Inclusive Design of Open Spaces for Visually Impaired Persons: A Comparative Study of Beijing and Hong Kong

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Abstract. Over the past few years, researchers, designers and policymakers have made tremendous efforts to move towards a barrier-free society for all by enhancing the accessibility of public space. Barrier-free legislation and design guidelines for built environments have been developed in many cities. However, compared with design for individuals with mobility impairments, design for visually impaired persons (VIPs) is seldom discussed, especially with regards to open and green spaces. Based on a comparative study of Hong Kong and Beijing, this study finds that the implementation and management of public design and policy must work together to ensure effective universal design principles for open spaces. This study discusses how design can be improved to meet the needs of VIPs. Finally, the study provides some directions for researchers, planners and policymakers seeking to enhance the contribution of built environments to healthy living.

Keywords: Inclusive design · Public design · Visually impaired

1 Introduction

In densely populated cities, open spaces and public facilities are important aspects of our daily activities. 'Openness' is the key characteristic of open spaces (Hsia, 1994), which have commonly been designated as public spaces. Three aspects should be considered in the design of a public space: (a) responsiveness – whether it meets the users' needs; (b) democratic – whether it is accessible to all city users and provides freedom of action; and (c) meaningful – whether it facilitates strong connections between the place and individuals' personal lives (Carr *et al*., 1992). Inclusive design has grown out of the concept of barrier-free design, which aims to provide barrier-free environments for the widest spectrum of people, regardless of age and ability (Mace, 1985). In the past few decades, policies, laws and regulations supporting inclusive design have been promulgated and implemented. However, the needs of VIPs are seldom discussed in the design of public spaces in many urban cities. Designers and

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policymakers should pay close attention to users' perceptions and behaviour, especially in different physical, social and cultural settings (Siu, 2005).

Using a case study approach, this study reviews the implementation of inclusive design policies in two Asian cities – Beijing and Hong Kong. Policies and regulations pertaining to barrier-free public spaces have been promulgated for nearly three decades, and yet the implementation has been quite different in the two cities. From the perspective of VIPs, there are various problems in terms of accessibility, safety and convenience in both cities. To enhance the quality of open spaces and improve open space experiences for VIPs, it is necessary to examine the views of users in both cities on the implementation and management of inclusive design policies, and to identify the factors that influence the effectiveness of inclusive design. This study has implications for inclusive design policy, implementation and management. A 'FAIR' principle is proposed: *flexibility, accessibility, in place* and *reliability*. This study provides some guidance for researchers, planners and policymakers who wish to enhance the quality of built environments.

2 Methods

2.1 Case studies in Beijing and Hong Kong

In this study, two densely populated cities with similar cultural contexts, Beijing and Hong Kong, were compared. Both have issued policies and regulations related to barrier-free design and inclusive design over the last three decades. There are numerous open spaces of various sizes in both cities, such as small-scale sitting areas, gardens, promenades, neighbourhood parks and large-scale district parks. Due to time limitations, it was difficult and impractical to study all of these spaces. A previous study showed that when on their own, VIPs tended to visit neighbourhood parks near their homes rather than large-scale district parks. Therefore, this study investigated 30 neighbourhood parks in the two cities.

In Beijing, 15 parks located in eight districts were selected. Nine were located in three old districts: Xicheng, Dong cheng and Chaoyang. These three districts had high densities (number of persons per km^2) – 24,372/km^2, 21,881/km^2 and 7,530/km^2, respectively. Some of the selected parks had been located in the same places in the old communities for decades, whereas others had been built between newly built buildings in the last few years.

In Hong Kong, 15 parks were chosen from three old districts: Sham Shui Po, Kwun Tong and Kowloon City. These three districts had both public housing estates and private houses. The percentage of people aged 65 or above in Sham Shui Po was far higher than the average in Hong Kong. The population densities of these three districts were 43,381 for Sham Shui Po, 57,530 for Kwun Tong and 41,802 for Kowloon City, making them the fourth, first and fifth densest districts, respectively (Census and Statistic Department, 2016).

2.2 Procedures

This comparative study was conducted in Beijing and Hong Kong beginning in January 2017. The qualitative approach included documentation, interviews and observations. With support from organisations for the blind in both cities, semi-structured interviews were conducted with VIPs (*N*=32) of different ages. The interviews included questions such as 'How do you feel about the settings in the neighbourhood parks?', 'Have you encountered any difficulties in accessing the parks?', 'Are you satisfied with the inclusive design inside the parks?' and 'What factors influence the effectiveness of inclusive design?' The interviews were audio recorded and transcribed. For the observations, the 30 neighbourhood parks were visited on both weekdays and weekends. Photographs and notes were taken during the observations.

