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STUDY ON THE PREFERENCE OF SENIOR CITIZENS IN URBAN PARK PUBLIC FACILITIES

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Abstract

As aging has become one of the social trends in many countries and regions around the world, the urban park environment for senior citizens' activities and social places has become one of the concerns. This study explores the preferences of senior citizens for the use of public facilities in urban parks. Through six non-participatory observations of the use of public facilities in the park by the elderly in Taipei Daan Forest Park, Taiwan, it was found that the public facilities most used by the elderly in the park were seats, followed by green space, then Trails and gazebos, In addition, through the chi-square analysis, it is found that the gender distribution of the elderly users in the physical fitness facilities and the bird watching area is significantly different, the proportion of male users is higher than that of females, and the gender distribution of the elderly users in the green space active areas also exists significant difference, namely the proportion of female elderly users is higher than that of males. The study found that it can provide some reference for urban park planners, park planning departments and park managers.

Keywords

City Parks, Public Facilities, Senior Citizens, Preferences, Park

1. Introduction

The aging population has become an important issue facing many countries in the world. Taiwan is one of the world's most rapidly aging region, according to Taiwan's Population Estimation Report notes that in March 2018 the proportion of aging population in Taiwan has more than 14%, formally entered an aged society, the number of seniors over 65 years was 3.43 million (National Development Council, 2018) .

After retirement, the elderly have more leisure time. They are more involved in various leisure and social activities in the park green space. As Thompson (2002) points out, the group that most needs park green space and its public facilities is mainly old. Urban parks are an important environment of space that the elderly to entertain and play, they provide people with activities and environments beneficial to their physical and mental health (Wolch, Byrne, & Newell, 2014)，and have an irreplaceable role in improving the quality of life for the elderly.

However, it greatly affects the quality of life of the elderly whether the planning and design of various public facilities in the park meet the behavior and use needs of the leisure activities of the elderly. Therefore, research on the public facilities of the park has become one of what people are concerned about.

In recent years, the academic community has conducted case and empirical research on the public facilities of park green space from the perspectives of satisfaction of public facilities use, the safety of public facilities, the failure rate of public facilities, users of public facilities, public facilities design, etc. For example, in terms of satisfaction with the use of public facilities, Xin-Bei (2006) studied the satisfaction of park recreation soft and hard facilities. It was pointing out that gender, education, and age have great differences in public facilities satisfaction. Women, young and middle-aged people have relatively high satisfaction with public facilities. Tien-Lin (2011) explored the satisfaction of senior citizens on the design of park trails from a universal design perspective, and proposed suggestions on improvement of trail width, height and slope, and pavement quality. In terms of crowd use and usage in public facilities, Duan, Wagner, Zhang, Wulff, and Brehm (2018) pointed out that elderly prefer walking in Hong Kong, and casinos and fitness facilities are used relatively frequently. Chow,

McKenzie, and Sit (2016) study found that the majority of people entering the park were adults and the elderly, and more men than women. The study also found that more than 60% of people used park fitness facilities for physical exercise. In terms of public facilities impact factors, Cohen and Eimicke (1998) pointed out that users' demand for park green space public facilities are affected by the "clean", "safe" and "playing facilities", etc. Especially the "safety" factor is the most important. In terms of public facilities design and facility layout planning, Chang and Liao (2011) discussed the distribution of public facilities in the park from the perspective of spatial distribution and proposed a facility distribution method for accessibility and mobility. In addition, Gong, Mao, Qi, and Xu (2015) survey of the satisfaction of public facilities in the park pointed out that due to the increasing usage frequency of fitness facilities by the park visitors, many fitness facilities were seriously damaged or often malfunctioned.

