², 7387 m² for schools 1–3 respectively). Figs. 1–3 illustrate the layout of the selected schools. The pink colour demonstrates the outdoor school environment in each of the primary schools selected.

The selected schools shared similar educational philosophies, curricula and organisational rules common to all Australian public schools. They all contained a Covered Outdoor Learning Area (COLA), grassed areas, a basketball court, and some handball courts. Two out of three featured play equipment in the primary school with monkey bars, a slide and a piece of play equipment that resembled a spider web. The three schools catered for about the same student population (412, 388 and 488 for schools 1–3 respectively) with a balance between the population of boys and girls. The participants in this study were children aged 8–10 years, in years 3–5 in the primary schools. This age group was chosen as the sample group for this study because according to the literature, this age group is more interested in self-directed play and in the activation of physical environments (Fromberg & Bergen, 2012; Frost et al., 2001; Samborski, 2010).

2.2. Methods

This study used three methods, including two participatory research methods and one observational method, completed within the school grounds and during recess. These included: (1) 78 walking tours with children (2) 18 focus groups with children and (3) 60 behaviour mapping sessions. While walking tours and focus groups were conducted only with students aged 8–10 years, students from all grades in the primary school were inevitably included in the behaviour mapping. The entire fieldwork was completed during Australian school terms 3 and 4 in 2015 (i.e. 14 July – 18 September and 6 October – 15 December).

Data collection for all methods took approximately six weeks to complete in each school.

2.2.1. Walking tours

Walking tours or go-along interviews were the main method used in this research to establish children's insights into their use, and subjective representation of these spaces (Green, 2015; Pawlowski et al., 2014). This is a mobile method popular in research with children in which the researcher walks with interviewees as they go about their daily routines, asking them questions along the way (Clark, 2012). These child-led walks positioned children as tour guides and experts. The conversation along the way sought their preferred self-directed activity patterns during recess, and their perception of spaces that supported or impeded these activities. During the walking tours, the researcher recorded the interviews using a digital voice recorder and took pictures of the in-between spaces identified by children along the way, to refer to in the subsequent focus groups.

The number of walking tours depended on the concepts which emerged during the behaviour mapping. The researcher purposefully looked for indicators of concepts until the data reached the point of saturation (Corbin & Strauss, 2008). This meant that the researcher kept doing walking tours as long as new themes emerged. In total, 78 walking tours were completed across the three schools, with an overall 150 children. Although walking tours were mostly completed individually, walking in pairs worked best with younger children (8-year-olds specifically). Their partners were chosen from the list of students whose parents had given informed consent for their child's participation in the research by the researcher. A balance was maintained between the number of boys and girls and across the age range. Each walking tour took approximately 15 min and it took approximately eight days to complete all the walking tours in each school.

2.2.2. Focus groups

Focus groups were conducted to enable children to reflect on their experience of the entire set of play areas available in each school, including those that were officially classified as 'out-of-bounds'. Children were asked to discuss their preferred spaces around the school grounds, their preferred play activities, their view on the school rules, their overall satisfaction with the school grounds and their suggestions to improve the standard of the school ground spaces. As young children communicated more effectively through visual mediums (Heath, Brooks, Cleaver, & Ireland, 2009; Stanley et al., 2012), a Google Earth site plan of the school was presented to the participants coupled with the pictures of different settings which were used as visual prompts. To prevent data duplication, the participants in this method were not

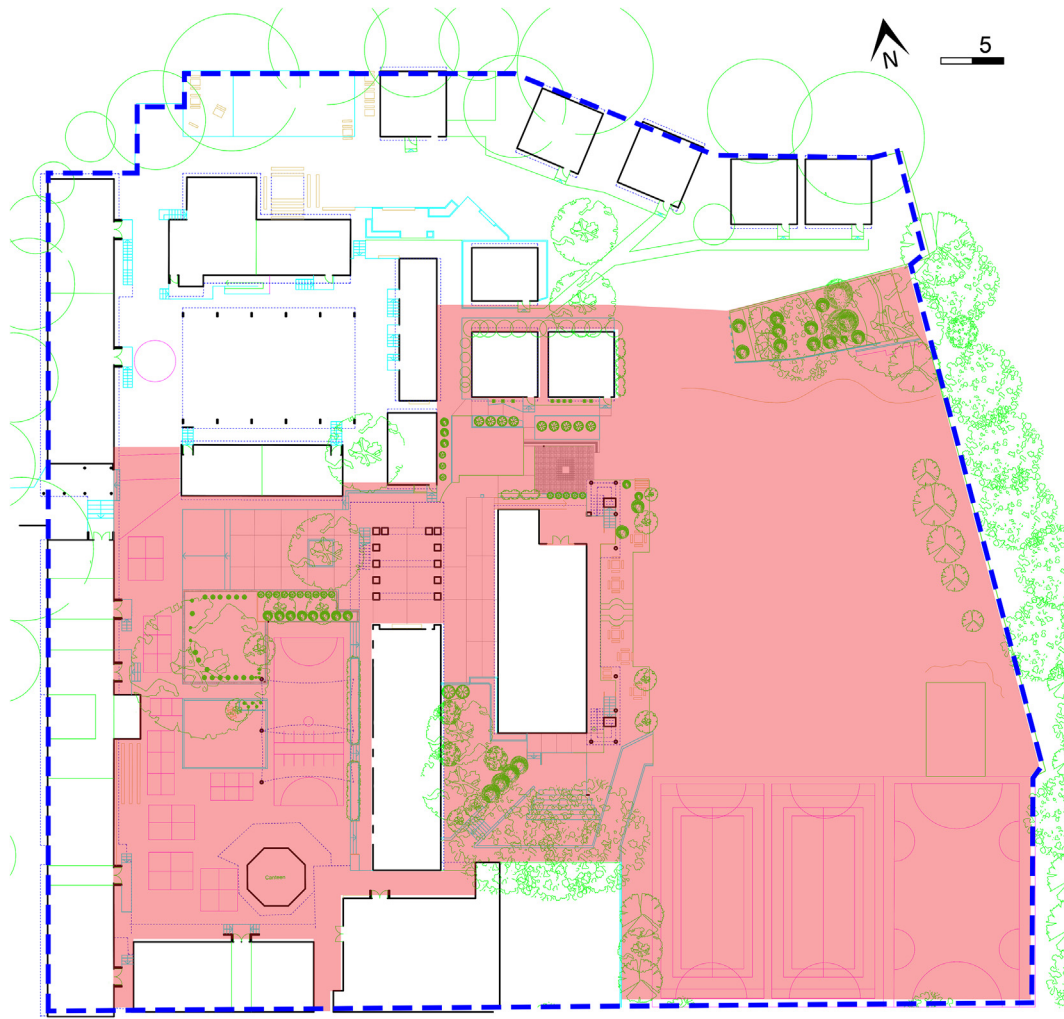


Fig. 3. School 3.

recruited from children who had already participated in the walking tours. Each volunteer child was asked to select 1–2 friends from the list of children who had returned the parental consent form. In total, this study undertook 18 focus groups across the three schools i.e. three focus groups of 2–3 children of each gender in each school. The total number of focus group participants was 47 across the three schools and each focus group took approximately 20 min.

