Evaluation And Suggestions Of The Environment And Facilities Of The Window Of Canton In The Epidemic Situation

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Abstract. As a unique component of the urban greening system, waterfront green spaces play a crucial role in creating a healthy living environment and meeting urban residents' growing demand to be close to nature, especially during the COVID-19. This study takes the waterfront green space of the Window of Canton, a landmark building on the southcentral axis of Guangzhou as an example to evaluate the response of the environment and facilities to the epidemic situation, especially during the COVID-19, through thorough investigation and interview. The existing problems and reconstruction measures are put forward based on the investigation results. Results show that the Window of Canton has a pleasant environment but some limitations in epidemic protection. The functional zones including recreation areas, training and exercise areas, children's play areas, and rest and quiet areas are suggested to meet the needs of different groups of people. Moreover, species were increased to enhance the park's aesthetics and enrich people's visual experience. It is necessary to build a systematic epidemic prevention strategy and an integrated epidemic prevention system to ensure people's health during the epidemic period.

Keywords: Evaluation, Environment, Suggestions, COVID-19, Waterfront Green Space, The Window of Canton.

1. Introduction

As a unique form of space in the city, urban waterfront green space is an integral part of public open space. It has the ecological functions of purifying air sewage, containing water, improving the microclimate environment, etcetera. It is the environmental lung of the city and an essential part of the urban ecological green corridor. As a unique component of the urban greening system, waterfront green spaces play a crucial role in creating a healthy living environment and meeting urban residents' growing demand to be close to nature[1]. The waterfront is ideal for residents to de-stress, exercise, and relax with its unique natural landscape. The good waterfront green space could meet the demand of people to close the water and upgrade the landscape grade of the whole city.

Nowadays, the new crown pneumonia epidemic has led people to reflect on the impact of urban space design on human lifestyles and living environments. As one of the critical built environments in cities, waterfront space carries the function of people's activities and public interaction[2].

The COVID-19 epidemic has linked urban construction to public health and made people re-examine the relationship between the urban built environment and human health[3]. At the same time, as the epidemic restricted residents from traveling long distances for extended periods, more people opted for nearby outdoor spaces. Waterfront green spaces became one of their choices[4].

The Window of Canton lies on the first bank of the Pearl River, with a superior geographical location. At the same time, the utilization of waterfront space in Guangzhou is facing a series of practical problems[5]. Most waterfront space construction is mainly in an idle state, which does not give full play to the vital role of promoting public health[7]. With the epidemic developing typically, the spatial design optimization of urban waterfront green spaces should be considered and studied in the post-epidemic period to enable people to engage in outdoor activities effectively. This study takes the Window of Canton as an example to explore how to arrange the waterfront green space better and

set up the landscape to keep people socially distant. It is of positive significance to explore new strategies and methods for transforming and enhancing waterfront green spaces and exploring their health promotion value to solve urban public health problems[8].

2. Methods

2.1 The Questionnaire Design

This study conducted a questionnaire survey on the use of waterfront green space after the epidemic in the Window of Canton. The number of respondents is 100, and they are primarily people in the immediate workplace and the surrounding community. Most neighborhood workers are 19-40 years old according to the questionnaire. The kind of this crowd mainly comes to the green space at noon and afternoon on weekdays to chat or have a rest and lunch at nearby coffee shops. The rest of the older age groups, such as those who live in surrounding communities would like to come here to exercise or go for a walk after dinner or breakfast.

The questionnaire includes three parts: basic information about the survey objects, evaluation of the facility, and evaluation of the use of the Window of Canton. It also includes the use of the pandemic.

The first part about the people's basic information includes 8 questions.

(1) The age of survey objects;
(2) The status of survey objects, such as students, employees, the retired, tourists, or locals;
(3) The following modes of transportation include walking, sharing bikes, subway, and car;
(4) The time needed to come here and the available time to stay here;
(5) The time of day when respondents frequently visit;
(6) The reasons the following for being here include work, passing by, and leisure;
(7) The evaluation of the public environment of the Window of Canton;
(8) The cost time that respondents come to this green space often.

The second part about the usage of Window of Canton during the epidemic includes 4 questions.

(1) The impacts of the pandemic on green space use of social distancing;
(2) The opinions of respondents on epidemic marking and disinfection facilities;
(3) The impacts of the pandemic on how often respondents come here;
(4) The affection of the stay time of respondents by the epidemic.

2.2. The Interview

The study interviewed 4 people in the Window of Canton. They are a nearby male worker, a woman with her daughter, and two women. The interview questions include the time they got here, the things they do here, and the suggestions for the facilities.