However, despite the multi-angle study of public facilities in the above-mentioned research, some discoveries have been made. Nonetheless, in the context of global ageing, research on the use of public facilities in parks for the elderly is still Slightly insufficient. Only by doing a basic observational study and understanding of the use of public facilities for the elderly, can we further understand the problems of the existing public facilities. And finally, improve the design and planning of the public facilities of the park according to the preferences of the elderly. Providing a good park environment and improving the use of park facilities for the elderly. Therefore, the purpose of this study is to understand the preferences of senior citizens for various public facilities in the park, as well as to understand the differences between male and female elderly about this, and hope that the research results will be used for the planning and management of parks, especially the planning and layout of the public facilities part can play a certain reference role.

2. Methods

2.1 Location

This study was based on the Taipei Daan Forest Park, Taiwan, and was targeted at seniors who were active in the park. This park is located in downtown Taipei (Fig 1.), on March 29, 1992, officially open public use, an area of about 26 hectares, was the largest park in downtown Taipei. It has various public facilities, including the Central Park set a bandstand which can accommodate 900 people, public seatings, children's playground, physical health facilities, basketball courts, bird-watching area, wood carving viewing area,

underground parking, 12 gazebos , 6 public telephones, public toilets , red clay jogging track, bicycle lanes, etc.

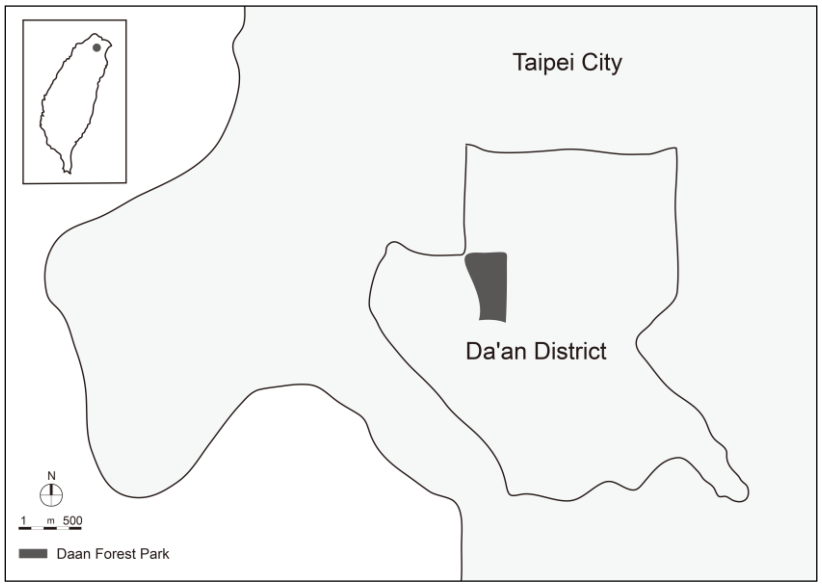

Figure 1: *Park location. By the author*

2.2 Observation Method

Berry (1989) pointed out that observation is one of the most important ways to study human behavior. Through the observation of user behavior, rich user behavior information can be obtained. Therefore, this study used non-participatory observation methods to observe the use of the elderly in public facilities in Taipei Daan Forest Park, Taiwan. This observation amounted to 6 times, each of which was 2 hours long, and the observation time was mainly in the morning (9-11 a.m.), the afternoon (2-4 p.m.) and the evening (5-7 p.m.), which included a working day with a weekend. The main content of observation was the number and gender of an elderly group who used various public facilities. Before the observation work began, the researchers first conducted a review and induction classification of public facilities in Taipei Daan Forest Park, Taiwan. The specific designation of each public facility refers to the division of public facilities in Taiwan (Construction and Planning Agency Ministry of the Interior, 2016), Taipei Daan Forest Park public facilities and their classification are shown in Table 1. The researchers then conducted a fluid observation based on the distribution of public facilities in the park. The recording method is based on the pre-made facility classification table, and the researchers

directly record the number of elderly people and gender records in the paper documents. Figure 2 shows the photos taken during the live observation. In addition, the researchers used a chi-square analysis to examine the distribution of gender among different users in each public facility.