2.2.3. Behaviour mapping

Mapping children's behaviour within in-between spaces identified the correlation between children's play and the physical, social and organisational characteristics of in-between spaces from the researcher's point of view (Smith et al., 2016). Behaviour mapping was completed in 10 popular areas across three schools that contained children's in-between spaces. They included three areas in School 1, three areas in School 2 and four areas in School 3 (Figs. 4–6). To get an idea of the popular areas that contained children's in-between spaces and to understand the larger context of play behaviour, four observation sessions of each school ground were conducted, prior to the main task of behaviour mapping. The data that emerged from walking tours and focus groups further helped the researcher identify other popular areas consisting of in-between spaces.

The behaviour mapping sessions were conducted during 4-day visits to each school for three weeks when the weather was fine. Each area was observed six times during the recess period for 20 min. A record of children's activities, their gender and their group size, the overall

quality of the area and the ambient environment of the area (i.e. cold, windy, sunny, noisy) was created. Because of their illustrative quality, photographs were taken to capture the subtleties of children's activities and the physical characteristics of each area.

2.3. Analysis

The nature of the data generated by the research methods in this study required two kinds of analysis: (a) content analysis for the narratives recorded over the walking tours and focus groups, and for the notes taken during the behaviour mapping; (b) tabulation of the data collected on the maps during the behaviour mapping.

To analyse the qualitative data, an inductive thematic approach was used (Corbin & Strauss, 2008). The narrative analysis was processed manually in this research. All 96 interviews were transcribed, and the transcripts were processed and categorised by the environmental characteristics (i.e. physical, social and organisational), guided broadly by the socio-ecological perspective. They were then analysed thematically to identify the themes and sub-themes that indicated the nature of in-between spaces and their associated play activities. The procedure included reading the transcripts to identify recurring words, phrases or sentences (Seale, Gobo, Gubrium, & Silverman, 2004). The themes were saturated with appropriate cases in a process of exploring new instances (Seale et al., 2004). The themes were given conceptual names derived from the commonalities between them that represented the ideas contained in the data (Corbin & Strauss, 2008; Creswell & Poth, 2017).



Fig. 4. Areas selected for the behaviour mapping in School 1.

In the analysis of the field pictures and the maps, the size of the in-between spaces, their locations, the physical boundaries and the surface material of each space were illustrated on the maps. Each gender was assigned a different symbol representing their participation in each space to record the number of participants and their gender. The patterns of children's movement and the sequence of activities were identified on the maps and the overlays of the spaces that children used were built up. The overlays of the location of school staff on the school ground were also recorded to build up a picture of the patterns of staff

supervision and any potential impact on children's use of spaces. The overlays of data were processed to identify the correlation between the patterns of children's use and the environmental characteristics of each area.

To reach the overall findings, two levels of data triangulation were employed in this study: firstly, across the research methods deployed in each school and secondly, across the three schools.



Fig. 5. Areas selected for the behaviour mapping in School 2.

