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[Article title]**Quality Open Space Experiences for the Visually Impaired**

Author 1 Name: Kin Wai Michael Siu

Department: School of Design

University/Institution: The Hong Kong Polytechnic University

Town/City: Kowloon, HungHom

Author bio: Chair Professor & Public Design Lab Leader of Public Design Lab of The Hong Kong Polytechnic University

Author 2 Name: Jia Xin Xiao

Department: School of Design

University/Institution: The Hong Kong Polytechnic University

Town/City: Kowloon, HungHom

Author bio: Research Associate and PhD of School of Design, The Hong Kong Polytechnic University.

Author 3 Name: Yi Lin Wong

Department: School of Design

University/Institution: The Hong Kong Polytechnic University

Town/City: Kowloon, HungHom

Author bio: Teaching Fellow, School of Design, The Hong Kong Polytechnic University.

Corresponding author: [Name] Kin Wai Michael Siu

Corresponding Author's email: m.siu@polyu.edu.hk

Corresponding Author's telephone: 2766 5455

Abstract

Researchers, economists and policymakers have made tremendous efforts to improve the quality of life (QOL) in many cities. While many researchers point out that open space is particularly essential in providing recreation and leisure zones in densely populated areas, it is challenging to enable high quality open space experiences (QOSE) for people with disabilities, especially those with sensory disabilities. Using open spaces in Hong Kong as a case study, this paper defines QOSE for visual disabilities. The study uses quantitative and qualitative research methods such as interviews, questionnaires and observations. The features of current open space experiences and factors affecting QOSE are identified. The results show that the implementation status of QOL improvement strategies stated by policymakers is quite different to visually impaired persons' perspectives. This study further proposes eleven QOSE indicators suitable for the challenges, policy goals and strategies. The findings of this study can provide guidance for researchers, designers and policymakers as they consider how to achieve QOSE for visually impaired persons in high-density living environments.

Keywords: Open space, Policy, Quality of life, User experience, Visually impaired persons

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Quality Open Space Experiences for the Visually Impaired

Kin Wai Michael Siu*

The Hong Kong Polytechnic University / Massachusetts Institute of Technology

Jia Xin Xiao

The Hong Kong Polytechnic University

Yi Lin Wong

The Hong Kong Polytechnic University

* Corresponding author

Address: School of Design, The Hong Kong Polytechnic University, Hunghom, Kowloon,
Hong Kong
Tel: +852-27665455
Email: m.siu@polyu.edu.hk

Quality Open Space Experiences for the Visually Impaired

Abstract

Researchers, economists and policymakers have made tremendous efforts to improve the quality of life (QOL) in many cities. While many researchers point out that open space is particularly essential in providing recreation and leisure zones in densely populated areas, it is challenging to enable high quality open space experiences (QOSE) for people with disabilities, especially those with sensory disabilities. Using open spaces in Hong Kong as a case study, this paper defines QOSE for visual disabilities. The study uses quantitative and qualitative research methods such as interviews, questionnaires and observations. The features of current open space experiences and factors affecting QOSE are identified. The results show that the implementation status of QOL improvement strategies stated by policymakers is quite different to visually impaired persons' perspectives. This study further proposes eleven QOSE indicators suitable for the challenges, policy goals and strategies. The findings of this study can provide guidance for researchers, designers and policymakers as they consider how to achieve QOSE for visually impaired persons in high-density living environments.

Keywords Open space, Policy, Quality of life, User experience, Visually impaired persons

Introduction

Quality of Life (QOL) in Western societies has been widely discussed in various disciplines for decades (Diener & Suh, 1997; Grow et al., 2011; Sirgy et al., 2008). Over the past few years, QOL has gradually received increasing attention in Asia due to rapid urban development (Shek and Lee, 2007; Ng et al., 2017). In Hong Kong, policymakers, researchers and professionals have sought to achieve 'a better quality of life'. According to Mercer's 19th annual *Quality of Living Survey* (2017), Hong Kong is ranked as one of the top 100 cities in the world for quality of life. The Mercer survey measures living conditions based on 10 categories, including political environment, economic environment, health, public services, recreation, housing and so on. In terms of infrastructure, Hong Kong is ranked among the top ten cities in the world, ahead of London, Sydney and Vancouver. Hong Kong offers a good QOL in terms of transportation, reliable electricity, and consumer goods.

High-rise high-density living has become commonplace in many Asian cities, especially in Hong Kong. According to the Census and Statistics Department (2018), the population density of Hong Kong is 6,780 persons per km², and Kowloon district is extremely dense, with 47,750 persons per km². Open spaces such as parks, gardens, promenades and sitting areas are particularly essential to the mental and physical well-being of the public as recreation and leisure zones within such these high-density living environments. In *Open Space: The Life of American Cities* (1977), Heckscher and Robinson suggested that ‘open space’ must have ‘some role, actual or potential, for adding to the quality of life in the cities’ (p. 3). To improve the quality of open spaces and ensure that they are accessible to all, local authorities have introduced various ordinances, rules and guidelines. However, most policy strategies for inclusive and barrier-free design focus on elderly people and those with mobility issues. There has been relatively less focus on those with sensory disabilities such as visual impairment (Siu, 2013). Considering that policy strategies and services related to quality open space experience (QOSE) in Hong Kong are still in their beginning, QOSE design for visually impaired persons is a pertinent and necessary research topic.

