Comparison of Urban Residents' Use and Perceptions of Urban Open Spaces in China, Canada and USA

Introduction

Open space perceptions and evaluations of people in different social-economic background have been comprehensively explored (Sugiyama, 2008. Roose,2007. M. Joseph and Sirgy,2000). Some studies focused on ethnic groups and their outdoor recreation behaviours in western countries (T. Zhang and Gobster,1998).Some studies discussed about the relationship between user perceptions and park planning.(C.S. Shafer 2000, Myron F. Floyd, 2008). "As the recent drastic social, political, and economic changes in China, especially in cities", (C. Y. Jim a and W. Y. Chen, 2009) more and more research have been focus on cities transformation in China and its function on the recreation patterns of millions of people.(A.Y.H. Lo, C.Y. Jim, 2010)

As *Park, Recreation, Open Space and Greenway Guidelines*, a publication by NRPA (National Recreation and Park Association) in US and "The Six Acre Standard" by FIT (fields in trust, formerly the National Playing Fields Association) have been recommended in American and British cities, Park and Recreation Master Plan has been widely applied in the western countries to provide the open public parkland to satisfy the local people's recreation demand. Although China has no such park plan which has similar contents and goals , the Chinese urban plan system has Urban Green System Plan including green system space plan to control the lost of green area in urban land use in the fast urban development, and park lands for recreational use.

The park planning systems in western countries and China have differences in their names, contexts, criterion, documentations and outputs, they have four key factors in common: quantity, type, facility and service. In order to compare and deepen understanding of public perceptions of open space in two systems, largely for convenience, residents' use and perceptions of open space are examined in Shanghai, China, Waterloo, Canada and Kokomo, USA, which possess very different social, economic and cultural attributes.

Study Area and Methods

Study Area Background

Shanghai City is in the east part of China, covering 6340.50 km^2 of land with 22,208,300 population. The City has provided approximately 0.61 hectares per 1000 population of municipal green space, of which 0.08 hectares per 1000population is municipal park space(Shanghai Municipal Greening Authority,2009). The city has 18 boroughs, with each has different levels of green space provision. In boroughs of downtown area, for example Jingan, Luwan and Hongkou, the public green space per capita are largely under the average standards, with only 0.0001ha per 1000. Relatively newly built boroughs such as Pudong, Baoshan and Jinshan, although the parkland is at low level, but still three times of downtown area ,with 0.0003ha per 1000. (Shanghai Greening Administration, 2005)

According to China national standard of urban area greening classification（CJJ/T85-2002）, Shanghai has provided parkland under five broad categories, which are urban park, residential park, specific park, line park and street garden. Urban park contains large green

space and recreation facilities for public use. Specific park which has specific recreation topic and use for the public, includes children's park, zoo, botanical garden, historical garden, scenic area, theme park. Residential park which includes community park, neighbourhood park, tot lot, is always located in residential areas of corresponding borough and residential development areas. Line park, which is similar to parkways, is located along street, historical wall and rivers, and it usually provides some green area for the protection of the ecological and historical status, and provided facilities for recreation use. Street garden is located at roadsides with small green area, square, usually for landscape use. Shanghai municipal government has set up standards as follows. (Shanghai Greening Administration and Urban Planning Research Institute, 1995)

Type	Preferred Size	Service Area	Service Population
Urban Comprehensive Park	Over 10 ha	No more than3000 m	270,000-450,000
Borough Comprehensive Park	Over 10 ha	No more than2000 m	120,000-200,000
Community Park	2-4ha	No more than1000 m	30,000-50,000
Neighborhood Park	0.3-0.8ha	No more than500 m	7,000-15,000
Tot Lot	0.04-0.08ha	No more than250 m	1,000-3,000

Table1. Park Plan Standards of Shanghai

Waterloo City is in Southern Ontario, Canada, a municipality which is one of the original settlements within the County of Waterloo, covering 64.10 km^2 of land, with 121,700 residents, and the Region of Waterloo with a population of over 450,000 people. The City has provided approximately 9.6 hectares of municipal park space per 1000population. Under one-half that amount, 4.4 hectares is provided in the form of open space lands, 5.2 hectares of parkland exists per 1000 population. (The Corporation of the City of Waterloo Recreation and Leisure Services Master Plan,2009)

Waterloo has generally provided the outdoor recreation resource in three broad categories: parks, open space and trails. The provisioning standards proposed for the total city parkland planning are 5.0 hectares per 1000 population. Though this rate exceeds the commended provisioning level, the municipal government has decided to maintain more parkland due to the significant value and importance residents place on the City's parks. The main standards proposed for the parklands are as follows(The Corporation of the City of Waterloo Recreation and Leisure Services Master Plan,2009).