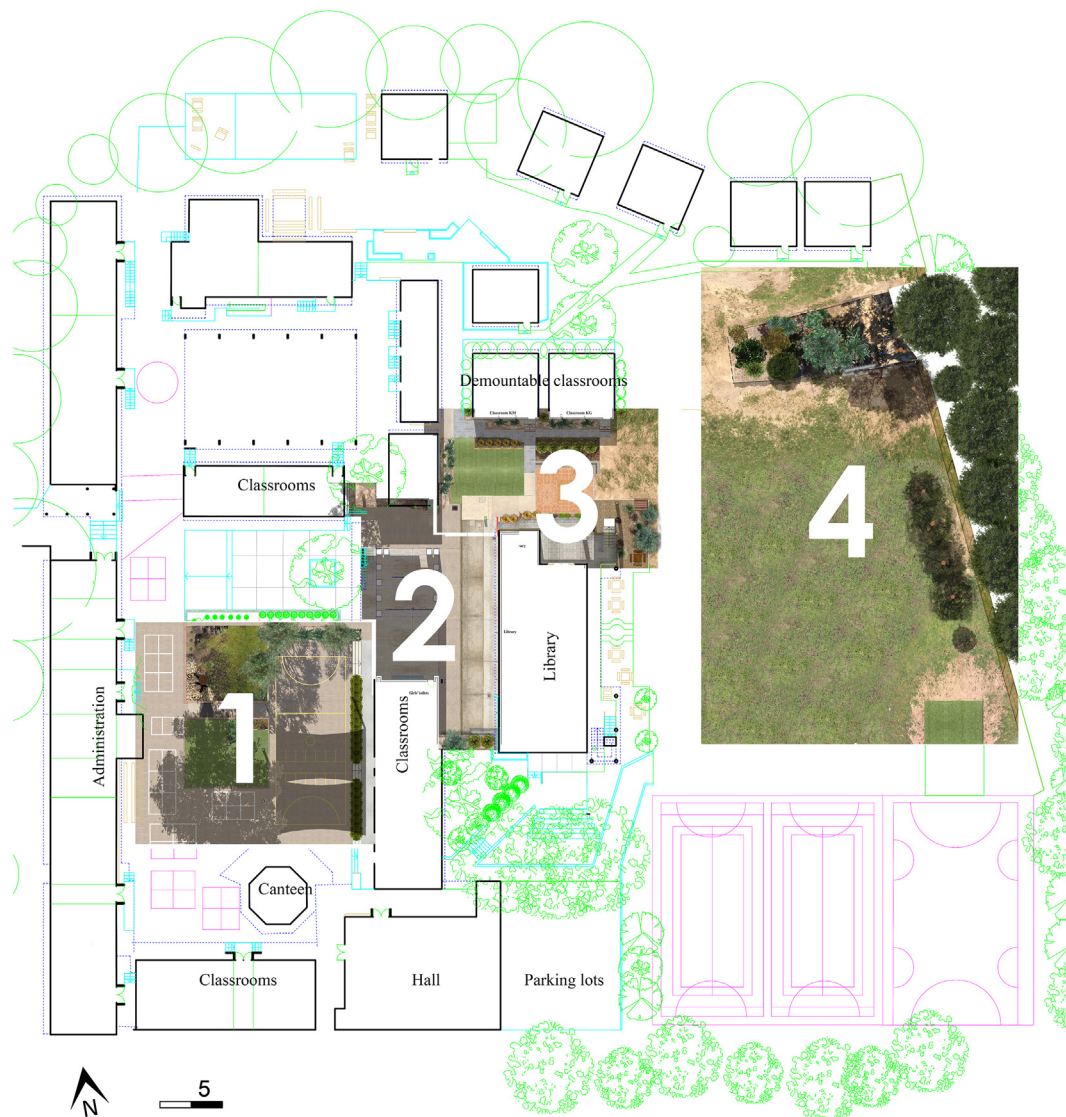


Fig. 6. Areas selected for the behaviour mapping in School 3.

3. Results

The findings of this study elaborate on the nature of in-between spaces that support children's self-directed play. This study shows that in-between spaces are located in the corners of the COLA courtyards, the edges of the grassed areas, the edges of the paved sporting courts, the corners of the classroom courtyards, and the corners of the manufactured play equipment areas (Figs. 7–9). They are small, compared to the adjacent formal spaces and accommodate a fewer number of students. The walking tours further elaborate on the physical elements of in-between spaces from children's perspectives, indicating the affordances that support their play activities. The influence of school rules such as the Out-of-Bounds rule and the school problems including school crowding are discussions which emerge in the focus groups. Overall, children express two main reasons why they choose to use in-between spaces instead of the formal spaces of school grounds during the recess time: first, the formal spaces of school grounds features some issues that inhibit children's use as they wish; second, children discover opportunities within in-between spaces to accommodate their self-directed play, not often found within the formal spaces.

The discussion of findings is oriented around the major themes that focus on the physical, social and organisational characteristics of these spaces supporting children's self-directed play. The key physical

characteristics and types of in-between spaces are *enclosures*, *edges* and *natural settings*. The key social characteristics of in-between spaces centre on children's needs to *mitigate overcrowding* and manage *gender balance*. The organisational characteristics centre on children's opportunities for *regulating the direct supervision of school staff* and *the use of out-of-bounds areas* (Fig. 10).

3.1. The physical characteristics of in-between spaces

Three consistent physical characteristics were indicated by children, describing the nature of in-between spaces and supporting their self-directed activities. Children identified in-between spaces that (1) provided small enclosures, (2) were located along the edges of formal spaces and (3) were natural settings. These themes revealed the nature of in-between spaces as perceived and described by children and were categorised in terms of space type (enclosure), space location (edges), and space elements (natural settings).

3.1.1. Small enclosure

Children's preferred in-between spaces provided small enclosures with affordances that properly defined the play boundaries of their small-scale play activities. This quality was not often observed in the conventional school play spaces that were traditionally very open with

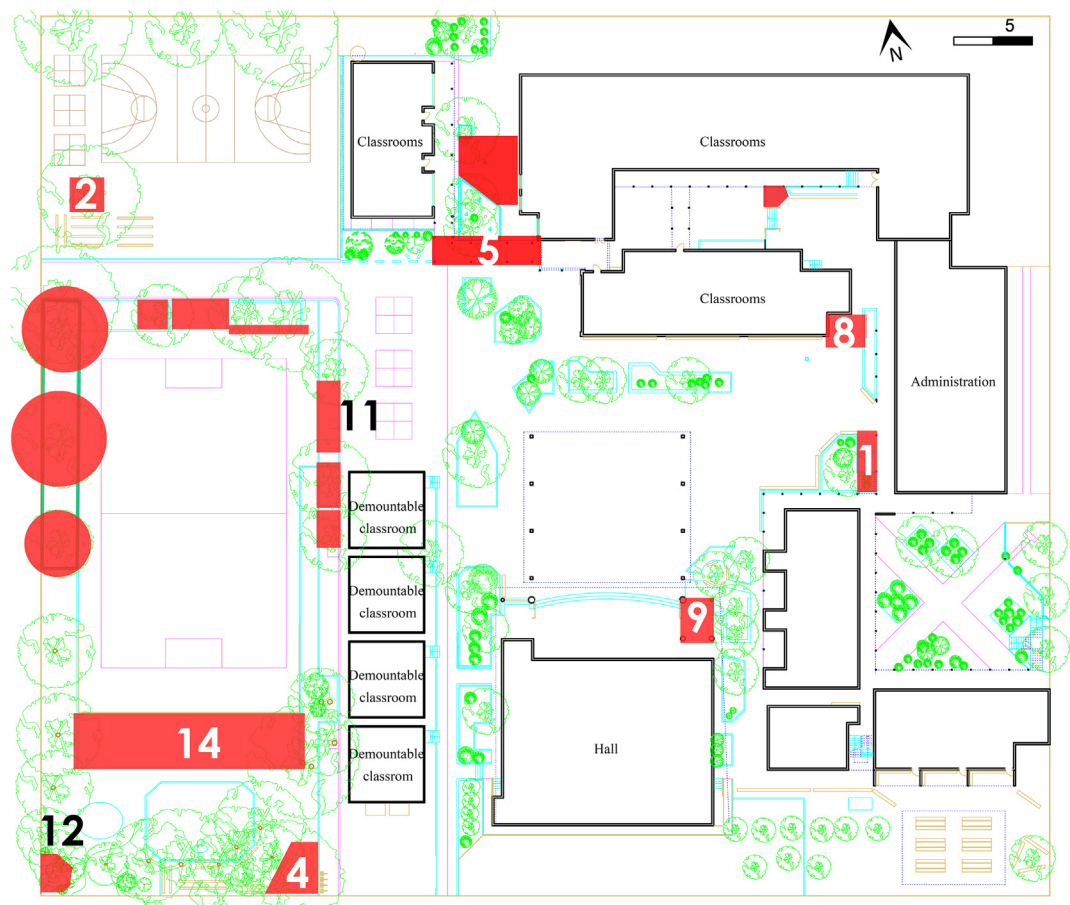


Fig. 7. In-between spaces identified in School 1.