Aiming to contribute to fill the research gap, this paper analyses data collected from a 2017 case study in Hong Kong. The paper uses a mixed methods approach involving qualitative and quantitative methods. Visually impaired persons of different ages were recruited for the interviews, questionnaires and field visits. This paper reviews the policy strategies and quality of life for visually impaired persons in Hong Kong. The goal of this study is to define QOSE from the user’s perspective and evaluate factors affecting QOSE in open space. Based on the empirical study, the paper proposes QOSE indicators suitable for the challenges and policy strategies. The findings of this study are expected to provide a reference for researchers, designers and policymakers as they seek to achieve QOSE for visually impaired persons.

Quality of Life and Policy Direction

The concept and issues of QOL in urban areas has been widely discussed for decades (Andrews and Withey, 1976; Blomquist et al., 1988; Diener & Suh, 1997; Ferriss, 2006; Jaśkiewicz & Besta, 2014). In terms of the concept of QOL, it is suggested that both exogenous and endogenous forces should be addressed (Ferriss, 2006). Exogenous forces include social and culture structures, living conditions in the social environment that affect the individual,

community and society, while endogenous forces include emotional, psychological and physiological responses of the individual. QOL is a multi-faceted concept that encompasses objective factors and subjective perceptions such as satisfaction and subjective well-being. According to the World Health Organization (1997), QOL is defined as an 'individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns' (p. 1).

Leung and Lee (2005) indicate that socioeconomic status is not a key determinant for predicting QOL. According to Eurostat (2015), 8+1 dimensions have been defined as a significant framework for measuring well-being. 'Leisure and social interactions' is one of the domains that directly affect subjective well-being, happiness and life satisfaction. Leisure refers to the time that people spend outside their productive activities, while social interaction is considered as 'social capital' for individuals. Leisure activities can significantly contribute to subjective well-being because they provide opportunities for satisfaction and fulfilment (Brajša-Žganec et al., 2011).

The Hong Kong Planning Standards and Guidelines was issued by the Planning Department of the Hong Kong Special Administrative Region (HKSAR) Government in 2015. It documents current trends in terms of the quality of space, principles of space planning, standards and guidelines for the provision of different kinds of recreation and greening facilities in open spaces. One key trend is to provide more open space near homes due to the ageing society, and to improve the quality of facilities. It also states that the visibility of open spaces and the accessibility requirements of all segments of the population, including the disabled, should be taken into consideration. *Hong Kong 2030+: Towards a Planning Vision and Strategy Transcending 2030 (Public Engagement)* prepared by the Development Bureau and Planning Department (2016) was promulgated to engage the public to build a liveable, competitive and sustainable Hong Kong. 'Planning for a liveable high-density city' is proposed as one of the building blocks. The document states:

A quality living environment is one that is compact; integrated; unique; diverse and vibrant; healthy; and inclusive and supportive. It is also a place where green-blue assets are appreciated by the public; where the public space can be enjoyed by all; and where our ageing city fabric is well maintained with timely rejuvenation (p. 23).

Although the phrases ‘inclusive and supportive’ and ‘enjoyed by all’ are related to the concept of inclusiveness, there is no specific recognition of those with disabilities. The key strategic directions of the creation of inclusive and supportive cities in the first building block do not mention the disabled. The document focuses on an elderly-friendly public space in the built environment. According to the Census and Statistics Department (2015), 174,800 people are visually impaired (2.4% of the population). However, due to a lack of in-depth and comprehensive research and policy strategies on the QOL of visually impaired persons, most existing open spaces do not meet the requirements of persons with special needs. The Hong Kong Society for the Blind and Asia-Pacific Institute of Ageing Studies, Lingnan University (2009) have conducted quantitative research on the QOL of visually impaired elderly in Hong Kong. They propose a tool of measurement and QOL indicators covering physical health, mental health, family and community services, living environments, and economic and social status.

Knopman et al. (2015) propose a conceptual framework for the indicator system, identifying the relationships between challenges, policy goals, strategies and indicators (Figure 1). Policy goals are derived from the challenges and are the desired outcome that improves peoples’ QOL within the realm of a government’s mission. A strategy is a policy action (or series of actions) that governments undertake. One or more strategies can be adopted to achieve a goal. Strategies can include the adoption of laws, regulations and guidelines to ensure the provision of public services. Furthermore, strategies need to be continuously updated due to changing conditions, and their effectiveness must be measured using the indicators. This framework linking goals, strategies and indicators is helpful for planning open spaces for visually impaired persons.