Type	Preferred Size	Service Area	Service Standards
Criteria-City Park	Serves the entire City and beyond	Size varies depending on land features and base	3ha/1,000 population
Community Park	Minimum 4 hectares	1.6 to 2.6 km	1ha/1,000 population
Neighborhood Park	0.5 to 2 ha	0.6 to 0.8 km	1ha/1,000 population

Table2. Park Plan Standards of Waterloo

Kokomo covers approximately 40.7 km^2 of land, with 83,776 residents. It is located approximately 50 miles north of Indianapolis, the state capital of Indiana, USA. As the county seat of Howard County, the Kokomo park system attracts users from not only the city limits, but also the rural and communities within all of Howard County. Although the park classifications have been grouped into four categories, there're no detailed LOS standards for each type. The existing park level of service (LOS) standard is 10 acres per 1000 residents, and the baseball/softball fields are 5.43 fields per 10,000 population, with 1.0 per 10,000 for soccer fields and 4.35 per 10,000 for tennis courts(City of Kokomo.2009 Parks and Recreation Master Plan. January,2009). According to the 2009 Kokomo Park Master Plan, the standards are as follows.

Description	Kokomo Current LOS	Recommended Kokomo LOS Standard	Per Residents
Park Acreage	9.6	10	1,000
Paved, Multi-Use Trails(miles)	1.64	2.0	10,000
Baseball/Softball Fields	5.43	5.0	10,000
Soccer Fields	0.43	1.0	10,000
Tennis Courts	4.35	3.5	10,000

Table3. LOS Standards for Park and Recreation Facilities of Kokomo

Questionnaire Design and Data Collection

The questionnaire and interview questions have been designed in English and Chinese. To avoid misunderstanding caused from the term use, after the English-version questionnaire has been designed, it has been sent to five local speakers, with two students, two professors and one businessman to do the edit work. Pre-surveys have been conducted covering ten local residents of different backgrounds in Waterloo. During the pre-surveys, the author has finished the interview and collected the information which caused misunderstandings of the language expressions and the suggestions from the participants. The questionnaire has been improved before being used in the formal interviews. As three cities have different terminologies in open space planning especially classification, seven different classifications has been selected based on reference to park planning case in American and Chinese cities.

The questionnaire includes question and interview parts. Question part has sections of frequency of activities, park selection, satisfaction of facility. And interview part includes open questions which are "In your city, do you feel open space for all age groups are adequately provided for?", " In order of priority, which factors would make you like or want to visit the park?" ,"Could you suggest any suggestions for current open space system plans?"and "How far at most do you think a park should be located from your home? What type should the park be?"

The survey was conducted during March to July, 2010 respectively in Waterloo, Kokomo and Shanghai. 103 Face-to-face interviews have been finished, and questionnaire fillings have been accomplished simultaneously, shortly after the interview or feedback by e-mail to the researcher. After excluding returned thirteen invalid responses, the response rate was 87.3%. Random sampling methods have been used when collecting data and the interview sites have covered almost all different open space types. The samples in Waterloo were chosen from

different age groups and employments, and covers immigration group such as Chinese, Pakistan and Indian with over five living years in Waterloo. The samples in Kokomo and Shanghai were selected carefully based on similar socioeconomic profile of respondents in Waterloo to avoid the differences brought by socioeconomic factors.

By large, the respondents are distributed between males and females. 20% of the respondents come from the dominant 18–25 age group and 40, 33.3, and 6.7% of the respondents in the26–35, 36–45, and 46-55 age brackets, respectively. 6.7% of the respondents had a high school education background, over 43.3% with university or higher degree.