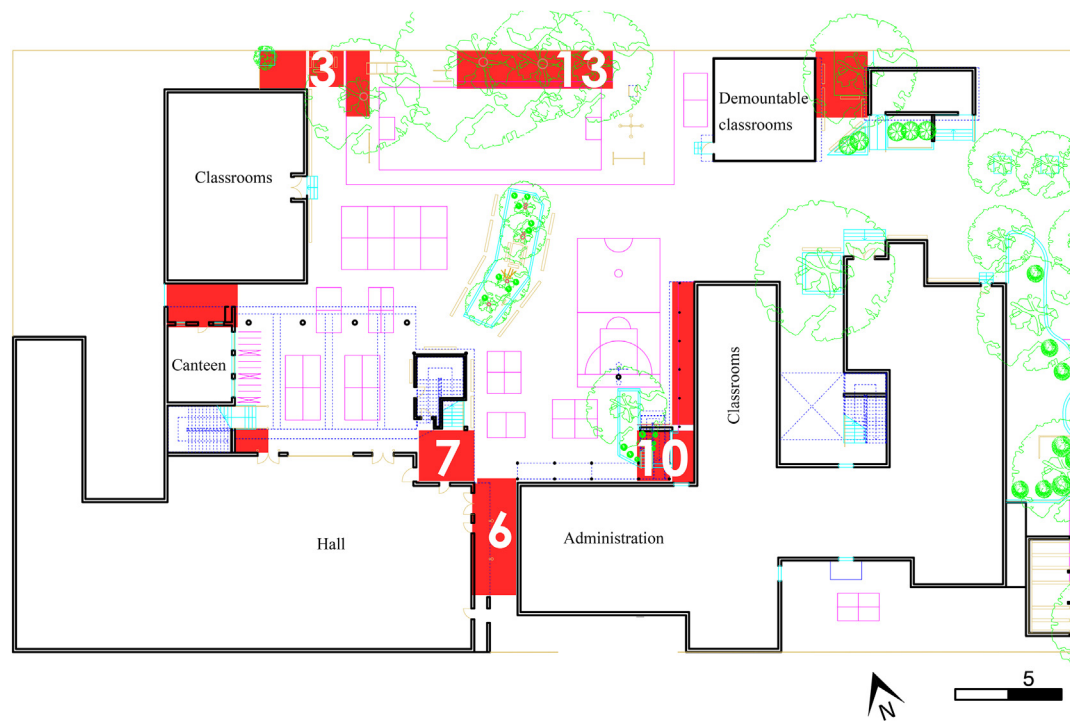


Fig. 8. In-between spaces identified in School 2.

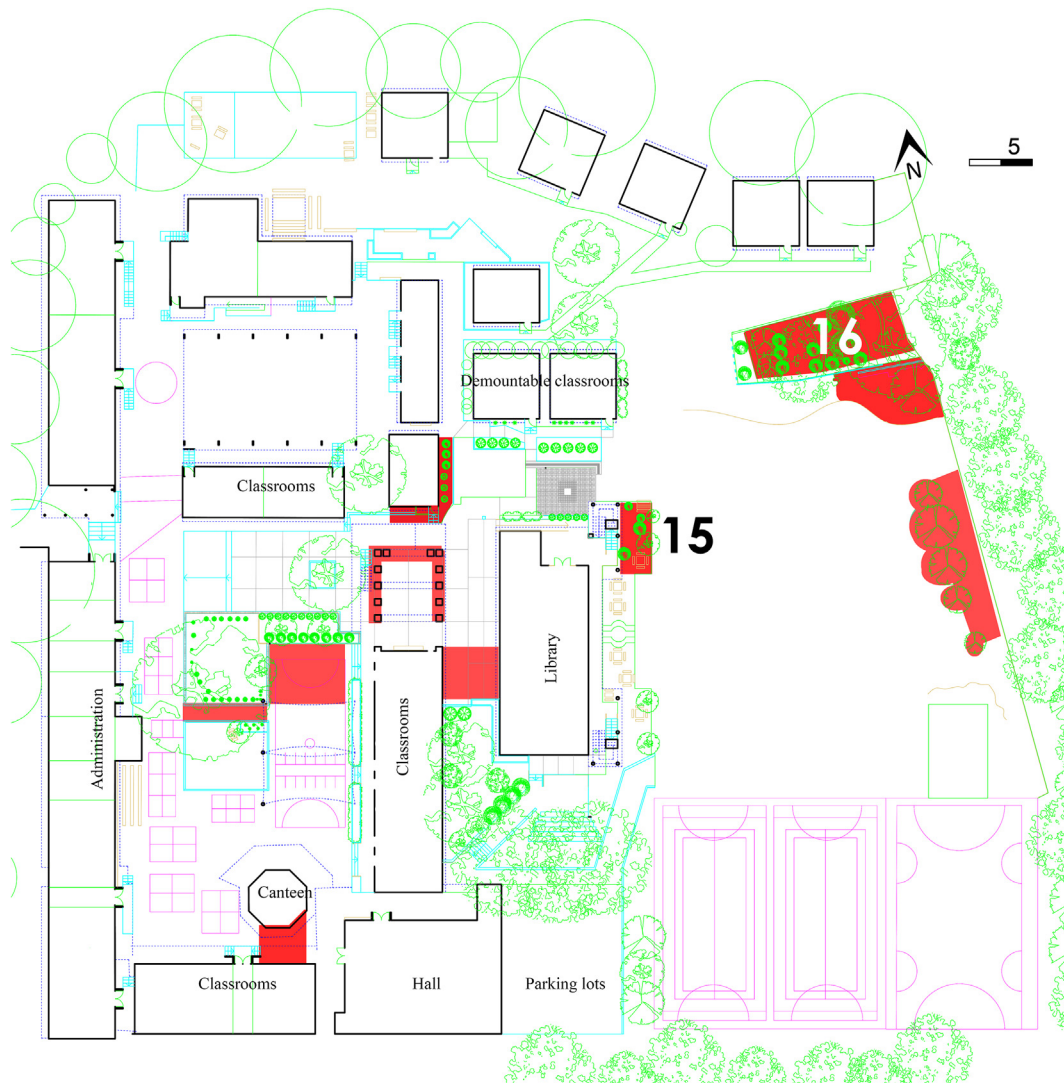


Fig. 9. In-between spaces identified in School 3.

very porous boundary edges.