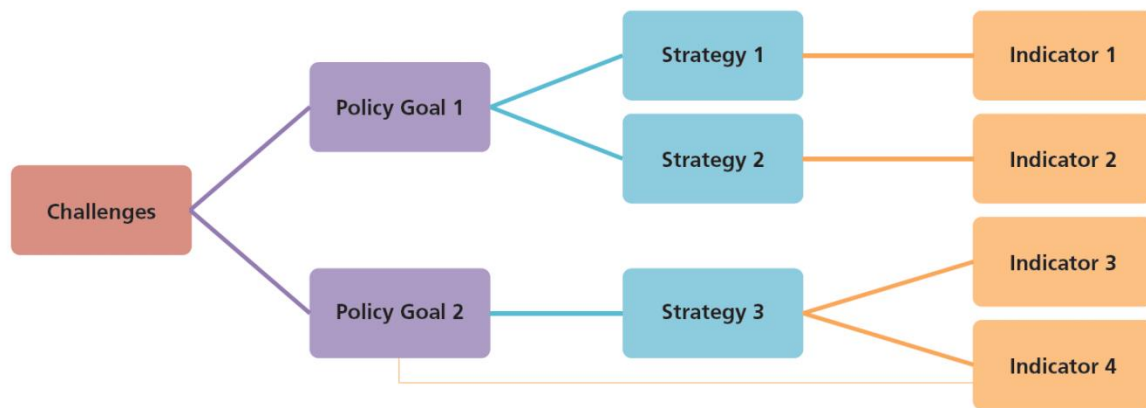


Figure 1. Conceptual framework for the indicator systems (Knopman et al., 2015)

Case Study

Since 2005, the research team has conducted a series of studies on visually impaired persons in Hong Kong. Studies show that a more in-depth qualitative study of QOSE with reference to policy strategies is necessary. The quality of life in Hong Kong is high compared to other Asian cities (Mercer, 2017). Local governments have made considerable efforts regarding barrier-free policies to improve QOL. It is an opportune time to examine QOSE for visually impaired people.

As de Certeau (1984) emphasises, everyday practice provides a realistic perspective to recognise unforeseen possibilities. Merriam (1988) indicates that case studies are an ideal research strategy for understanding and interpreting social phenomena in a variety of real-life settings. An empirical case study on open space quality was conducted in Hong Kong in 2017. While numerous studies have examined QOL using quantitative methods, the Chinese University of Hong Kong develops Hong Kong QOL Index to evaluate the QOL of Hong Kong people based on a mixed-method approach – a combination of official statistics and survey data (Chan et al., 2005). The mixed-method approach provides a comprehensive data source for analysis from different perspectives. Therefore, mixed method approach with both qualitative and quantitative methods was used in the case study. Specifically, in order to value the lively experiences of the visually impaired persons, this study adopted a qualitative approach supplementing with quantitative components. Both the core and supplementary components were conducted simultaneously. The core component was the main approach in the mixed methods. The supplementary component joins alongside with the core component but also merges with it at the point of interface (Morse & Niehaus, 2009). Data collection were conducted through field observation, interviews and questionnaires. Field observations enable researchers to explore what users actually do and describe the phenomena in real-life settings, while interviews and questionnaires enable researchers to identify users' concerns and the factors behind their behaviour (Yin, 1993). Figure 2 shows the research framework of this study.

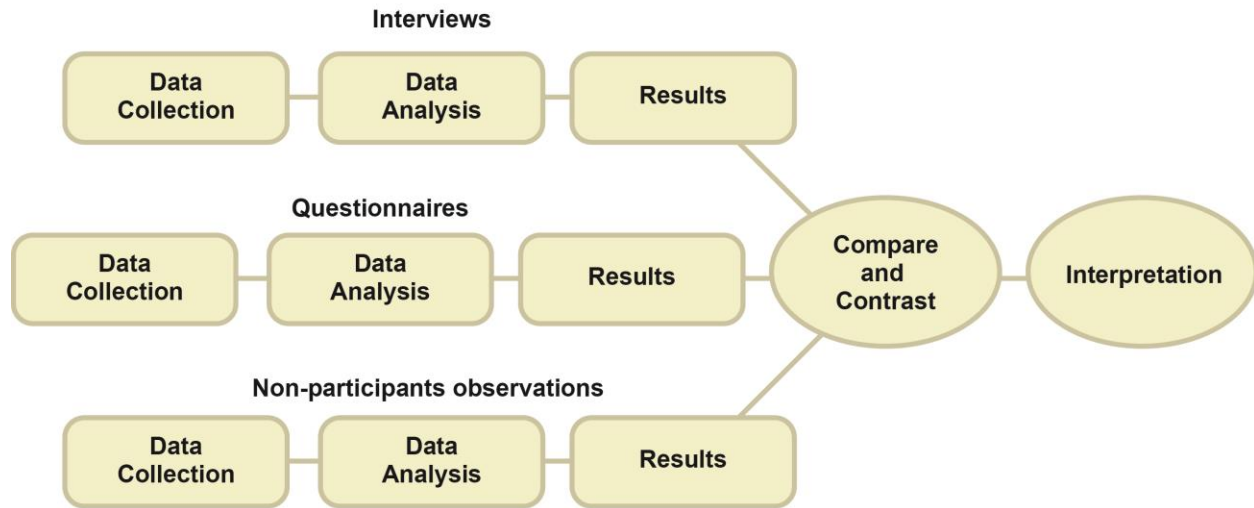


Figure 2. Research framework

Interviews

Semi-structured and unstructured interviews were conducted at different stages during the research process. With the assistance of two non-governmental organisations (NGOs), semi-structured interviews were conducted with visually impaired persons ($N=30$) at different age groups. The in-depth interviews with these respondents provided insight into the QOSE and users' expectations for the open space. The interviews included questions such as 'How do you define a quality open space experience?', 'How do you feel about the existing open spaces', 'Are you satisfied with the current settings in open spaces?' and 'Have you encountered any difficulties in open spaces?' Unstructured interviews, which were closer to 'conversations' than interviews, were held during the field visits to allow participants to freely express their views and attitudes. The interviews were audio recorded and transcribed. Both descriptive and in vivo coding were adopted.