Table 1: *Classification of Public Facilities in Taipei Daan Forest Park, Taiwan. By the author*

Transportation Facilities	**Branding facility**	**Recreational facilities**	**Health facilities**	**Service Facilities**	**Communication facility**
Red clay jogging track Trail bicycle lane	Park floor map Directional sign	Open air music station Gazebo Seat Children's playground Ice rink Woodcarving viewing area Green space activity area Bird watching area Basketball court Physical fitness facility	trash can Public toilet	Park management room	public phone

Figure 2: *Elderly People using Green Space activity Area. By the author*

3. Results

3.1 Population Basic Characteristics Statistics

In this observation, the researchers observed a total of 641 elderly, including 324 (50.55%) males and 317 (49.45%) females, as shown in Table 2. Table 2 shows that the highest number of male-aged people using public facilities in the park is in the evening, reaching 130, followed by 129 in the afternoon, and the least in the morning, only 65. Our observations also show that the number of females enters the park in the afternoon and use public facilities was more than males, reaching 143. It was also the most active period for female seniors to use public facilities in the park during the three observation periods. This was followed by the evening, when there were 98 people, less than the males during this period, and only 76 in the morning.

Table 2: *Demographic Characteristics Statistics. By the author*

	Morning (9a.m.-10a.m.)	**Afternoon (2p.m.-4p.m.)**	**Evening (5p.m.-7p.m.)**	**Total**	**Percentage**
Male	65	129	130	324	50.55%
Female	76	143	98	317	49.45%

3.2 Public Facility Usage Preferences

According to our survey, among the various public facilities in Taipei Daan Forest Park in Taiwan, There are 478 elderly (74.57%) used the recreational facilities which were the most used ones. And the second is public transportation facilities. There are 116 (18.10%) senior users. The third is public facilities such as sanitation facilities. There are 34 (5.30%) senior users. The fourth category is public branding facilities. There are 12 (1.87%) senior users, and the fifth is communication facilities. There is only one (0.16%) senior users. By the way, the service facilities and public facilities had not been seen seniors use them in our observation period, as shown in Table 3.

Among the recreational and public facilities, the most used by the elderly were public seats，and 124 (19.3%) Elderly persons used it for activities such as chatting and leisure. The following one was the Greenfield activity area. A total of up to 102 (115.9%) of the senior citizens were engaged in leisure activities in the Greenfield activity area. The third was the gazebo which was used by 90 elderly persons. In addition, the children's playground had 51 elderly persons, as well as 40 elderly persons in the bird watching area for photography and other activities. However, the number of elderly users of physical fitness facilities was not more, only 22 people.

In the public traffic facilities, we observed that the most frequently used was the trail which was used by 99 (15.4%) seniors, then the red clay jogging track, only 16 senior users. However, during the observation, we found that only one elderly person used the bicycle lane for recreational activities.

At the same time, sanitary facilities were also commonly used facilities by elderly people in the park for their recreation activities. In our observations, 21 elderly people used public toilets and 13 elderly people used garbage bins. In addition, it was not found that senior citizens

went to the management office of the park for related management consulting services, and one elderly person only used public facilities telephones.

Table 3: *Number and preferences of elderly people using public facilities. By the author*

Large Categories of Facilities	**Facility Detail Name**	**Male**	**Female**	**Total**	**Percentage**
Transportation Facilitie	Red Clay Jogging Track	10	6	16	2.5%
	Trail	48	51	99	15.4%
	bicycle Lane	1	0	1	0.2%
Branding Facility	Park Floor Map	5	2	7	1.1%
	Directional Sign	3	2	5	0.8%
	Open Air Music Station	8	11	19	3.0%
Recreational Facilities	Gazebo	48	42	90	14.0%
	Seat	54	70	124	19.3%
	Children's Playground	22	29	51	8.0%
	Ice Rink	5	4	9	1.4%
	Woodcarving Viewing Area	8	5	13	2.0%
	Green Space Activity Area	42	60	102	15.9%
	Bird Watching Area	31	9	40	6.2%
	Basketball Court	2	6	8	1.2%
	Physical Fitness Facility	18	4	22	3.4%
Health Facilities	Trash Can	9	4	13	2.0%
	Public Toilet	9	12	21	3.3%
Service Facilities	Park Management Room	0	0	0	0.0%
Communication Facility	Public Phone	1	0	1	0.2%