Children used some small enclosures to support their socio-dramatic play. Examples of in-between spaces of this type included spaces under staircases (Fig. 11), between the edges of small gardens (Fig. 12) or between a cluster of benches (Fig. 13). As described by children, these spaces were ‘cosy’ with ‘walls’ or ‘roofs’, between or under which they could play pretend ‘houses’ or play Mums and Dads or other imaginary games.

Children also selected enclosures to accommodate physical play that needed a bound area. Examples included parallel raised edges or benches (Fig. 14), poles supporting covered ways (Fig. 15), or parallel walls (Fig. 16). They were observed jumping from one raised edge or bench to another, trying to dodge the person in the middle (Fig. 14). They also described a game in which they chased each other between the poles, trying to not get ‘tipped’ before touching the poles (Fig. 15). A walking tour with a nine-year-old girl described her use of two parallel walls (Space 7 in Fig. 8) in a game called “Wallball”: “She goes and stands on the wall and I stand over here and we play a game where we throw on the wall ... you throw on the other person’s wall, it bounces back and bounces on the floor and then the other person must catch it.” To play “Wallball”, children chose spaces enclosed by big walls that did not feature any windows to be able to bounce the ball without concern for any possible damage.

Some enclosures were identified by children to have potential for

supporting their self-directed play, but some physical features discouraged their use. Children’s experience of informal enclosures was not always as safe or pleasant as they wished. In focus groups, they remembered injuries that they received when they fell on asphalt during a jumping game on a set of benches or when they were repelled by the poor conditions of these spaces. From their perspectives, these spaces did not often get enough attention from the school administrations.

3.1.2. Edges

Unlike sports and other formal activities, located on the central formal spaces of school grounds, children’s selected in-between spaces were located along the edges. This study mapped the form of the edges which according to Dee (2004) could be *ragged* or *smooth*. Ragged edges that were generally found in the corners of school grounds, created sub-spaces as part of their form. The nature of children’s activities within the ragged edges shared some similar characteristics with those within small enclosures. Examples of ragged edges found by children included cul-de-sacs, staircases and stairs wrapping around the space (Figs. 17–19). Children chose these spaces to support their physical play (Figs. 17, 18) or socio-dramatic play (Fig. 19).

In contrast to the ragged edges, smooth edges did not often provide enclosure and were valued by children because of offering appropriate visual links to the adjacent settings. Children were observed to use the

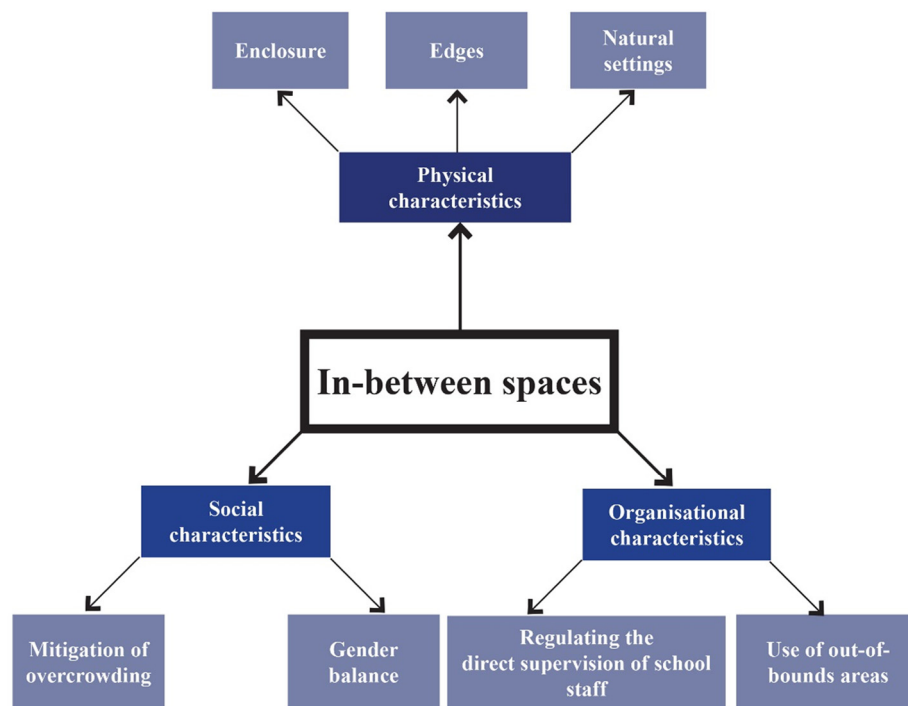


Fig. 10. Themes which emerge from the analysis.



Fig. 11. Under-spaces of staircases used to play 'houses' (Space 1 in Fig. 7).



Fig. 12. Raised edges of the garden used as pretend 'houses' (Space 2 in Fig. 7).

edges of paved sporting courts and grassed areas widely to watch their peers, playing on the courts (Fig. 20). The edges often interested children when they were either exhausted or reluctant to engage actively in the games. Despite children's extensive use of these spaces, edges were not formally recognised as important spaces in schools. As indicated by children, these spaces were often left unclean, not properly maintained, and were often characterised as out-of-bounds by the school.