Questionnaires

Questionnaires were distributed to visually impaired persons ($N=82$). The sample of respondents covered different ranges of visually impaired persons in terms of age distribution (aged 15-24: 12 female and 12 male; aged 24-64: 17 female and 16 male; aged 65 and above: 13 female and 12 male). In terms of the educational attainment, 26.83% of respondents had a primary or lower degree, 48.78% had a secondary degree, and 24.39% had a tertiary degree. Due to physical

limitations, visually impaired elderly persons with serious hearing impairments were not recruited for the questionnaires.

Field observations

Observation is a qualitative method that enables researchers to describe situations in real-life settings (Marshall and Rossman, 2011). To explore the quality of daily life of visually impaired persons, six female and six male visually impaired interview participants were recruited for the field visits with researchers. Eight of the participant had lost their vision totally. The participants were between 18 and 72 years old (aged 15-24: 2 female and 2 male; aged 24-64: 2 female and 2 male; aged 65 and above: 2 female and 2 male). In this study, twelve parks of various sizes including small sitting-out areas, neighbourhood parks and district parks were visited. To be convenient to the visually impaired participants and as recommended by the NGO representatives, all of the parks were located near the participants' living areas. In five cases the parks were new to the participants (they had never been there before), while others had visited their park more than once. The observations were arranged in an unobtrusive manner to enable the participants to act freely in the parks. Individual participants were asked to access the parks, and the researchers did not help them unless requested. During the observations, photographs and notes were taken. Some of the participants were concerned about their privacy and were reluctant to be captured on camera, so notes were made to document their actions and comments. The data collected from observations covered the participants' actions, sociocultural context and physical settings (Kwok, 1998).

The QOSE for Visually Impaired Persons

Features of Current Open Space Experiences

In the interviews, the features of current open spaces for visually impaired persons were addressed. The descriptions of current open space experiences are summarised in Table 1. Issues raised in the interviews were categorised according to the following three steps involved in accessing open spaces: (1) prior to entering the park, (2) walking in the park and (3) exiting the park. Most of the interviewees claimed that it was difficult to identify the entrance of the park due to lack of clear guidance. To enhance social equality and provide support for visually impaired persons, local authority design requirements specify that tactile paths must be installed

at park entrances. However, most of the tactile paths¹ failed to meet users' needs, making it difficult for them to identify the park entrance from the main street (Figure 3). Tactile paths are more likely to satisfy local governments than the users.

Table 1 Description of current open space experiences

Current open space experience	
Before entering	Difficult to identify and approach the open spaces, inconvenient location, nervous, some walkways are under-repaired
Walking in the park	Unclear information, no reminder near the exit of carparks, chaotic, feel helpless, dangerous, lack of sensory assistance, difficult to access various places, confused by the tactile surface provided, unacquainted
Exit	Difficult to find the exits, lack of information