3. Results

3.1 Questionnaire Results

The age composition of participants in the study are ranging from 19 to 60 years old. Around 60% of participants come to the Window of Canton on weekdays, and 40% come on weekends. (1) According to our survey results, 6% of the age group is 7-18, 39% of the age group is 19-40, 41% of the age group is 41-60, and over 60 years old is 14% (Figure 1a).

(2) The respondents who always come to the Window of Canton on weekdays are 61.82%, and 38.18% of the population go over on the weekend (Figure 1b).

(3)12.56% of the residents think this waterfront is strongly opposed to going out; 56.30% of the residents think they decide whether to go out according to the flow of people in the outdoor space; 31.14% of the people think they go to the outdoor space (Figure 1c).

(4) The time residents spend within half an hour is 23.64%; more than half an hour within an hour is 59.09%; more than one hour is 17.27% (Figure 1d).

(5) The number of people to go to the waterfront green space by walking is 39.09%; by bicycle or electric car is 44.55%; by public transportation modes, such as the subway, the bus is 15.45%; by private car is 0.91% (Figure 1e).

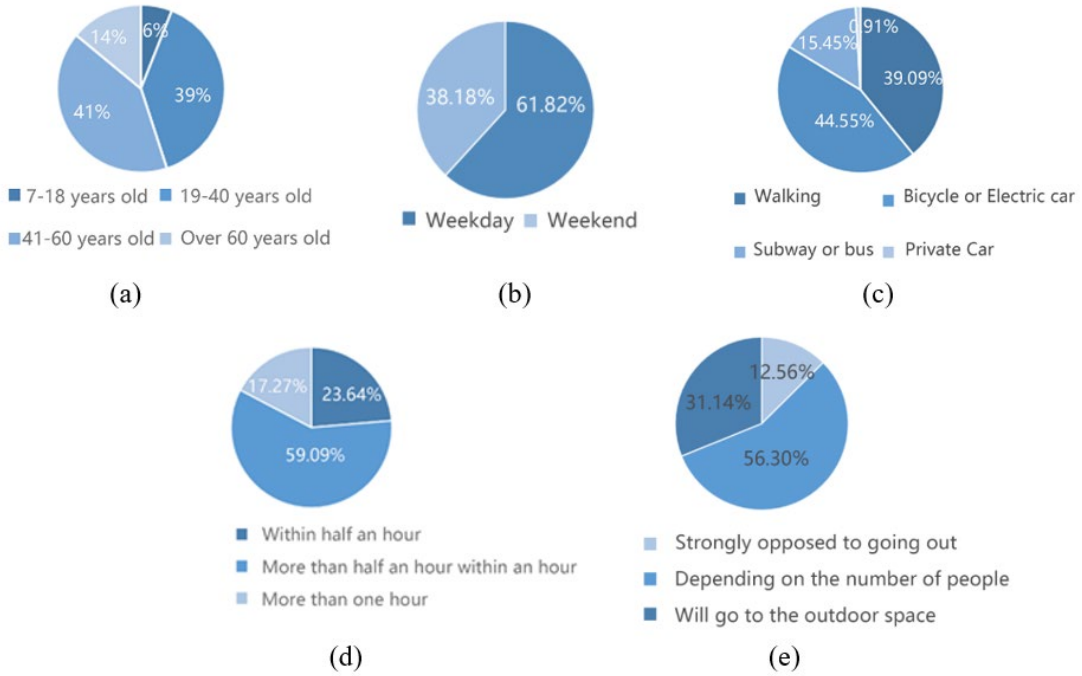


Figure 1 (a) The Age; (b) The Day; (c) The Transportation; (d) Length of time to stay; (e) View of the user

3.2 In-Depth Interview Results

(1) A nearby worker

He may come here to have their lunch breaks and drink coffee in the beachfront green space. He thinks the promotion of the seat and zone should be implemented (Figure 2a).

(2) A Woman with her daughter

She may usually come here with her daughter on weekends. She thinks there is a lack of children's amusement facilities (Figure 2b).

(3) Two women

They come here every day for a walk in the morning and night. They noticed the creation of the Window of Canton. They can notice the control work of the Window of Canton, such as checking tourists' codes before entering. They both think there should add children's amusement facilities and add more shade facilities to provide shade (Figure 2c).



(a) (b) (c)

Figure 2 (a) Nearby workers; (b) A woman with her daughter; (c) Two women

4. Discussion

4.1 Impressions And Attitudes Of Respondents On The Window Of Canton

As for the advantages, the interview results show that the nearby workers feel comfortable and quiet in the Window of Canton. The results of the nearby residents feel close, large space, fresh air, and pleasant environment with the Window of Canton. As for prevention and control measures, the health codes were checked at the entrance, and some felt there was a lack of protection measures and signs. Additionally, there are temperature checkpoints and epidemic prevention signs, as well as epidemic prevention signs at the entrance (Figure 3).