3.1.3. Natural settings

Through mapping children's in-between spaces, this study found that natural settings constituted approximately 65% of children's chosen in-between spaces across the three schools (28 out of 42). Willows were repeatedly identified by children as their popular enclosures as they offered big canopies marking the roofs of their imaginary 'houses'. As described by them, a circle of tree trunks defined a space and were popular for imaginary play (Fig. 21). Massive tree trunks such as paperbarks or Moreton Bay Fig trees were also favoured natural elements and were used to define goal posts or as hiding places

(Fig. 22). The microclimate of enclosures or edges containing trees or bushes were identified as pleasant by children particularly in summer because natural settings provided shade and a reduced temperature. Malleable natural materials (e.g. mud, sticks, leaves, woodchips) further contributed to children's constructive play (Fig. 23). Children's use of malleable materials in natural settings was reflected in a focus group with three eight-year-old girls (in Space 12 depicted in Fig. 7): "... we also pretend there was like an evil spirit in there so we would have to like dig all these traps... this is our trap [the hole] and there is one there ... and we like imagine there is like monster thing after us and we're like in the jungle and we like pretend to make traps for it and stuff like that ... and now we've kind of finished our trap. We're covering it up with leaves and some sticks and ... these sticks are too big and then we're like gunna fill it up with little sticks and leaves so it doesn't look like there is anything in there and then if we step in, it falls."



Fig. 13. A cluster of benches used as pretend 'aisles' of a 'supermarket' (Space 3 in Fig. 8).



Fig. 14. A pair of parallel long benches used to play 'Tips' (Space 4 in Fig. 7).



Fig. 15. Poles of the covered way used to play 'Tips' (Space 5 in Fig. 7).

3.2. The social characteristics of in-between spaces

Besides the physical characteristics, children identified the social characteristics of in-between spaces as an influential dimension in their



Fig. 16. A pair of parallel walls used to play 'Wallball' (Space 6 in Fig. 8).



Fig. 17. A cul-de-sac used to play 'mini-soccer' (Space 8 in Fig. 7).



Fig. 18. An edge wrapped by stairs used to play 'Tips' (Space 9 in Fig. 7).

self-directed play. The important social characteristics were indicated and identified by analysing the dynamics of student groups and their gender as they used the schoolground and in response to their discussion of their use. The findings indicated that the collective activities of children in the formal spaces created a social character in these spaces



Fig. 19. An edge wrapped by a staircase used to play 'Mums and Dads' (Space 10 in Fig. 8).



Fig. 20. Edges of paved sporting courts used to watch surrounding games (Space 11 in Fig. 7).



Fig. 21. A circle of trees used to play pretend 'houses' (Space 12 in Fig. 7).

that did not support or invite children's self-directed play. In-between spaces mitigated the negative influence of overcrowding and offered peaceful and quiet settings with greater support for children's self-directed play activities, especially those of girls.



Fig. 22. Massive tree trunks used to play 'Hide and Seek' (Space 13 in Fig. 8).



Fig. 23. Malleable natural elements used to construct a 'trap' (Space 12 in Fig. 7).

3.2.1. Mitigation of overcrowding

In-between spaces enabled children to exercise more control over the social access of others to their activities. While children often felt too crowded in the main outdoor spaces (e.g. basketball courts, soccer pitches and handball courts), in-between spaces were less busy and more supportive of their self-directed play. Children frequently complained about the balls flying off the courts and expressed their sensitivity to getting hit by the balls or knocked around by others running fast off these courts. Children's self-directed play was often disrupted on the main sports courts, so they regularly chose to retreat to the in-between spaces to relieve the tension. They believed these spaces were well-separated and not negatively affected by the crowd. The following

quote from a focus group illustrated the complaint of a nine-year-old girl about the disruptive nature of others' activities, which made them retreat to the edges of sports fields: "There is like NO room for people that do handstands and cartwheels because the soccer people always kick them off. We just go in the corner because not many balls go to the corners."

Although children's chosen in-between spaces often offer a quiet area for their play, they maintain visual links with the rest of the community of children. Some younger children did not feel safe going behind the school buildings which were fully separated from the action of the playground. Being totally secluded was not desirable as it undermined children's enjoyment and reduced the fun of their games. A walking tour with a ten-year-old boy illustrated his feeling about the use of spaces behind some school buildings: "I don't really like near the buildings because there is like not many people and it's like quiet... so it's like not as fun"

3.2.2. Gender balance

The social group whose activities were more sensitive to the overcrowding was the girls. As a result, in-between spaces were mostly used by girls, with only a few of these settings used by boys. From girls' perspectives, boys took control of the sporting courts, and their rough and aggressive play in these formal behaviour settings intimidated girls and discouraged them from using the courts. Although girls were interested in using the grassed areas to play gymnastics or compete in running races, they were pushed back to the edges, less crowded and interfered with by boys. The girls' concern about the boys' use of space was reflected in this quote from a focus group with three eight-year-old girls. "Up there, all the boys no matter what age, they always play soccer or football ... That's why we play here, no soccer or something. We can do everything here like gymnastics ... So, this is like the girls' zone and that's like the boys' zone. We make like that ... They never let us play there because last year we wanted to play there with my friends, but I couldn't, and the ball just hit me right here and I had to leave the school." These girls referred to a space on the edges of the grass area (Space 14, Fig. 7) which provided a safe refuge for them, seeking quiet spaces for their play. The data emerged from behaviour mapping supported the gender segregation in the use of school ground spaces (Fig. 24).

3.3. The organisational characteristics of in-between spaces

Findings indicated the organisational characteristics of in-between spaces, playing a significant role in children's choice of these spaces. The organisational characteristics centred on the influence of school rules on children's self-directed play.

3.3.1. Regulating direct supervision of school staff

Children preferred to establish self-directed play activities in spaces, not often under the direct supervision of school staff. They realised that in-between spaces were usually overlooked by school staff on duty, so these spaces offered a more relaxing environment for their play. A focus group of nine-year-old boys explained why they were interested in a secret space that they discovered in the corner of the grassed area (Space 15, Fig. 9): "It's kind of fun to play here... because it's a kind of secret area. Teachers don't normally check there".