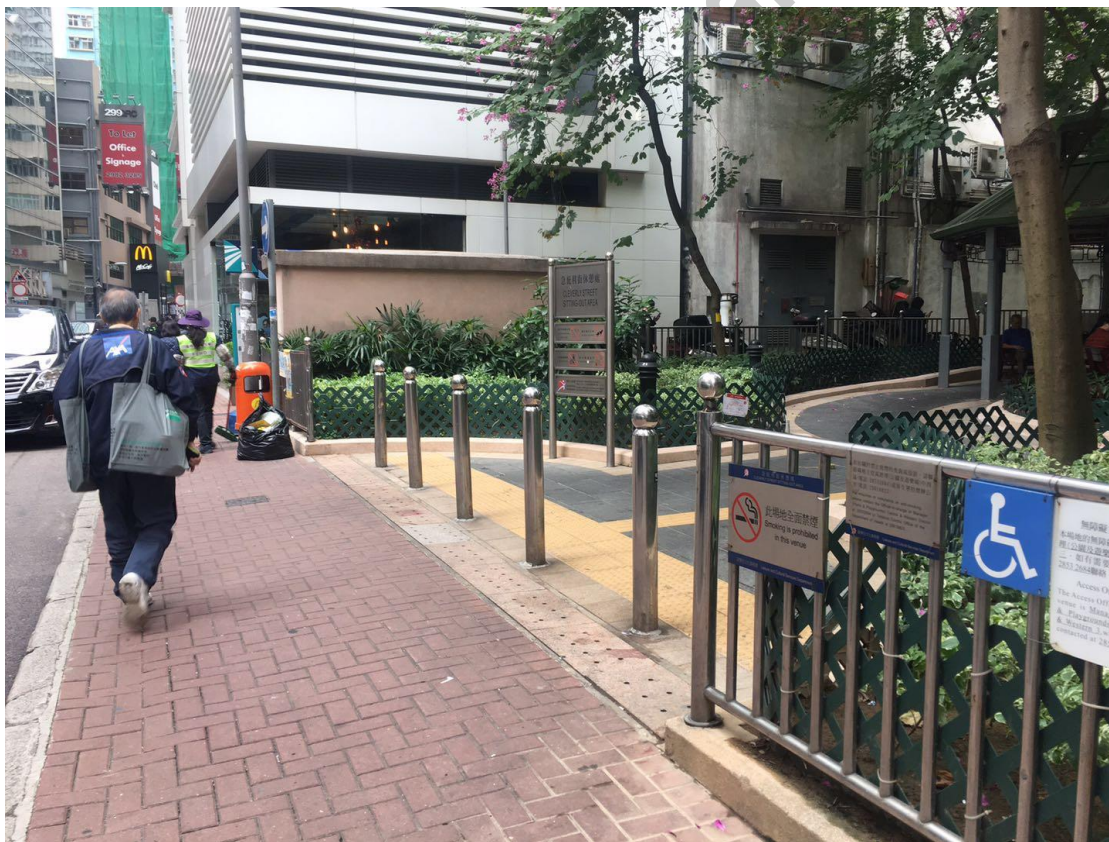


Figure 3. A seating area in Sheung Wan, Hong Kong

¹ Tactile path tiles of three different functions are used in Hong Kong. The functions are to guide, alert and stop the visually impaired persons.

In the field visits, each participant was taken to a location about 20 metres from the park. They were asked to locate the park, enter it and then play or relax for 30-60 minutes inside the park. Of the twelve participants, four failed to locate the selected parks, especially those who were new to the area. Half were slow to approach the places. The other two participants were able to identify the park easily because they went there frequently.

Respondent: Some of the tactile paths are paved inappropriately...and so strange... maybe they imagine we can see the paths!

Some respondents emphasised that tactile paths were one solution, but were not the only way to provide assistance for visually impaired persons. They did not entirely rely on the tactile paths. Nevertheless, most indicated that they use it when they notice it.

Respondent: Most of us have a 'map' in our mind. Generally, we visually impaired persons seldom use tactile paths if we are familiar with the place...the tactile paths are mainly used by the 'freshman' or our first visit.

Respondent: The visually impaired person who goes to parks frequently without any assistance must be a master! S/he must be very familiar with the conditions! Going to the parks is an adventure for me.

In Hong Kong, the walkways should be paved smooth and maintained well to prevent dangerous situations from occurring. In the study the walkways were often in poor repair. Signs and rails were provided to remind passers-by, but they also introduced hazards and inconvenience for visually impaired persons.

Unlike those with normal eyesight, visually impaired persons navigate their surroundings by hearing, touching or smelling when walking. In the observations, visually impaired persons tended to walk along the curbs, flower bases, rails and waysides, which made it easier for them to locate their position and direction (Figure 4). They felt a bit nervous in wide-open spaces where no guidance (e.g., objects, tactile paths) was provided. In this regard, they would only go outdoor for specific purposes. Although most of the respondents mentioned that they were interested in open spaces such as parks, green spaces and sitting areas, some emphasised that they seldom go to a new place themselves without training or assistance. In this study, five participants who were willing to go to new places had been visually impaired for a long time or

had congenital vision loss, and so were well used to their situations. In the process, however, researchers found that they were still a bit nervous when they walked in the parks.



Figure 4. Visually impaired persons tended to walk along the wayside to locate their positions

Barrier-free facilities such as tactile paths, warning strips and braille maps were much more frequently provided in publicly owned open spaces than in privately owned open spaces. In some of the publicly owned open spaces, comprehensive tactile paths were paved to provide guidance to visually impaired persons (Figure 5). However, respondents emphasised that they sometimes had to deal with information overload, and it was observed that they seldom used braille maps provided in the open spaces.



Figure 5. Comprehensive tactile paths were paved to provide guidance to visually impaired persons

Respondent: Providing lots of tactile paths is good for us! However, I find that they often mislead me. It is like a maze! For example, they lead me to the recycling bins and the toilets...but I did not want to go there...I remember once I arrived back at my original place half an hour later after going left and right, back and forth on the tactile paths...

Factors affecting the QOSE

In the interviews, factors such as built environments, barrier-free facilities, physical conditions and psychological factors were frequently mentioned. The interview transcripts were coded and two major categories were identified: contextual factors and personal factors (Table 2). The contextual factors included physical and socio-cultural contexts such as safety and reliability of the access route, the location of open spaces, the number of accessible facilities, provision of guidance, assistance from others and so on. The personal factors included endogenous conditions such as physical condition, familiarity with the location, attainment of orientation training and so on.

Table 2 Factors that affect QOSE

Nature	Factors
Contextual factors	Safety and reliability of access route, ease of access, the location of open spaces, the maintenance of barrier-free facilities, the number of accessible facilities, provision of information, assistance from others
Personal factors	Confidence, familiarity with the location, physical condition, willingness to go outside, attainment of orientation training