3.3 Gender Preferences

In our research observations, we found that the most used public facilities for male seniors were seats (n=54), followed by trails (n=48) and gazebos (n=48), and then green space (n=42), and also bird watching was also one of the places that senior citizens' favourite. There were 31 seniors taking photos here. The next was physical fitness facilities (n= 18) and red clay jogging track (n=10 people), however, a guided tour of the park. The map and orientation signs were only used by individual male seniors. However, just individual male seniors used planar navigation maps and azimuth signs set up throughout the park. Our observations showed that 70 female elderly used public seats which were the most used public facility for them. And at the same time, there was 16 more female than elderly male users. The second was the green space activity area (n=60 people). The third was the trail (n=51). The fourth was the gazebos (n=42), and the fifth was the children's playground. In addition, we found the basketball courts, physical fitness facilities, Red clay jogging track and azimuth signs will also be used by some female elderly, see Table 3.

The chi-square analysis was used to test whether there was a significant difference in the gender distribution of different users in each public facility. The analysis results are shown in Table 4. The analysis showed that the gender distribution of the elderly people using physical fitness facilities was significantly different, $\chi 2$ (1, N =641)=8.913, p=0.003, The proportion of male elderly people in physical health facilities (81.8%) is higher than the proportion of female users (18.2%); there is a significant difference in the gender distribution of elderly people who use the bird watching area. $\chi 2$ (1, N = 641) = 12.39, p = 0.000, the proportion of male elderly people in the bird-watching area (77.5%) is higher than the proportion of female users (22.5%); The results also showed that there was a significant difference in the gender distribution of the elderly in the green space activity area, $\chi 2$ (1, N=641)=4.260, p=0.039, and the proportion of female elderly people in the green space activity area (58.8%) was higher than that of male users (41.2%).

Table 4: *Gender Differences in the Use of Public Facilities. By the author*

Gender / facility		Female	Male	χ^2	*df*	*p*
Physical fitness facility	n	4	18	8.913	1	0.003
	%	18.2%	81.8%			
Bird Watching Area	n	9	31	12.399	1	0.000
	%	22.5%	77.5%			
Green Space Activity Area	n	60	42	4.260	1	0.039
	%	58.8%	41.2%			

4. Discussion

The purpose of this study is to understand the preferences of older users for the use of public facilities when carrying out activities in the park, and hope to make some references to the planning and design of public facilities in parks. Through non-participatory observation, the researchers found that the elderly had different preferences for different public facilities in the park. At the same time, there were some different preferences between the genders of elderly people. For example, our research shows that the number of female seniors entering the park using public facilities is higher than that of male seniors in the afternoon, but the number in the evening is less than that of males. This may be because female seniors are responsible for dinner in the family, etc., and so leave the park early, then return and prepare dinner or go to the market to buy food. Overall, our results show that male elderly are more likely to enter the park than female elderly, and this finding is consistent with the findings of Chow et al. (2016). Also, the periods of elderly enter the park are mainly in the afternoon and evening, while the number of people in the morning is relatively small.

The results showed that the most used by the elderly in the park were public recreational facilities, and followed by transport facilities and sanitary facilities.. It can explain to a certain extent that the primary purpose of the elderly to the park was leisure and recreation. Meanwhile, the results of the study were consistent with the purpose of the elderly entering the park on the

survey by Lee and Kim(2015). This may be due to the fact that the majority of the elderly as the regular users of the park enrolled in the park, who use less branding facility, service facilities and transportation facilities. They had a clear understanding of the relevant routes of the park. In addition, as a result of the popularity of modern people using communications equipment such as smartphones, the demand for the use of communication facilities in public environments was less intense among the elderly.