As for the disadvantages, views vary from person to person. The results show that the surrounding workers are used to doing daily activities here, such as walking, chatting, and drinking coffee there. They think the transportation is not very convenient and the facilities are not so perfect. They suggested that some rest seats and activity facilities could be added. In addition, the nearby residents were used to taking their children there on weekends and suggested that some children's rides could be added, as well as the lack of shading. They also suggest improvements to the waterfront trail.





Figure 3 Temperature checkpoints

4.2 Evaluation Of The Window Of Canton And Problems

The structure of the waterfront green space has a single function, and the waterfront space with leisure and relaxation cannot play its role. There are patches of lawn greening and low shrubs geometrically planted in the Window of Canton. This kind of landscape design seems to meet the visual requirements of waterfront space landscape greening, resulting in crossing space more stay spaceless. At the same time, it does not achieve the visual feeling of landscape with different steps and scenery. The function of landscape form thus is single, which cannot meet the diversification needs of waterfront space functions and activities [9].

The waterfront trails within the plot are short and lack a connection between people and water, making it difficult for residents to carry out healthy behaviors in the waterfront space. The poor accessibility of the waterfront space leads to its distance from the residents' life, and the monotonous layout of the node space does not attract people to gather. The Window of Canton is a waterfront green space that forms an axis with the surrounding ancestral halls and is a critical leisure place for the residents. With the rapid development of urbanization, the waterfront green space is gradually replaced by buildings and roads, with less consideration for users' activities. Therefore, the waterfront space gradually loses its living function[10].

The construction of public activity facilities has become an essential attraction for the crowd, and fitness and sports facilities are desirable to the surrounding residents [10]. However, the Window of Canton waterfront green area lacks public activity facilities and cannot meet the leisure needs of residents. The functional zoning is not apparent, resulting in a poor user experience.

The lack of epidemic safety is reflected in control during the epidemic and the interior landscaping. During the COVID-19 epidemic, the waterfront green space of the Window of Canton is mainly set up with epidemic prevention and monitoring points at the entrance and exit to manage people entering and leaving. However, there is no interpersonal distance control within the actual green space, and there are no signs to remind people of the social distance. Although the space inside the green area is relatively open, the lack of proper management and reminders may pose a risk when people neglect to maintain social distance during their activities during use.

To sum up, the renovation and improvement of the Window of Canton's waterfront green space can be firstly reflected in the structural functions, water-friendly walkways, public activity facilities, and epidemic prevention and control work.

4.3 Suggestions For Improvement

As for modern cities, it is best to take a humanized perspective based on the actual needs of the area's residents. For example, it is suggested to make spaces in front of parks, squares and businesses, trees and walkways into high-quality shared spaces, to build humanized streets and diversified spatial interfaces, and to inject new vitality into the area. Creating shared spaces in the waterfront space forms a space for people to gather, thus better performing its role and increasing the connection with the river[10].

4.3.1. Create Different Activity Spaces To Create Active Spaces

Considering that various activities require other venues and facilities, it is recommended that the other activities be divided into four areas, including recreation areas, training and exercise areas, children's play areas, and rest and quiet areas.

The entertainment zone provides people with an open space for picnic and entertainment, including various functional needs, such as picnics and flying kites. As for the epidemic situation, therefore, set up the landscape such as trees or shrubs between the single picnic areas based on keeping social space.

The activity and exercise area mainly provides some exercise facilities to the nearby residents and arranges popular facilities considering the residents' different ages. For example, light exercise fitness is equipment equipped with suitable fitness equipment for the elderly, such as strength training type (Figure 4a), aerobic type (Figure 4b), and massage stretching type (Figure 4c).

The children's play area specifically meets children's entertainment by placing children's play facilities and a small opening square.

The resting and quiet rooms mainly provide basic seats to give a soft and comfortable space for relaxation.

4.3.2. Increase The Richness Of Plant Species

The design of the landscape environment should be as rich and diverse as possible so that people can generate various imaginations through the landscape environment and thus relax their bodies and minds.