Given that personal factors have been widely discussed by many researchers, this study mainly focused on contextual factors. The contextual factors identified in the interviews were used to design a questionnaire on quality open spaces from the perspectives of visually impaired persons. Respondents were asked about the importance of physical elements pertaining to QOSE. All the elements mentioned in the interviews were measured on a five-point Likert scale, ranging

from ‘highly disagree’ to ‘highly agree’. Table 3 shows the ranking of each element. The results show that respondents at different age groups had different concerns about and requirements for the physical elements. The younger respondents strongly relied on portable electronic equipment, whereas the elderly considered devices as less important for walking in the parks. It is rational that the youths are generally more able to use electronic devices and explore new technology. Besides, the younger respondents only identified three elements as important (4.00 and above), while the adults between 25-64 identified five important elements. For the elderly, seven physical elements scored over 4.00. Obviously, older respondents needed more assistance and support from quality physical elements. This also correlates to the findings that adults and the elderly often went to open spaces alone. Without any assistance from friends or family, adults and the elderly would consider physical elements more important for having QOSE. Youths, in contrast, tended to go to the parks with friends or family. They had a higher level of physical ability, and their companions would assist them when necessary. It is unsurprising that they showed less concerns about the elements that address the physical needs. Despite the difference, tactile warning strips, access routes and caution signals were ranked among the top five issues for respondents of all ages.

Table 3 Ranking of the physical elements affecting QOSE

Ranking			Physical elements	Mean		
Age 15~24	Age 25~64	Age ≥65		Age 15~24	Age 25~64	Age ≥65
1	7	13	Portable electronic equipment (e.g., mobile phone, GPS)	4.71	3.47	1.77
2	5	8	Audible sign	4.29	4.03	3.12
3	1	2	Tactile warning strips	4.08	4.53	4.65
4	3	3	Access route	3.92	4.25	4.54
5	2	4	Caution signals	3.88	4.34	4.50
6	6	5	Accessible entrances and exits	3.83	3.97	4.35
7	13	11	Signs with high luminous contrast	3.79	2.63	2.62
8	4	1	Accessible toilets	3.75	4.22	4.69
9	10	9	Tactile paths	3.63	3.09	3.04
10	11	12	Braille and tactile sign	3.38	3.06	2.23
11	9	6	Handrails	3.21	3.31	4.31
12	12	10	Braille map	2.96	2.84	2.77

QOSE and Policy strategies

Over the past two decades, policies for improving QOL for people with disabilities have been promulgated. Local authorities have proposed five major strategies: (S1) adopt the universal design concept to provide a safe and convenient living environment, (S2) provide sufficient and high-quality open spaces within residential areas, (S3) ensure that open spaces can be enjoyed by all, (S4) adopt responsive design concepts and (S5) provide barrier-free open spaces for all including visually impaired persons. Ordinances, regulations, rules and guidelines were promulgated to implement these strategies, such as the Disability Discrimination Ordinance (1995), Design Manual: Barrier Free Access (2008), Building Ordinance (2012) and Hong Kong Planning Standards and Guidelines (2015).

In general, many open spaces are built according to the suggestions of local governments and developers rather than users. Government officers, managers and designers assume that they share the same understanding of QOSE as visually impaired persons, and the open spaces were designed based on the needs of the visually impaired persons. A coordinate system was constructed to show the evaluation of implementation of policy strategies on QOSE (Figure 6). In Figure 6, the X-axis represents the ease of implementation, from easier to harder, while the Y-axis represents the extent of implementation, from lower to higher. The black spots represent the implementation status of strategies from policymakers and designers. The white spots represent the status of the strategies from the perception of users. The five black spots are established using observations and documentation, while the five white spots are established using interviews. The results show that the implementation status of strategies from policymakers is quite different to the perceptions of the implemented strategies held by visually impaired persons. From policymakers' perspectives, policy strategies have implemented at a relative high level. However, according to user's perspectives, most of the strategies are actually still at a low level of implementation. For instance, following S5, tactile maps and paths have been provided at the entrances of many parks (especially publicly owned parks) in accordance with the inclusive guidelines. However, due to a failure to understand users' requirements, most barrier-free facilities and access routes are not designed appropriately. Consequently, many visually impaired persons consider that the policies have been implemented slowly insufficiently. In

terms of ease of implementation, four strategies are considered as middle or easy level from the perception of users, while four are middle or hard levels from the perspective of policymakers.

