International Association of Societies of
Design Research Conference 2019
DESIGN REVOLUTIONS

Manchester School of Art
Manchester Metropolitan University
02-05 September 2019

Children Deserve Better Public Life: Human-centred Design in Play Spaces

Siu, Kin Wai Michael*[a]; Wong, Yi Lin[a]; Lam, Mei Seung[b]

[a] School of Design, The Hong Kong Polytechnic University, Hong Kong
[b] Department of Early Childhood Education, The Education University of Hong Kong, Hong Kong
* m.siu@polyu.edu.hk

ACCORDING TO the United Nations, children have the right to play. In the recent years, increasingly more researchers and designers have advocated the importance of quality play spaces for children. However, children are often neglected in the design of play spaces, with adults dominating the decision-making process. Children's needs for a public life are seemingly less imperative than those of other groups. However, increasingly more researchers have argued children need to have a meaningful and exciting public life in public spaces. Children interact with other children they do not know and make new friends in play spaces, where they develop their cognitive, emotional and social ability in play spaces. In short, a favourable public life in play spaces is crucial for their development. As the interaction and communication in these spaces depend greatly on their design, it is important to consider design as one of the decisive factors in determining the quality of children's public life. This paper argues that human-centred design in public spaces is essential for improving children's public life. Based on a case study of Hong Kong, the paper explores this issue by first reviewing the categories of play spaces and the related activities of children's public life. The paper then offers suggestions as to how children can live a better public life in human-centred design play spaces.

Keywords: Children; public life; play space; human-centred design; play interactions

1   Introduction

Adults have to take on direct public responsibilities and obligations for society's sake after entering the workforce. They also have the right to decide the extent to which they engage in public life after contributing to the economy. The government and non-government parties that design and build public infrastructure are adults and they consult exclusively with other adults. In other words, adults make all of the decisions on behalf of the public, which includes children who lack opportunities to express their opinions on public matters, unlike other minority groups. While issues such as public policy, welfare and finance are too complicated for children to fully understand, they should have the opportunity to provide opinions on the facilities and services designed specifically for them.

The public affairs closest to the lives of children are those involving the design of public spaces, such as public play spaces. As the term suggests, the major aim of a play space is to provide an environment containing facilities and services for playing and engaging

children in play (Brett, Moore, & Provenzo, 1993). Brett et al. (1993) describes play as child's work. According to Play Therapy, play is 'a physical or mental leisure activity that is undertaken purely for enjoyment or amusement and has no other objective' (Play Therapy United Kingdom, 2017). Gordon (2009) suggests that play is 'the shift from reality to a new play-specific space/time with its own rules of procedure' (p. 6). Play is also the attitude that triggers the shift. Interestingly, through this imaginary space/time, children learn how to cope with problems in the real world. Apparently, the definition of play is complex and ambiguous (Eberle, 2014). In this study, play was defined as any activity that is enjoyable for children. A broad definition was adopted to make sure that no play activity was excluded.

Article 31 of the Convention on the Rights of the Child states that 'states parties recognize the right of the child to rest and leisure, to engage in play and recreational activities appropriate to the age of the child and to participate freely in cultural life and the arts' (United Nations, 1990). Children have the right to play according to the Convention; however, they do not have opportunities to have a say on the design or development of play spaces (Brett et al., 1993). In other words, children are often marginalised, and little is done to involve them in the play-space design process. Yet a favourable public life in play spaces is crucial for their all-round development. Based on a case study of Hong Kong, this paper explores the issue by first reviewing play-space categories and the corresponding activities of children's public life. Based on the findings, the paper suggests how children can live a better public life through human-centred play-space design. It is believed that optimising play-space design will provide children with the public life they deserve.

2   Method

2.1   Sample Play Spaces

Hong Kong has a very high population density, with most people living in crowded residential areas. Play spaces in the city are often full of different kinds of people, and various incidents occur within them (Siu, Wong, & Lam, 2018). This unique situation provides a rich source of data that other cities may be unable to provide.

The play spaces in Hong Kong's Kwun Tong District were chosen for this study. Kwun Tong had the highest overall population density in Hong Kong during 2011 (55,204 people/km^2) and its density of children aged 12 and below was also the highest (5,325 children/km^2) (Census and Statistic Department, 2015). The district was chosen because it could reflect the typical environments and phenomena in the city's play spaces. To gain a holistic understanding, four other popular play spaces were also visited, located in Tuen Mun in the New Territories, Sham Shui Po in Kowloon, Quarry Bay on Hong Kong Island, and Inspiration Lack on the Lantau Island.