3 Results

3.1 Policies related to inclusive open space

Support for a barrier-free environment has grown in both cities since 1990. In mainland China, laws, regulations and rules have been promulgated. The *Law on the Protection of Persons with Disabilities* (1990) calls for the 'gradual realisation' of barrier-free design in urban roads and buildings for the convenience of disabled persons. The *Regulations of Beijing Municipality on the Construction and Management of Non-barrier Facilities* (2004) describe the design standards and relevant regulations for building non-barrier facilities in accordance with the municipality's goals. The *Code for Accessibility Design* (2012) describes the standards needed for different kinds of facilities, such as tactile paths, accessible entrances and wheelchair ramps.

In Hong Kong, the *Disability Discrimination Ordinance* (1995) prohibits discrimination against persons with a disability by failing to provide means of access to any premises that the public or a section of the public is entitled or allowed to enter or use, or by refusing to provide appropriate facilities. *Design Manual: Barrier Free Access* (2008) sets out the design requirements for providing proper access to and appropriate facilities in a building for persons with a disability.

The regulations and standards pertaining to VIPs are relatively few in both cities, especially in Beijing. Compared with the policies in Hong Kong, design guidelines and standards pertaining to VIPs are general and vague. Most of the guidelines are recommended rather than mandatory. For instance, the terms 'should', 'could', 'not suitable' and 'if applicable' are frequently used in the design guidelines. In Hong Kong, to ensure effective enforcement, some obligatory design requirements have been legislated. Any violation can lead to punishment by local governments. Special obligatory design requirements have been implemented to allow persons with visual/hearing impairments to make various uses of the buildings. However, most of the requirements are applicable to buildings, elevators, public information or service counters and accessible toilets. There are no requirements pertaining to the specific category of open spaces and green areas. The scattered obligatory and recommended requirements make it difficult for developers and builders to implement these design features during the construction of parks.

3.2 Implementation and management issues in inclusive design

In Beijing, most of the respondents mentioned that it was difficult for them to go to the neighbourhood parks by themselves without help from others. Compared with people with normal vision, VIPs had to spend a lot of energy focusing on every step and their surroundings. In the interviews, the VIPs identified many reasons for their decreased interest in going to neighbourhood parks. These included not only physiological factors, but also the physical and cultural contexts. Due to the lack of non-governmental organisations for VIPs, most were not able to obtain good training and were afraid to go outside alone. Moreover, 'walking' was not a good experience for VIPs in Beijing due to poor physical conditions such as broken tiles on the floors and bikes on the tactile paths (Fig. 1). They would be in danger due to difficulties in identifying the potential risks. Furthermore, most of the VIPs lacked confidence due to their low economic and social status. They felt alienated from the community and were not willing to express their opinions, which made it difficult for researchers to understand their expectations. An old visually impaired woman who lived in the Xi'cheng District spent 30 minutes walking back and forth in a single lane downstairs, rather than walking to the neighbourhood park nearby. In practice, carparks located around the neighbourhood park, together with many parking poles on the ground, made it difficult for VIPs to access the public areas (Fig. 2).

Fig. 1. Tactile path leading to the neighbourhood park in Chaoyang District, Beijing (Photo by the authors)

Fig. 2. Neighbourhood park located in Xicheng District, Beijing (Photo by the authors)

In Hong Kong, the implementation and management of inclusive design policies in neighbourhood parks were better than in Beijing. Moreover, unlike Beijing, most of the VIPs in Hong Kong could obtain sufficient training to be able to go outside alone. They were taught how to walk in the streets, how to use the tactile paths and elevators and even how to use the escalators as part of their daily activities. With these skills, they were more confident than the respondents in Beijing in terms of going out for leisure activities. In the interviews, some of the VIPs, especially the elderly, said they enjoyed walking in the neighbourhood parks. Tactile paths were provided at the entrance of the parks, and warning strips strictly defined the edges (Fig. 3). The VIPs who frequently visited the parks seldom used the tactile paths as they had a 'map' in their minds. However, the VIPs who were new to the parks emphasised their need to trust and rely on the tactile path, even though they were sometimes misleading. In practice, most of the respondents mentioned that the tactile paths were not designed appropriately and did not always meet their requirements.

Fig. 3. Neighbourhood park located in Kowloon City District, Hong Kong (Photo by the authors)

4 Discussion

4.1 Inclusive design factors

This examination of the policies about and implementation of inclusive design in both cities found that different factors influenced the effectiveness of inclusive design. The field observations and interviews identified several factors. The PPCIES framework comprises six key factors related to the inclusiveness of open space: physiological, psychological, cultural, ideological, environmental and social (Fig. 4). These factors are not independent, but are linked to each other. The physiological factors are the physical conditions and features of different users, regardless of their age, ability or situation. Psychological factors are mental and psychological conditions such as users' preferences, needs and wants. Cultural factors include the values, beliefs, norms, customs, religions, behaviour, languages, user cognitions and user perceptions (Siu, 2003) of individuals and the community, and should be considered seriously, as most of the design issues are affected by such factors. Users' attitudes towards open spaces can be changed in some cases. Ideological factors, which include epistemology, semantic analysis and philosophical tendencies, are the origin and essence of outward appearance; that is, how people think about their surroundings and actions reflects their willingness to change. For instance, in Beijing, many VIPs feel excluded from the community and have little confidence due to their physical and economic conditions. As a result, most of them are unwilling to voice their opinions and to demand

the provision of access to facilities, even when public places are inaccessible to them. Environmental factors can include features of the natural and built environments (Altman & Chemers, 1980). The natural environment refers to physical features such as climate, temperature and terrain. The built environment includes neighbourhoods, communities, infrastructure and other aspects of artificial environments. Social factors include various complex areas such as politics, economics, education, and social and family structures, which are closely connected to cultural factors.