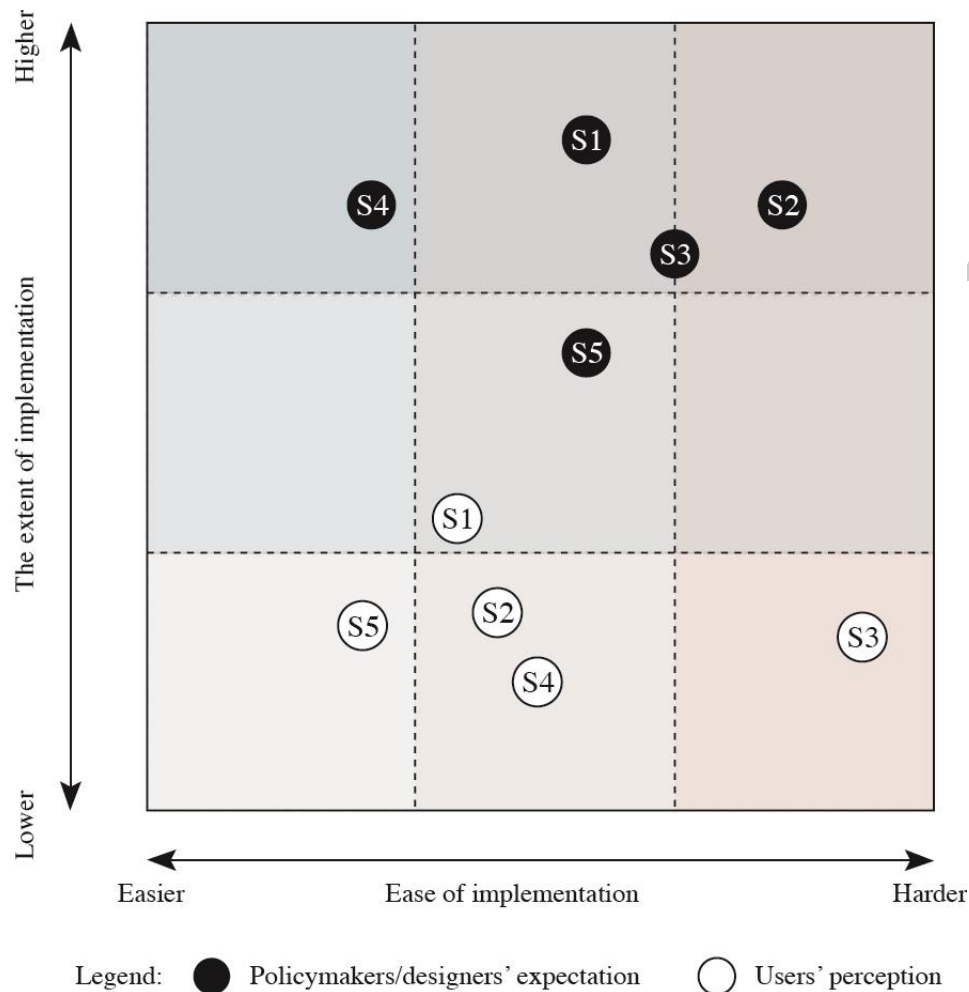


Figure 6. Evaluation of implementation of policy strategies on QOSE

From the case study, it is obvious that there is a gap between policymakers and visually impaired persons on QOSE. To enable a comprehensive understanding of QOSE, following the conceptual framework proposed by Knopman et al. (2015), challenges, policy goals, strategies and indicators pertaining to quality open space for visually impaired persons are illustrated in detail in Table 4. Two main challenges pertaining to QOSE within the particular living situation in Hong Kong are addressed: (1) enhance liveability in the high-density urban context of Hong Kong, and (2) social equality and support for the disadvantaged. Local government further proposes three policy goals. The first is to improve quality of living, especially in public rental housing. A second is to promote socially inclusive and supportive open spaces for all ages and

abilities. The third goal is to ensure that visually impaired persons have equal access to open spaces. A high-quality open space experience for visually impaired persons should not only meet their needs but also balance the interests and desires of various city users. To meet the policy goals and provide high-quality open spaces for visually impaired persons, this study proposes eleven indicators including both objective and subjective indicators of QOSE. Both objective and subject indicators are equally important, as QOL is a multi-faceted concept and should be evaluated objectively and subjectively (Ferriss, 2006).

- *PI1 Satisfaction with the living environment in terms of safety*

Rationale: Due to the dense populated living space, the environment and open spaces in neighbourhoods are of great concern to local governments. Safety is the most significant factor that directly affects QOL for people with disabilities, especially visually impaired persons. The findings from the questionnaires in the case study also showed that safety elements such as caution signals were imperative among visually impaired persons at all ages.

- *PI2 Satisfaction with the living environment in terms of convenience*

Rationale: Convenience is another significant factor that influences people's determination to access open spaces. However, the inclusive design guidelines proposed by government have little consideration for convenience from the user's perspective. All the subjective items can be measured on a five-point Likert scale, ranging from 'very poor' to 'very satisfactory'.

- *PI3 Average distance (travel time) to open spaces*

Rationale: The distance to open spaces is directly related to convenience. It is an objective factor that evaluates whether there are sufficient open spaces within the residential area. The distance should be measured by the travel time to the space (e.g., 5-10 minutes' walk; 10-20 minutes' walk), rather than the distance (e.g., 500 metres; 1000 metres). As in the case study, the respondents spent a long time to approach the spaces, although the walking distance to the spaces is just 20 metres. Travel time to the space is more critical for the visually impaired persons.

- *PI4 Satisfaction with the location of open spaces*

Rationale: PI3 is an objective indicator, and PI4 is its subjective indicator to evaluate the location of open spaces. The findings from the field observation in the case study also

suggest that the satisfaction level with the location of open spaces affects user's enjoyment in the park. Satisfaction with the location of open spaces can influence users' leisure activities in everyday life.

- *PI5 Satisfaction with the quality of open spaces and the facilities*

Rationale: This indicator is a direct measure of the QOSE from the user's perspective. The data source should include the widest spectrum of people, regardless of age, ability and situation. It encapsulates one's overall impression of and satisfaction with open spaces.

- *PI6 Satisfaction with open spaces in terms of access and use*

Rationale: To evaluate the implementation of policies pertaining to social equality, it is necessary to investigate the level of accessibility and usability from the user's perspective. The gap between policymakers and visually impaired persons found in the study is a solid evidence to show the importance of involving user in the evaluation. The data source should include the widest spectrum of people. This indicator provides a reference for accessible design for visually impaired people that does not affect the satisfaction of others.