There are 105 play spaces in Kwun Tong District, with play equipment having been installed in 85 of them. These 85 public play spaces are managed by either the Leisure and Cultural Services Department (LCSD; 24 spaces), the Housing Authority and Housing Department (HA and HD; 52 spaces) or the private sector (9 spaces). All these play spaces are open to the public, making it easy for nearby residents to access them.

2.2   Procedures

The 85 play spaces were identified through a number of field studies in Kwun Tong District (see the Note). In all of the spaces, participant observations were conducted. The entire

research process, including field studies, data collection and analysis, lasted from 2016 to 2018.

During the study, the researchers detached themselves from the play spaces and observed the behaviour of the children and their adult caretakers. They then talked to caretakers' groups about their children. Photos were taken, and semi-structured and unstructured interviews were conducted with the caretakers and the children. The questions were related to the time of day the caretakers typically brought their children to the selected play spaces, the games the children played and other activities the children engaged in once there. The researchers also interviewed the older children to understand their activities. Questions such as 'what are you playing?' and 'what are the rules of your game?' were asked. The interviews were conducted in groups. While the interviewers kept in mind the importance of obtaining individual responses, group interviews were helpful in that they eased the nervous tension of both the children and their caretakers. Similar data collection processes were conducted in the 85 play spaces, and the data set approached saturation after interviewing 10 caretakers and around 25 children. The researchers stayed for at least an hour at each play space on weekends or weekdays after school at about 4 pm. The children and their caretakers usually went to play spaces on the weekends or after school, i.e., at around 4 pm. Some of the children went to play spaces next to their homes unaccompanied by caretakers. Children often returned home at around 6 pm or until sunset.

3   Findings

3.1   Play Space Categories

In parallel with city development, different kinds of play spaces emerge, depending on particular social issues and needs. These spaces have various designs and different degrees of popularity. Brett et al. (1993) separates play spaces into four categories according to their facilities, environments and purposes: traditional, designer, adventure and creative playgrounds. However, the findings of the field studies in Kwun Tong District suggested that such categorisation does not apply to Hong Kong. For instance, due to the intensive using and high demanding of lands, adventure playgrounds are unpopular in the city. This situation is also common in other densely populated cities. On the other hand, a few of these available adventure playgrounds are also far from living environments. Hence, after some research meetings with the government official, professional planners and designers and NGOs serving the children' needs and according to the field work findings, four new categories of play spaces were identified based on the field studies. They are (1) cramped play spaces, (2) one-size-fits-all play spaces, (3) designed play spaces, and (4) participatory play spaces. Cramped play spaces refer to public play areas with very limited number of play facilities. One-size-fits-all play spaces refer to public play areas with one or several sets of composite play structure in a larger area. The design of this kind of play spaces are the same across districts. Designed play spaces is defined as the public play spaces with newly design elements. These design elements are distinct from the features of typical composite play structure. Users of cramped play spaces, one-size-fits-all play spaces, and designed play spaces take a passive role in the design process. However, participatory play spaces involves users and allows them to provide opinions in the design process. Table 1 below shows the descriptive statistics of play spaces in the four categories in Kwun Tong District. It is noted that the four other popular play spaces visited are not included in Table 1. Table 2 shows the number of play facilities found in the play spaces.

These data were collected based on the field study and the data provided from the government websites,

Table 1 Descriptive statistics of play spaces in different categories in Kwun Tong District

Play space category	Camped play space	One-size-fits-all play space	Designed play space	Participatory play space
No. of play spaces	57	24	4	0
No. of play space spaces managed by LCSD / HA and HD / Private sector	0 / 52 / 5	20 / 0 / 4	4 / 0 / 0	0 / 0 / 0
No. of play facilities on average	7	15	23	-
Most popular play facilities in the play spaces	Climbing facility	Climbing facility	Climbing facility	-
Least popular play facilities in the play spaces	Merry-go-around	Merry-go-around	Dramatic play facility*	-

* Dramatic play facility refers to structures decorated as houses or castles.