3.3.2. Use of out-of-bounds areas

Across the three schools, around half of the in-between spaces (21 out of 42) were identified by children as out-of-bounds areas where children were not given permission to play as these areas were not supervised. Although children were not officially allowed to play there, these spaces were still very attractive to children due to the physical opportunities and supportive social characteristics. They found these spaces more peaceful and less crowded compared to the sanctioned areas of the school grounds. In a focus group with nine-year-old boys, they described how they would like to use an out-of-bounds area in a natural setting (Space 16, Fig. 9) if they were allowed to: "Sometimes we

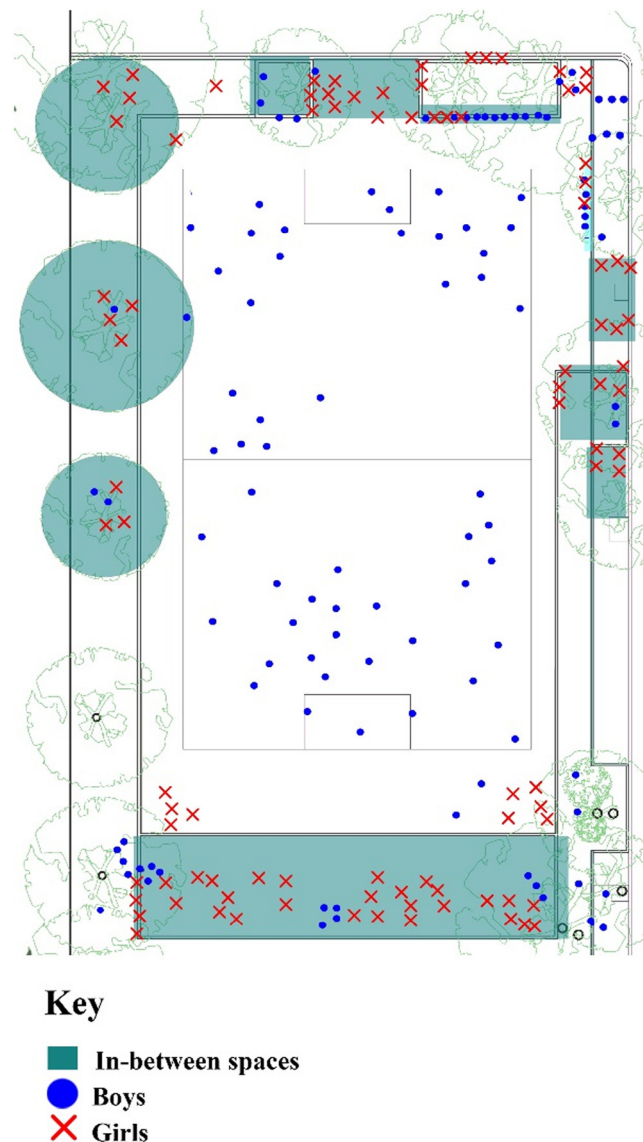


Fig. 24. Gendered use of the grassed area.

could move around ... there's like the small little gateway which separate the top oval from the low oval so it's like a mini bushwalk and sometimes we like to run along the tree but we're not actually allowed to do that."

4. Discussion

This study documents in-between spaces as important environmental opportunities identified by children, offering them more freedom to manage their own experience of school grounds for play. It shows that children use in-between spaces because they are both pulled by the intrinsic qualities of these spaces and pushed by the lack of alternative suitable spaces. In-between spaces and their environmental characteristics should be appreciated in school design and school policy for their spatial value for children's play in schools.

4.1. The dynamic interrelationship between multiple environmental characteristics of in-between spaces

The central argument resulting from this study is that for children to be able to establish their self-directed play, all the environmental dimensions (physical, social and organisational) of a play space should be supportive. Children's preference for in-between spaces is not only

associated with the affordances that support their activities but also linked to the capacity of these spaces to let children have more control over their social interaction and the impact of the school's rules. The reason that children value in-between spaces is that all the environmental characteristics of in-between spaces help them navigate in social life and satisfy needs. These multiple dimensions of 'environment' and their potential influence have been acknowledged in the models underlying the theoretical framework of this study (Bronfenbrenner, 1977; Stokols, 1992).

These models not only show the influence of multiple dimensions of 'environment', but also their dynamic interrelationship. This study shows that unsupportive social and organisational characteristics can limit children's use of the potential affordances of school grounds. This finds expression in Kyttä (2004) study of child-friendly neighbourhood environments, indicating that not all the potential affordances are actualised and properly valued due to some levels of constraints. This needs the design professionals and policy makers to consider not only the direct impact of their design or policy on children's use but also the possible consequences on other environmental dimensions that influence children's lives in school grounds.

In line with Barker's theory of behaviour settings, the findings further suggest that in-between spaces are dynamic behaviour settings in which the physical environment modifies the impact of the social and organisational characteristics (Barker, 1968). The physical elements of enclosures, edges and natural elements tend to create supportive social and organisational environments by enabling children to regulate collective behaviours and the impact of organisational rules. Enclosing elements of in-between spaces can work as barriers that prevent the activities of the surrounding settings from interfering with the activities of enclosures. Physical barriers can mitigate children's unwanted social interaction and conflict as indicated by Moore (1987) study of children's activities in pre-school environments.

The dynamic relationship between the social and physical characteristics of in-between spaces is also evident along the edges. The location of in-between spaces along the edges of larger formally designed spaces can assist children with more control over the social access of others to their activities. As indicated by previous studies, children's self-directed play, that can be easily interrupted, is well-accommodated by the edges, spatially separated from the surrounding busy behaviour settings (Maxwell et al., 2008). These spaces particularly provide supportive social environments for girls who are often intimidated by boy's activities in the formal spaces of school grounds. This finding resonates in Dymont et al. (2009) study using observational methods indicating that boys, and in particular physically competent boys, dominate the traditional sporting spaces and girls use the side lines. In this instance the behaviour settings of formal spaces in school grounds can be socially overwhelming and fail to offer all children opportunity to play. In-between spaces can offer alternative behaviour settings with totally different environmental characteristics and qualities, supporting a different range of social interaction and behaviour.

This study also suggests that the physical characteristics of outdoor school environments can influence the areas impacted by the school rules. The location of in-between spaces along the edges and their enclosing elements tend to block the sight lines across the space between the ragged edges and the centre, where the school staff are often positioned. This results in having in-between spaces characterised as out-of-bounds by the schools which formally prohibit children's use of these areas (Parrish et al., 2012; Thomson, 2005, 2007). This dynamic relationship between the organisational rules and the physical characteristics of the environment is central to the Barker (1968) theory of behaviour settings.

While physical characteristics can modify the impact of school rules, the rules concerning out-of-bounds areas in school grounds can influence the social characteristics of in-between spaces located in these areas. Since children are not officially allowed in out-of-bounds areas, these spaces tend to be less crowded than sanctioned areas and as

indicated by the findings, this is one of the main reasons that children are attracted to them. By using out-of-bounds areas, children can avoid the school crowds and enjoy spaces that are quieter and are less interfered with by other students.