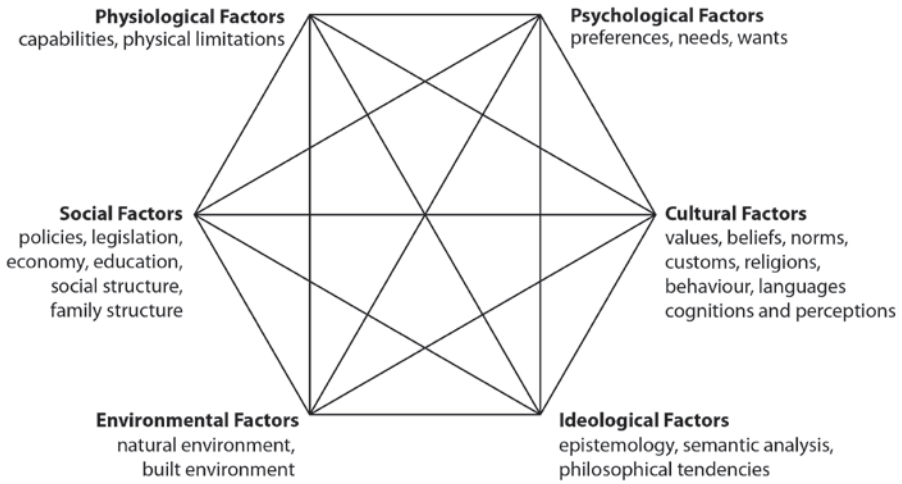

Fig. 4. PPCIES framework (by the authors)

4.2 Implications for policy, implementation and management

This study's findings indicate that there are various barriers preventing VIPs from visiting open spaces in both Beijing and Hong Kong. There are no universal standards in policy, implementation or management due to different local contexts. The factors mentioned above should be discussed on a case-by-case basis. However, some guiding principles are necessary to enhance the effectiveness of the policies, implementation and management of inclusive open spaces. This study proposes a 'FAIR' framework for this purpose.

F (*Flexibility*). The design should accommodate the widest spectrum of individual preferences and abilities. Design guidelines and standards must provide appropriate and flexible choices for users' access and use. Moreover, there should be clear and detailed instructions for developers and builders, making it possible to implement policies in actual settings. In practice, there are many barriers to implementation, such as features of a particular physical environment. Clear and flexible guidance with examples suitable for various situation is necessary.

A (*Accessibility*). An accessible open space aims to provide a barrier-free environment for various user groups – not only individuals with mobility issues, but also

those with sensory disabilities such as the visually impaired. The concept of accessibility runs through the whole process, from planning to implementation and management. Planning should address most of the requirements that directly influence VIPs' access to open space and use of its facilities, and this decision-making process should be mandatory rather than based on vague and recommended requirements. The level of accessibility should be evaluated by the users rather than by experts, designers and policymakers. Effective communication with users is of great importance during the process of implementation and management.

I (*In place*). Inclusive public facilities should be provided in place. Appropriate locations and functions should be selected so that the facilities satisfy the expectations of real users rather than policymakers and designers. Inclusive public facilities should focus on convenience for users, rather than on being decoration. Any broken facilities and other actual barriers should be identified and repaired immediately. Collaborations with users frequently enhances the effectiveness of public facilities.

R (*Reliability*). Ensuring the reliability of the implementation of inclusive design policy is key. First, policies, laws and rules must be promulgated in detail. Next, implementation and maintenance are of great importance to the success of the whole process. Furthermore, as this study has shown, obtaining opinions from users during the early stages of the design process allows different stakeholders to develop ideas together. Public participation in improving the design of open space builds users' trust, which is pivotal to enhancing the reliability of public design.

5 Conclusions

This study contributes to the literature on the inclusive design of open space for VIPs. Comparing two Asian cities with similar cultural contexts – Beijing and Hong Kong – shows that VIPs face various barriers and challenges when visiting open spaces in both cities. This study identifies six inclusive design factors that influence the effectiveness of inclusive design and proposes a 'FAIR' principle to enhance the quality of inclusive design.

To identify the challenges and barriers faced by VIPs who wish to engage in recreation in open spaces and to provide effective implementation of policies promoting the inclusiveness of open spaces, it is necessary to conduct systematic, in-depth research into the particular features and conditions of each society.

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