Table 2 Number of play facilities found in the play spaces in Kwun Tong District

Play space category	Camped play space	One-size-fits-all play space	Designed play space
Climbing	182	147	28
Slide	98	70	9
Cognitive games	57	77	21
Rocking chairs	34	36	9
Swing	12	19	4
Facility related to the 5 senses	11	17	8
Seesaw	8	8	7
Dramatic play facility	7	3	3
Merry-go-around	5	2	4

3.1.1 Cramped play spaces

When Hong Kong was governed by the United Kingdom, various social issues compelled the government to develop the city and quickly build facilities. The colonial government then built play spaces to address the high rates of truancy and child crime (Fung, 2008). In the 1930s and 1940s, play spaces were built out of concrete (Kwok, 2003), and most of the facilities were for climbing. In the 1950s, in response to rapid population growth, the government built public housing and gradually added adjacent play spaces with facilities including swings, slides, roller slides and climbing apparatuses, some of which were more dangerous than those used today. The materials commonly used were metal, wood or plastic. Most such play spaces have been rebuilt or dismantled, but some still exist. Composite play structures, purchased from the US or UK, were then assembled on sites. It was observed in the field studies that because these older play spaces are small, it is common for the composite structures to have only one slide and few climbing apparatuses. The interviewed children said that did not find this kind of play structure to be challenging.

As the population continued to grow, New Towns in the New Territories were developed in the 1950s (Siu, 2001). Old residential areas were transformed into new public housing estates and some small play spaces were built nearby. Composite play structures were again used (Figure 1). The environments of the remaining spaces in this category are crowded and some are even positioned under buildings (Figure 2). In larger play spaces,

some inclusive play facilities are included (Figure 3). These play spaces, along with the older play spaces mentioned above, are still managed by the HA and HD.

Figure 1. Composite play structure in a play space next to a public housing estate

Figure 2. Composite play structure under the eaves of a building on a public housing estate

Figure 3. Inclusive play facilities in a play area next to a public housing estate

3.1.2 One-size-fits-all play spaces

During the 1990s, the LCSD began building and opening one-size-fits-all play spaces. According to the field studies, these play spaces are much larger and also with diverse play facilities than their older counterparts. Most are in parks alongside other facilities such as bicycle tracks, jogging trails and elderly fitness stations, allowing children can run back and forth among different facilities.

Almost all of these play spaces consist of composite play structures, and they usually include slides, climbing facilities and swings. The scale of these spaces is much larger than those next to housing estates mentioned above (Figure 4). However, the designs of such spaces are similar across districts in Hong Kong (Siu, Wong, & Lam, 2017). During the field studies it was obvious that the type of play facilities appeared repeatedly across spaces in slightly different forms and colours without having any connections with other areas of the parks. Other facilities supporting the play spaces were also inadequate.

Figure 4. One-size-fits-all play space with composite play structure

3.1.3 Designed play spaces

After 2000, the government noticed that many buildings in urban areas were aged and had safety issues (Urban Renewal Authority, 2017). Some areas also needed to be revitalised or redesigned so that people could live better lives. Under the government's urban redevelopment plans, some areas in Hong Kong were transformed into recreation parks with different kinds of facilities such as performance areas, viewing pavilions and amenity lawns. Play spaces were also included among the facilities in these parks. Field observations of such spaces indicated that the facilities within them are new and that they allow children to play in their own ways. For instance, the play facility in Figure 5 is a wave that can be changed by pressing down or lifting up the component at the end. This kind of play space often includes other play facilities and structures that provide sensory and cognitive stimulation.

Figure 5. Play facility in the Designed Play Space

This type of play space is much larger than the others mentioned above. The distance between each piece of equipment is large enough for children to run around in safety. These play spaces are also well attached to the surrounding environments with different kinds of leisure facilities next to them.

3.1.4 Participatory play spaces

Although participatory design (otherwise known as community design) has been advocated for several decades, participatory design of public environments with and by children is new to Hong Kong. Play spaces designed with the participation of children have either (1) involved children in the actual design process, such as Tuen Mun Playground in Tuen Mun Park (Figure 6), or (2) been constructed with materials that allow children to build their play spaces, such as the 'Community Build Playground' organised by Playright Children's Play Association at Inspiration Lake on the Lantau Island (Figure 7). In the first type, children were invited to design their dream play spaces. Architects and designers talked to the children and gained thorough understandings of their designs. They then used the children's design ideas and designed a set of play facilities. Positive feedback was usually gained after the participatory design process.

In the second type of space, children are given building blocks to build play equipment by themselves in a designated play area (Figure 7). They can build and dismantle the blocks easily so that they have a large variety in their play over a very short period. This kind of play space is often temporary and is most often used by non-governmental organisations to promote play in the community. The organisations rent lawns or large areas to allow children to play freely with the building blocks, which are usually recyclable materials or foam cubes that children can handle easily.