- *PI7 Percentage of people at different ages and abilities access open spaces*

Rationale: It is important to survey existing users from an objective perspective through observations and questionnaires, as in the case study of this paper. The number and percentage of people at all ages and abilities in open spaces can reflect the situation of inclusive design, whether the design is really open for all and used by all in practice.

- *PI8 Satisfaction with the barrier-free facilities and services inside the open spaces*

Rationale: This is a direct measure of the quality of barrier-free facilities from the perspectives of different people. As users at different ages have different needs for the physical elements in open spaces, as suggested in the study, and users with different level of capability also have different needs for the barrier-free facilities, the data source should include the widest spectrum of people., regardless of age, ability and situation. It is best predicted using evaluations of satisfaction with the guidance provided, satisfaction with access routes, satisfaction with tactile warning strips, satisfaction with the accessible toilets and so on.

- *PI9 Percentage of open spaces provided with barrier-free facilities for people with disability*

Rationale: The indicator calculates the number and percentage of open spaces with barrier-free facilities, and should include publicly owned and privately owned open spaces. The case study also shows that the provision of barrier-free facilities is an important factor for having QOSE. The open spaces should cover a wide range of inclusive public spaces such as community parks, neighbourhood parks, district parks, squares, gardens and sitting areas.

- *PI10 Percentage of visually impaired persons access open spaces*

Rationale: To identify whether the barrier-free open spaces are beneficial to visually impaired persons, the number and percentage of visually impaired persons should be analysed from the questionnaires. Open spaces with high quality barrier-free facilities would attract more visually impaired persons as well as other users. Furthermore, the frequency of open space access can be investigated.

- *PI11 Percentage of visually impaired persons who are satisfied with the open spaces as well as the facilities*

Rationale: This is a direct measure of the quality of open spaces and facilities from the perspective of visually impaired persons. The data source can be further divided by age, physical condition (e.g., low vision, blind), attainment of orientation training and so on.

Table 4 Challenges, policy goals, strategies and proposed indicators for QOSE

Challenge 1: Enhance liveability in the high-density urban context of Hong Kong	
Policy goals and Strategies	Proposed indicators
PG 1: To improve quality of living, especially in public rental housing	
S1 Adopt the universal design concept to provide a safe and convenient living environment	PI1 Satisfaction with the living environment in terms of safety
	PI2 Satisfaction with the living environment in terms of convenience
S2 Provide sufficient and high-quality open spaces within residential areas	PI3 Average distance (travel time) to open spaces
	PI4 Satisfaction with the location of open spaces
	PI5 Satisfaction with the quality of open spaces and the facilities
Challenge 2: Social equality and support for the disadvantaged	
Policy goals and Strategies	Proposed indicators
PG 2: To promote a socially inclusive and supportive open spaces for all ages and abilities	

S3 Ensure that open spaces can be enjoyed by all	PI6 Satisfaction with open spaces in terms of access and use PI7 Percentage of people at different ages and abilities accessing open spaces
S4 Adopt responsive design concepts	PI8 Satisfaction with barrier-free facilities and services inside the open spaces PI9 Percentage of open spaces provided with barrier-free facilities for people with disabilities
PG 3: To ensure that visually impaired persons have equal access to open spaces	
S5 Provide barrier-free open spaces for all including visually impaired persons	PI10 Percentage of visually impaired persons accessing open spaces PI11 Percentage of visually impaired persons who are satisfied with the open spaces and facilities

Conclusion

Leisure is a significant domain that directly affects subjective well-being, happiness and life satisfaction. In Hong Kong, the government, including district councils and local communities, has introduced barrier-free policies to improve QOL. However, it is challenging to improve the QOSE and ensure that open spaces can be accessed by all. This study contributes to the qualitative literature on QOL studies for visually impaired persons in Asian cities, which has tended to focus on policy strategies and open space experiences in densely populated living environments.

This paper defines QOSE from the perspective of users in open spaces. The features of current open space experiences and factors that affect QOSE are identified. The findings show that there has been a lack of consideration of QOL from the perspective of visually impaired persons, resulting in the emergence of open spaces that do not meet users' needs and expectations. There is also a pressing need to understand the interests of the visually impaired persons when using open space. This paper compares five policy strategies related to QOL through interviews, observations and documentation. The results show that the stated implementation status of strategies by policymakers and designers is quite different to users' perceptions of those implemented strategies.

Based on the findings and results generated from the mixed-method approach, this paper further proposes several indicators of QOSE for visually impaired persons in accordance with the identified challenges, policy goals and strategies. Both objective and subjective indicators are included. It contributes to the existing indicators and measure tool of QOL for visually impaired persons, especially in the domain of leisure and social activities. It also suggests that high-quality open space experiences for visually impaired persons also provide a suitable way to balance the interests of different city users. It provides guidance for researchers and policymakers to consider how to achieve QOSE for visually impaired persons in densely populated areas.

Admittedly, there are still some difficulties in measuring the QOL of visually impaired persons, but preliminary results show that it is worth considering culture and leisure activities alongside socioeconomic development. Long-term and continuous studies with more informants should be conducted on visually impaired persons and people of all ages and abilities. Future research should examine the proposed indicators through further in-depth empirical studies involving more participants.

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