At present, the main focus is on greenery to form a green park space, where different kinds of flowers can be planted to increase the ornamental experience of users. For the green layout of the waterfront green space, the park should retain low shrubs and grow flowers to enrich the plant landscape[11]. At the same time, the garden should plant tall tree species, such as banyan trees(Figure 5a), that meet Guangzhou's climate to create a boulevard[12], ensuring the vitality of the waterfront green space, and providing shade places[13]. In addition, rich species can provide multi-layered visual senses, such as planting kapok trees (Figure 5b). The red flowers give a visual impact, but the origin of the "hero tree" also makes the decorated city both heroic and sense of power. Through the combination of different characteristics of the community, the space of the collection and release, open and contained, the park can form a variety of small spaces and richly varied and beautiful forest edge lines with orderly entry and exit, sparse and dense. The waterfront green landscape is a belt-like landscape zone, through the combination of different forms, tall and short species, forming a beautiful forest canopy line. When setting up greenery, it can be arranged in the geometric form to enclose, and the enclosure gives people a friendly space to stay and a square space to move around. For example, the enclosed plaza formed by planting enclosed plants in the renovation plan of St. John's Park opens up more resting space for pedestrians (Figure 5c)



(a) (b) (c)

Figure 4 (a) Strength training type; (b) Aerobic type; (c) Massage stretching type



(a) (b) (c)

Figure 5 (a) Banyan Tree; (b)Kapok Tree; (c) St. John's Park

4.3.3. Create Slow-Walking Trails

The Window of Canton is located on the Pearl River. Use the waterfront function to create water-friendly and slow-walking trails and slow walking trails for leisure and recreation to connect with external roads. At the same time, it is suggested to strengthen the connection between different areas, integrate the scattered roads in the area, and build a slow walking system in the area.

Walking is the most common activity in green areas and the most convenient health activity[14]. A sound pedestrian system can guide more people to walk, which is beneficial to promoting public health. In addition to integrating scattered paths in the area, the comfort of walking can be enhanced by paving. The application of barrier-free facilities should also be considered, making the walking system more humane and meeting users' people's needs with different mobility abilities [14].

4.3.4. Improve The Signage System To Improve The Security Of Epidemic Prevention

During the epidemic, waterfront green areas should adhere to a systematic epidemic prevention strategy and build an integrated epidemic prevention system of their epidemic prevention and linkage within and outside the park. It is recommended to set up epidemic prevention and monitoring points at the entrances of green areas to ensure people's safety through entrance control such as scanning codes, temperature measurement, and disinfection. In dynamic linear space need to control the safety distance of people in space movement. For example, road space marking safety distances using linear ground signs is observed.

The innovative design of ground signs in green spaces is encouraged to convey humanistic care through creative design based on the function of epidemic prevention and indication[14]. For example, the ground signage system of the neighborhood in Paris epidemic prevention and control uses people in the form of waves to remind people to keep a safety distance of 1m (Figure 6). When setting up a static resting space, the social distance can be controlled by the spacing setting of the seats. Also, respondents that bring pleasantness, such as movable flowers, are used instead of ordinary warning

signs when maintaining the interaction distance when the seats are in use [14]. Inactive faceted use spaces, such as picnic areas, interaction distances are controlled by delineating activity areas. In addition, Brooklyn's domino park also uses a similar scheme. The green space manager at Domino Park has designated white social distance circles on the lawn to provide visitors with a visual orientation to the park and ensure that visitors have a good time outdoors at a safe social distance (Figure 7)



Figure 6 Paris Neighborhood Floor Anti-epidemic Signs [14]



Figure 7 Brooklyn's domino park's social distance circle

5. Conclusion

One hundred questionnaires and four field interviews are conducted to evaluate the waterfront green space in the Window of Canton during the epidemic period and investigate its advantages and disadvantages.

The questionnaires include evaluating the use of waterfront green space and the suggestions for epidemic prevention measures of waterfront green space. Most of the respondents agree that the Window of Canton has a pleasant environment. As for the protection facilities, there are some parts to improve.

The different functional elements and the real problems of the Window of Canton are categorized and summarized. It is found that the waterfront space has real issues such as single function, insufficient space suitability, unsystematic road network, lack of activity facilities, and imperfect prevention. These problems lead to residents' lack of good activity experience in the waterfront green space.

This paper puts forward suggestions for renovation and upgrading for the issues found above. According to the principle of reasonable functional zoning, each applicable zoning does not interfere but keeps connected with each characteristic. According to the zoning and artistic layout, representative landscapes can be formed to meet the activity needs of different people as much as possible. At the same time, trees and flowers suitable for the urban climate are added to the park to enrich people's visual experience. Adhering to the principles of land and tree suitability and biodiversity, it is suggested to increase the heterogeneity of the landscape and create a stable plant community. Restore the degraded natural ecological functions of urban waterfront green areas to achieve sustainable landscape development. In addition, public activity facilities cannot meet the daily needs of the public, and the type is relatively single. It is necessary to increase the number of fitness equipment for different people, create a functional space, and enrich people's spiritual lives.

In addition, the epidemic prevention work needs to increase the sign pictograms and disinfection equipment to ensure the security of epidemic prevention in the park.

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