Figure 6. Play equipment in Tuen Mun Playground at Tuen Mun Park

Figure 7. Children building their own play facilities at an event called 'Community Build Playground' organised by Playright Children's Play Association at Inspiration Lake (Photos credited to Playright Children's Play Association)

3.2　Activities in Play Spaces

It was observed that children spent several hours a week in public play spaces, running, playing and talking with other children. In such spaces they met new friends and develop their interpersonal communication skills; they faced new challenges and cultivate their problem-solving skills; and they participated different kinds of play activities and developed their cognitive, physical and social abilities (Jeanes & Magee, 2012). Children created their own rules and communication methods in play spaces, contributing to one another's development. Clearly, play spaces are important in socialisation, the process by which children learn moral and social values (Denzin, 1975).

Maxwell, Mitchell and Evans (2008) summarised different types of play and social interaction behaviour, and identified five kinds of play behaviour and four kinds of interaction behaviour. The play behaviour includes dramatic/fantasy play, constructive play, functional play, games

with rules, and non-play. The interaction behaviour includes solitary, parallel, positive and negative interactions. All of the behaviour, which also relate to the public life of children, were observed in the field study. Apart from addressing each activity, the followings highlight two distinct findings in the observation. Higher level of play and other social activities are also highlighted below.

3.2.1   Running as a universal play activity

Running itself is a kind of play for younger children that can also help children work off their surplus energy. The surplus energy theory suggests that surplus energy is released through aimless play (Evans & Pellegrini, 1997). In addition, at this level of play, where rules do not exist, the element that makes running so much fun is the freedom children can enjoy. This helps them to lose the inhibitions and release the pressure of their daily lives (Mellou, 1994).

Nearly all of the children observed in this study ran in the play spaces. Older children played other games such as hide-and-seek but after that they started to play tag. Many of the other play activities or games observed were also based on running. The children could run anywhere without any restrictions, and they showed their delight in their happy faces. Although numerous caretakers (particularly appointed caretakers and not parents) urged the children not to run too fast, many of the children were able to run freely in the play spaces.

In the interviews, the caretakers suggested that running was more acceptable than other aimless activities such as jumping off play facilities or rolling on the ground. Running was comparatively safer, and caretakers could easily foresee the potential danger in front of the child.

3.2.2   Children's levels of dominance of the play equipment

The observed children understood and used play facilities differently. For instance, younger children followed the form and function of the play facilities. They slid down slides or climbed climbing apparatuses. In other words, the play facilities controlled/guided them. These children were 'followers', and the play facility could be regarded as a 'controller'.

Many older children, however, did not follow form and function. Instead, they challenged them. For instance, some walked up slides or twisted swings. Although this was dangerous in a certain sense, the children were creatively exploring new ways of play based on the forms of the facilities. In other words, sometimes play equipment could stimulate their creativity. These children were 'explorers', and the play facilities could be regarded as 'stimulators'.

Some children did not consider the facilities as specific play apparatuses. For instance, although some understood that certain parts of the composite play structures were slides, they used them as chunks of plastic in the play space. Therefore, they jumped across the slides and stood on the railings to practise their balance. They created new functions based on the affordance of the play facilities. These children were 'creators', and the play facilities can be regarded as 'providers'. Figure 8 shows the children's levels of dominance of the play equipment.
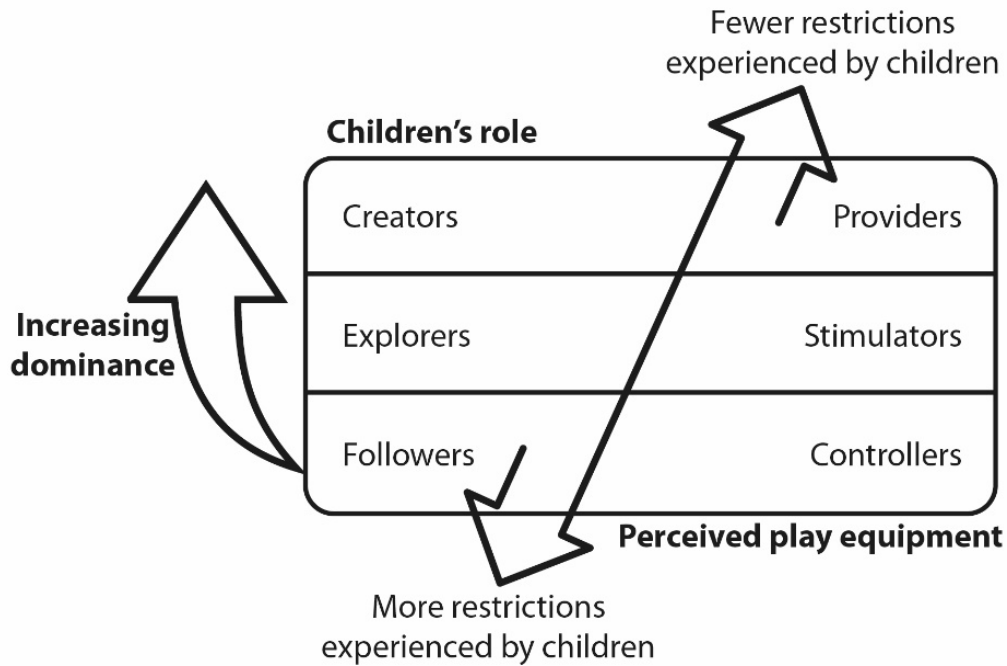
Figure 8. Children's levels of dominance of play equipment in play spaces