The results showed that the public facilities used by the elderly in the park had a certain preference. The most used was the public seats, the second was the green space activity area, the third was the trail, and the fourth was the gazebos. This shows that due to the deterioration of the physical function of the elderly, most of the activities carried out by the elderly in the park were mainly leisure type. At the same time, the number of seniors in children's playgrounds and ice rinks was close to 10% of the total number. This may be due to the fact that elderly people enter these facilities because they cared for children or had fun with children. It also appeared in some studies (Kaczynski et al., 2014). In addition, our observations also found that the physical fitness facilities of the park did not seem to be the preferred facilities for the elderly, and the total number of users was only 22. Because of the inconvenience of the physical function of the elderly, it led to a reduction in the need to use physical fitness facilities.

On the other hand, it may be because the health facilities of the park are set beside the children's playground. The overall environment was noisy and interfered and disturbance to the elderly movement. Besides, our research also found that because some male seniors had hobbies such as photography and crafts, the number of senior participants in the bird watching area and woodcarving viewing area of Taipei Daan Park in Taiwan had also reached 9%. Of course, this cannot be separated from the park planning plan for this kind of facilities scenic spots and their related dynamic, plant planning and introduction protection. Such a plan provided a variety of activity options for the elderly.

In addition, our findings also found that male and female elderly had certain differences in the use of public facilities in parks. For example, female elderly people used the seats mostly, although it the same as male seniors, but the number of male elderly were only 54, and the number of females was as high as 70. The second most used by female elderly were the park green area, while males were keen on the gazebos. This may be due to the different activities between female and male elderly. The male seniors liked to play chess games under the gazebo

in groups of three or five. Female seniors preferred to sit in the green area to chat and play with children. Although the green space area was also one of the preferred facilities for male seniors, the number of people using was only two-thirds of that of female users. At the same time, the use of trails for low-intensity exercises such as walking was also the main leisure activity for the elderly in the park. This result was the same as that of Pleson et al. (2014). In addition, the trail was also one of the facilities used by female seniors. The number of users was also higher than that of men, and due to physical factors, the number of male seniors on the red clay jogging track was more than that of female elderly.

This study also had some limitations. For example, the time of study observation did not cover all the periods of the day, which will affect the universality of the research results to a certain extent. In future research, observation time and sample size should be increased to obtain more comprehensive data and results. In addition, the study was only in Taipei Daan Forest Park, Taiwan. Observations have made the results of the study generally limited by the general applicability of other countries or regions.

5. Conclusions and Recommendations

The results of the study can provide a reference for urban park planners, park planning departments, and park managers. The study found that the public facilities most used by the elderly in the park were seats, followed by green space and then trails. At the same time, the gazebos were also one of the public facilities used by the elderly. The bird watching area, the physical fitness facilities and the red clay jogging track provided excellent recreational facilities and space for photographers, runways and other enthusiasts. The study also showed that the elderly were not demanding the use of branding facilities. In addition, our research results also pointed out that the gender distribution of senior users in physical fitness facilities and bird-watching areas is significantly different, and the proportion of male users is higher than that of females. There is also a significant difference in the gender distribution of the elderly users in the green space activity area, namely the proportion of female elderly users is higher than that of male users.

Based on our findings, the following suggestions should be worthy of reference by urban park planning designers and park planning departments. Firstly, based on the high demand for seat and walkway facilities for senior citizens, additional public seats can be placed in the park, the park trails can be reasonably planned, it can enhance the experience of the elderly. Secondly,

to reduce the planning and even cancellation of facilities that are not commonly used by the elderly, and the green space activity area should be expanded. It will provide the most natural leisure environment for the elderly to further meet the needs of the elderly. Thirdly, it is possible to try to set the physical fitness facilities for the elderly and the children's playground in different areas, to reduce the impact on the physical health of the elderly.

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