This study is the first examination of in-between spaces that provides a comprehensive framework of the social, physical and organisational characteristics of these spaces and their dynamic relationship. While the themes enclosures, edges and natural settings have been already indicated by the studies of school grounds (Drown & Christensen, 2014; Mårtensson et al., 2014; Maxwell et al., 2008; Shamsuddin et al., 2012; Smith et al., 2016), this paper acknowledges them as the characteristics of in-between spaces, hardly identified by the literature as a spatial type important to children and their self-directed play.

4.2. Children's active role in operating in-between spaces

Despite previous studies which describe the users of in-between spaces as 'unable' or 'unwilling' to participate in physical activities (Dymont et al., 2009), this study shows that children choose to retreat to the edges to find peace and quiet as their way of exerting control over their situation. The findings from this study suggest that the lack of enough opportunities for children's self-directed play do not translate into their overall feeling of being passive or disempowered. Rather as agents, they take steps to influence and restructure their surroundings through different environmental actions. They discover the affordances of in-between spaces and actively seek opportunities to regulate the negative impact of overcrowding or school rules on their play as a direct outcome of their discontent. Children's active role in the regulation of environmental characteristics lies at the heart of Wicker (1984) transactional view of the participants' role in a behaviour setting. As children have a greater zone of penetration within in-between spaces, they are able to continually monitor their control over their social interaction within these spaces.

Children's freedom and desire to manage their own experience has been identified as crucial to the development of their self-determination, self-regulation and feelings of agency (Bandura, 1991; Ryan & Deci, 2000). By developing this subjective capacity, children bring more energy and persistence to their activities to master new skills and apply their talents, and in turn, contribute more to society and to their own sense of wellbeing (Ryan & Deci, 2000). In-between spaces can support this capacity by offering children opportunities to regulate their space and run their preferred activities. According to Korpela, Kyttä, and Hartig (2002, p. 387), visiting favourite spaces empower children to "maintain a balance between pleasant and unpleasant emotions and a coherent experience of self".

The lack of understanding of children's perspectives on their preferences and their use of school environments is evident in their desire for the use of out-of-bound areas which is prohibited by the school rules. School staff are only designated to supervise the main play areas of the school grounds as these are assumed to be the valuable spaces to children for play, where they can manage children's risk and safety. Characterising in-between spaces as out-of-bounds eliminates a raft of small play spaces that children value. About 1/5 of the school ground areas identified in this study are classified as out-of-bounds, meaning that children do not have official access to a large amount of spatial opportunity in schools, even if these spaces are supposed to be designed for their use. With a considerable number of natural settings located in out-of-bounds areas, children have little chance to use them and little say in this outcome. It is impressive to discover how some children, particularly boys, find their way to access out-of-bounds areas; however, we should bear in mind that not all children resist the school rule on the use of these spaces, so they are simply losing access to these spatial opportunities as a result (Thomson, 2005).

The concern for controlling children's activities in schools is not surprising given that children's freedom in the use of school environments is generally seen as opposed to the ordinary life of schools in

which the emphasis is on institutional order (Markström & Halldén, 2009). Previous research strengthens this analysis, emphasising that “the contemporary schoolyard is a highly structured space with pre-defined areas for certain activities” (Rönnlund, 2015, p. 97). In-between spaces which do not support any clear predetermined activities are not often valued by school organisations. However, school administrators should be aware of the value of in-between spaces for children’s play to reconsider the school rules negatively impact their potential benefits for children.

This study shows that relatively young children are capable of articulating preferences and describing environmental characteristics. They could find their position quite quickly on the school maps and even recognise those school features that did not match the school map presented during the focus groups. The participants of this study were able to competently verbalise the association between their activities and the physical characteristics of their preferred spaces. They clearly remembered their former behavioural patterns and the school features which previously dominated the school appearance. They were competent agents being able to significantly contribute to and participate in research and design (Green, 2015).

The triangulation of the data emerged from different methods is one of the strengths of this research to understand children’s insight into the characteristics of in-between spaces and their actual use. While behaviour mapping recorded how children actually used outdoor school environments, walking tours and focus groups indicated children’s insight into school ground spaces and how they wished they could use some spaces if they had been given enough opportunities. The triangulation of these three different methods led to a comprehensive notion of playground dynamics and environmental opportunity, as perceived by children in this instance. However, conducting focus groups and walking tours during the limited time of recess and lunch involved constant interruption of the participants and little privacy at times. The time of fieldwork was limited to the recess and lunch time breaks to not interfere with class time and the regular school program. Some children decided to not share this time with the researcher because they preferred to focus on their play with their peers.

4.3. Enabling in-between spaces in outdoor school environments

The exploration of in-between spaces in this study challenges the way that school designers and school administrators should think about accommodating children in the outdoor school environments. The study offers insight into how school design could be done differently and value potential in-between spaces for greater benefit to children’s play. Possible in-between spaces can be discovered under covered walkways and colonnades; behind the trees planted around the edges of grassed areas; inside the gardens enclosed by raised wooden edges; under staircases and within interlocks and niches. Natural settings are also potential in-between spaces, of great value to children but not sufficiently appreciated in school grounds by designers. They accommodate a more diverse range of children’s social groups and abilities in school grounds (Änggård, 2011; Mårtensson et al., 2014; Samborski, 2010). School designers need to be aware of potential play opportunities that these spaces can offer to better support them in school design. They also need to recognise the value of in-between spaces for girls as a counterbalance for the problems they have within the main formal spaces.

The irony of this research is that it focuses on in-between spaces which are not deliberately designed, they are often simply left-over spaces that are discovered by children. Further participatory research with children may investigate how much we need to design the solution for children and how much we need to give children the opportunity to regulate the space by themselves. Once spaces are designed and ‘formal’, will they be sought after by children? Can we design in-between spaces within school environments and have them function as other ‘discovered’ in-between spaces do? This is unknown.

5. Conclusion

The findings of this participatory study reveal the complexity of children’s relationship with their environment and show that children’s experience of outdoor school environments is not limited to formal play spaces. Children’s experience of in-between spaces needs greater attention from school authorities and design professionals when a child-friendly outdoor school environment is being designed and used. Approaches to school design and school policy need to address the interdependencies between multiple environmental characteristics of school grounds to ensure that the environment ultimately supports children’s play.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.landurbplan.2019.103683>.

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