The children became more explorative and creative when they perceived the forms of play facilities as being less functional and meaningful. They also experienced fewer restrictions when playing. Usually, before becoming 'creators', most of the children had at one point been 'followers' and 'explorers' until they found the equipment to be boring. They then invented new ways of playing on the facilities.

3.2.3 Other play and social activities

When children begin to develop their ability to understand abstract ideas and concepts, imaginary play becomes the most popular game. Imaginary play is extremely popular among children everywhere, even those with disabilities (Harris & Jalloul, 2012). Siu, Wong and Lam (2018) show that imaginary play is very popular in play spaces.

The observed children's imaginary play included chasing, hide-and-seek, make-believe and playing 'the floor is lava', with more crowded play spaces giving rise to more diverse play activities. The children were both players and referees, and checked on each other to see whether anyone had broken the rules. Yet the rules changed on a daily basis. Still, not anyone was able to change the rules, and some children refused to follow new rules. Power struggles and tension emerged.

4 Discussion: Children's Public Life and Human-centred Design

4.1 Human-centred Design in Play Spaces

According to Lii (1988), strangers, who are individualistic and self-centred, interact to maintain public life. Similarly, children interact with others in play spaces, which become the environment in which their public life takes place. Children who do not know one another participate in a form of self-organisation, suggesting that play is the source of public life. Play connects children and provides a reasonable justification for children, and their caretakers, to share their lives.

In this study, the researchers observed that children's play activities were not limited by the category of play space in use, but the quality of play was. For instance, running and imaginary play could happen in any play space. Even in cramped play spaces, children could make-believe they were on boats at sea. They could also run around the play facilities and have fun. However, in such limited spaces, they could not run for long or risk crashing into one another. They became bored of being followers, their sense of enjoyment lessened and their interactions decreased. Given that play-related interaction and communication depend greatly on the design of the play space, it is very important to consider design as one of the decisive factors in the quality of children's public life.

Indeed, the findings of this study indicate the need for human-centred design in play spaces. In order words, children have to be at the centre of the design, with their interests given high priority and their needs taken into consideration. This will allow them to experience a better and more enjoyable public life when they are at play with other children. Obtaining first-hand information from children regarding their interests and motivations is the best way to create such human-centred play spaces. Having a better public life at an early age will help to develop children's capabilities to handle different kinds of relationships and cope with pressure. Children deserve to have such experiences with others in well-designed play spaces.

4.2   Towards a Better Public Life

Considering the child-equipment relationship derived from the children's dominance of play facilities shown in Figure 8, the explorer-stimulator and creator-provider relationships facilitate the most human interaction. More interactions among children in a human-centred environment result in more intense public life. However, having a more intense public life does not imply that it is more enjoyable. Factors such as other facilities and caretakers also need to be considered. That is why caretakers should be encouraged to accompany children in play spaces, so they can provide adult supervision and help the children to handle a full range of emotions.
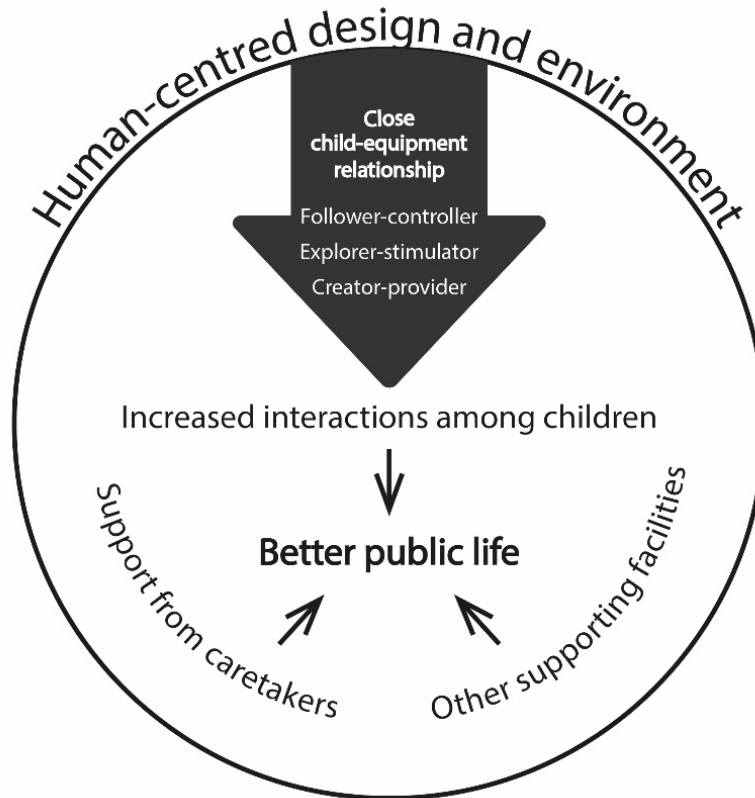
Figure 9. Attainment of better public life in human-centred play space environments

Figure 9 shows that interactions among children increase with the shift from 'follower-controller' to 'creator-provider' relationships in human-centred play spaces. These increased interactions, supported by other facilities and caretakers, help children to enjoy a better public life. Human-centred design (represented by the circle in Figure 9) is vital for maintaining a close relationship between children and equipment, and between children and play spaces. Without this close relationship, offering a better public life in play spaces will remain a challenge.

Although it may seem obvious that public facilities should be human-centred, such is not the case for play spaces. Children are usually not at the centre of the design process. The play equipment and the landscape layout are designed with children in mind, but it is questionable whether children actually enjoy them. According to the field observations in this study, cramped play spaces and one-size-fit-all play spaces suffer from this deficiency, resulting in younger children only following the form of the play facilities. Even when designed play spaces were observed, there was no evidence that children were at the centre of the design. The role of children's play in the design was found to be ambiguous and sometimes undervalued.

According to Wong, Lam and Siu (2018), most designs of play spaces in Hong Kong do not facilitate social interaction among children. Based on the findings of the present study, only the participatory play space design is centred on children and their needs. Children's opinions are valued in the design process, and the play environment is motivating. It can be argued that the design process is the major depository of human-centred design, and the play facilities are the tangible results of a human-centred process.

Approaches of participatory design varies. Druin (2002) suggested that children contribute to the design process in four different roles: user, tester, informant, and design partner. Although participatory play space can be achieved through involving children in any of the four roles, more participation of children in the design process, i.e., children as design partners, is more able to put children's feedback and opinion into practice. Different stakeholders and designers can join children and form different groups to generate different ideas for human-centred design.

5   Conclusion

Play spaces are places where children live their public life: they encourage social activities among children from different backgrounds and with different abilities (Siu, Wong, & Lam, 2016). In play spaces, children learn how to play with other children they do not know and make new friends. They play together to develop their cognitive, emotional and social abilities. This play also helps children to relieve the pressures of daily life. Although playing allows children to escape from reality, this specific space and time represents the reality of their public life. In this constructed reality, children practice how to become adults in the future. This explains why the United Nations, backed by the research of social and health organisations, places such a high value on children having play as a basic right.

The findings of this study show that children run and play in play spaces and use the facilities in different ways. Different kinds of child-equipment relationships suggest that children's creativity, as seen in their inventing new games, may either be encouraged or restricted by the design of the equipment. This, in turn, affects the quality of their public life. It is thus important that the design of play spaces takes children's needs into consideration.

Children have to be involved in the process of designing play spaces so that a human-centred play space, such as the participatory play space, can be built. Children's active participation in creating play spaces also contributes to a community's sense of social cohesion (Brett et al., 1993). However, children are often neglected in the design process, and adults make most of the decisions on their behalf. In Hong Kong, the design processes of only a few play spaces have involved the participation of children. Yet children deserve a better public life, and to that end human-centred play space design is vital.

6   References

Brett, A., Moore, R.C., & Provenzo, E.F. Jr. (1993). *The Complete Playground Book.* New York: Syracuse University Press.

Census and Statistics Department. (2015). 2011 Population census. Retrieved on March 15, 2019 from http://www.census2011.gov.hk/en/index.html

Druin, A. (2002). The role of children in the design of new technology. *Behaviour and Information Technology, 21*(1), 1-25.

Eberle, S. G. (2014). The elements of play: Towards a philosophy and a definition of play. *Journal of Play, 6*(2), 214-233.

Evans, J., & Pellegrini, A. (1997). Surplus energy theory: An enduring but inadequate justification for school break-time. *Education Review, 49*(3), 229-236.

Fung, H. C. (2008). Huí yì yóu lè chǎng. *Cultural Studies @ Lingnan, 11*(1), https://commons.ln.edu.hk/mcsln/vol11/iss1/1/

Gordon, G. (2009). What is play? In search of a definition. In D. Kuschner (ed.), *Play and Culture Studies, From Children to Red Hatters: Diverse Images and Issues of Play* (pp. 1-13). Lanham, MD: University Press of America.

Harris, P. L., & Jalloul, M. (2012). Running on empty?: Observing causal relationship of play and development. American Journal of Play, 6(1), 29-38.

Jeanes, R., & Magee, J. (2012). 'Can we play on the swings and roundabouts?': Creating inclusive play spaces for disabled young people and their families. *Leisure Studies, 31*, 193-210.

Kwok, S. T. (2003). *Yóu Lè Xiăn Tóng Zhēn: Cóng Yóu Lè Chăng Dào Shè Huì Fú Wù.* Hong Kong: Hong Kong Playground Association.

Lii, D. (1998). Social spheres and public life. *Theory, Culture and Society, 15*(2), 115-135.

Maxwell, L.E., Mitchell, M.R., & Evans, G.W. (2008). Effects of play equipment and loose parts on preschool children's outdoor play behavior: An observational study and design intervention. *Children, Youth and Environment, 18*(2), 36-63.

Mellou, E. (1994). Play theories: A contemporary review. *Early Child Development and Care, 102*, 91-100.

Play Therapy United Kingdom. (2017). Retrieved on March 15, 2019, from https://playtherapy.org.uk/ChildrensEmotionalWellBeing/AboutPlayTherapy/MainPrinciples/Play Definition

Siu, K. W. M. (2001). *The practice of everyday space: The reception of planned open space in Hong Kong.* Ann Arbor, MI: UMI Research Press.

Siu, K. W. M., Wong, Y. L., & Lam, M. S. (2017). Inclusive play in urban cities: A pilot study of the inclusive playgrounds in Hong Kong. *Procedia Engineering, 198*, 169-175. Elsevier. Urban Transition Global Summit 2016, Shanghai, China, September 5-9, 2016.

Siu, K. W. M., Wong, Y. L., & Lam, M. S. (2018). The needs of children and their caregivers in new urban lifestyles: A case study of playground facilities in Hong Kong. In J. Charytonowicz & C. Falcão, *Advances in Human Factors, Sustainable Urban Planning and Infrastructure: Proceedings of the AHFE 2018 International Conference on Human Factors, Sustainable Urban Planning and Infrastructure* (pp. 257-265). Orlando, Florida, US, July 22-26, 2018.

Siu, K. W. M., Wong, Y. L., & Lam, M. S. (2016). Designing for spatial justice for the disability children in Hong Kong: A case study of social design inclusion in public playgrounds. In *Conference Proceedings of the 10th Conference of the Pacific Rim Community Design Network* (pp. 624-634). Hong Kong: The Chinese University of Hong Kong. Hong Kong, December 15-17, 2016.

United Nations. (1990). Article 31. Retrieved on March 29, 2019, from https://www.cypcs.org.uk/rights/uncrcarticles/article-31

Urban Renewal Authority. (2017). Retrieved on March 15, 2019, from https://www.ura.org.hk/tc

Wong, Y. L., Lam, M. S., & Siu, K. W. M. (2018). Failure of social inclusion for public space: A case study of children's inclusive playgrounds and their engineering standards in Hong Kong. In *Conference proceedings of 6th International Conference Integrity-Reliability-Failure* (pp. 1313-1318). University of Porto, Lisbon, Portugal, July 22-26, 2018.

About the Authors:

Kin Wai Michael Siu: Eric C. Yim Professor in Inclusive Design, Chair Professor of Public Design, and Leader of Public Design Lab, The Hong Kong Polytechnic University. His research areas are in public design, user-centred design, inclusive design, FlexiDesign®, and design education.

Yi Lin Wong: Research Fellow in the School of Design at The Hong Kong Polytechnic University. Her research focuses on social design, inclusive design, participatory design, sign design, creativity and design education.

Mei Seung Lam: Assistant Professor in the Department of Early Childhood Education at The Education University of Hong Kong. Her research interests include transitions in early childhood, coping strategies and identity, sociocultural studies of learning, parental involvement, and research with children.

Note: The 85 visited play spaces are categorised below according to parties that manage them. Those not given names by the managing parties are named according to their locations.

The 24 visited play spaces managed by the LCSD were:

- Kwun Tung Promenade
- Choi Hei Road Park
- Choi Wing Road Park
- Hiu Kwong Street Rest Garden
- Hiu Ming Street Playground
- Hong Ning Road Recreation Ground
- Jordan Valley Park
- Kowloon Bay Sports Ground
- Kung Lok Road Children's Playground
- Kwun Tong Recreation Ground
- Laguna Park
- Lam Tin Park
- Lok Wah Playground
- Ngau Tau Kok Park
- Ngau Tau Kok Road Children's Playground
- Ping Shek Playground
- Sai Tso Wan Recreation Ground
- Sam Ka Tsuen Recreation Ground
- Sau Ming Road Park
- Sau Nga Road Playground
- Shun Lee Tsuen Park
- Shun Lee Tsuen Playground
- Yau Tong Road Playground
- Yuet Wah Street Playground

The 52 visited play spaces managed by the HA and HD were:

- Car Park Playground, Choi Fook Estate
- Choi Foon House Playground, Choi Fook Estate
- Choi Sin House Playground, Choi Fook Estate
- North-East of Choi Hay House Playground, Choi Fook Estate
- North-West of Choi Hay House Playground, Choi Fook Estate
- South-West of Choi Hay House Playground, Choi Fook Estate
- Choi Chun House Playground, Choi Tak Estate
- Choi Shun House Playground, Choi Tak Estate
- Ying Fu House Playground, Choi Ying Estate
- Kwong Hin House Playground, Kwong Tin Estate
- East of Lei Sang House Playground, Lei Yue Mun Estate
- Lei Lung House Playground, Lei Yue Mun Estate
- North of Lei Sang House Playground, Lei Yue Mun Estate
- West of Lei Sang House Playground, Lei Yue Mun Estate
- Kwai Sun House Playground, Lower Ngau Tau Kok Estate
- Kwai Yuet House Playground, Lower Ngau Tau Kok Estate
- North of Kwai Leung House Playground, Lower Ngau Tau Kok Estate

- South of Kwai Sun House Playground, Lower Ngau Tau Kok Estate
- Ping Mei House Playground, Ping Tin Estate
- Ping Sin House Playground, Ping Tin Estate
- East of Tat Yi House Playground, Po Tat Estate
- North of Tat Fu House Playground, Po Tat Estate
- North of Tat Fung House Playground, Po Tat Estate
- North of Tat Yan House Playground, Po Tat Estate
- North of Tat Yi House Playground, Po Tat Estate
- South of Tat Yan House Playground, Po Tat Estate
- South of Sau Hong House Playground, Sau Mau Ping Estate
- South of Sau Nga House Playground, Sau Mau Ping Estate
- South of Sau Yee House Playground, Sau Mau Ping Estate
- East of Sau Wai House Playground, Sau Mau Ping Estate
- North of Sau Nga House Playground, Sau Mau Ping Estate
- North of Sau On House Playground, Sau Mau Ping Estate
- North-East of Sau Yin House Playground, Sau Mau Ping Estate
- South of Sau Ho House Playground, Sau Mau Ping Estate
- South of Sau Yin House Playground, Sau Mau Ping Estate
- Sau Mau Ping Shopping Centre Playground
- Lee Cheung House Playground, Shun Lee Estate
- On Chung House Playground, Shun On Estate
- On Yat House Playground, Shun On Estate
- Tin Wing House Playground, Shun Tin Estate
- Tak Lai House Playground, Tak Tin Estate
- Tsui Lau House Playground, Tsui Ping Estate
- Tsui Mui House Playground, Tsui Ping Estate
- Tsui Nam House Playground, Tsui Ping Estate
- Sheung Yat House Playground, Upper Ngau Tau Kok Estate
- Wo Lok Estate Playground
- East of Tsui Lai House Playground, Yau Lai Estate
- Hong Lai House Playground, Yau Lai Estate
- North of Tsui Lai House Playground, Yau Lai Estate
- Yung Lai House Playground, Yau Lai Estate
- East of Kwai Tong House Playground, Yau Tong Estate
- West of Kwai Tong House Playground, Yau Tong Estate

The nine visited play spaces managed by the private sector were:

- Po Pui Court Playground
- Domain Mall Green Root Garden
- East of Lai Nga House Playground, Hong Nga Court
- Lai Nga House Playground, Hong Nga Court
- West of Lai Nga House Playground, Hong Nga Court
- Chung Pak House Playground, Hong Pak Court
- Laguna City Playground
- Telford Gardens Block Q2 playground
- Telford Gardens Block S2 playground