The collected data were analyzed using the Microsoft office Excel version 2007 software. Ch denotes Chinese park users in Shanghai, Ca denotes Canadian users in Waterloo and Us denotes park users in Kokomo, USA.

Results and Discussion

Activity Frequency

According to local residents' activity frequency, each group has been divided into three categories, which are daily users, weekly users and monthly users. In daily user category, three groups have no common activity frequency in all. Both Ch and Us have daily recreation habits, but with different trend when choosing open space types for recreation. Ch mainly choose the easily accessible open space, such as tot lot, neighbourhood park and parkways. But Us choose all types based on much better mobility. Ca, with similar mobility, has low participation in all types. It mirrors the lack of daily recreation activity participation.

In weekly user category, three groups all have high participations in neighbourhood park and community park. Ch and Us have medium but Ca with high participations in scenic areas. It shows that all groups have perceptions of "escape from the city" in the weekends. Waterloo, with plenty of natural resources around the city, has the advantage for residents to be in the "real nature".

In monthly user category, three groups show large differences for open space selection.Ch has high participation in tot lot and community park, and Ca participates frequently in regional recreational area. But Us has medium participation in all types. It mirrors that the abundant natural resource around Waterloo city provides good recreation opportunity for Ca, but there're featureless natural resources which has similar attractions as other open space types in Kokomo. Limited quantity, high entrance fee, low accessibility and huge number of visitors are the main reason for less participation in natural resources recreation in Shanghai.

	Ch							Ca							Us						
	P1	P2	P3	P4	P5	P6	P7	P1	P2	P3	P4	P5	P6	P7	P1	P2	P3	P4	P5	P6	P7
Daily																					
Weekly																					
Monthly																					

*P1, P2, P3, P4, P5, P6,P7 respectively denote Tot Lot, Neighborhood Park, Community Park, Parkway, Urban Park, Regional Recreational Area and Scenic Areas.

*The colors stand for the participation degree are: deep gray=High; light gray=Medium; White=Low.

Figure1. Activity Frequency and Open Space Selection

During the interview, the author asked interviewers to select the visit frequency of different open spaces. (Figure 1). For Ch, tot lot and neighbourhood park are the most regularly visited, with 76.7% daily and weekly visits. This behaviour aligns with the conclusion of the visit frequency in Zhuhai City(Jim and Chen,2009) that "the smallest and closet neighbourhood gardens are the most regularly visited." And there're large differences among visit frequency of the two and other types, with only 13.3% for Community Park and Parkways, 6.7% for Urban Park and 16.7% for Regional Recreational Area. This can certify the general observation from Müller-Perband 1979; Harrison et al.1995 that "proximity and easy accessibility would stimulate or attract park patronage"(Jim and Chen,2009). But for Ca and Us, it is not so obvious for the effect of proximity and easy accessibility factors in the open space visit. And there're no such large differences among visit frequency of close-to-home open space and other types. Ca has 13.3% use for tot lot, neighbourhood park, community park, parkways and urban park. Us has both high visit, with 33.3% for tot lot, 36.6% for neighbourhood park, and also around 25% for other types.

	Use frequency(%)														
Open Space	Daily			Weekly			Monthly			Never			Use Score[a]		
	Ch	**Ca**	**Us**	**Ch**	**Ca**	**Us**	**Ch**	**Ca**	**Us**	**Ch**	**Ca**	**Us**	**Ch**	**Ca**	**Us**
Tot lot	40	13.3	33.3	43.3	26.7	23.3	20	13.3	23.3	0	46.7	20.1	2.26	1.07	1.69
Neighborhood Park	36.7	13.3	36.6	36.7	30	36.6	13.3	16.7	20	13.3	40	6.8	1.97	1.17	2.03
Community Park	13.3	13.3	33.3	36.7	50	33.3	20	6.7	23.3	30	30	10.1	1.33	1.47	1.89
Parkways (trails)	13.3	13.3	23.3	26.7	36.7	26.7	10	23.3	26.7	50	26.7	23.3	1.03	1.37	1.50
Urban Nature Park	6.7	13.3	26.6	40	33.3	13.3	10	20	23.3	43.3	33.4	36.8	1.10	1.27	1.29
Regional Recreational Area	16.7	3.3	30	50	20	13.3	10	20	26.7	23.3	56.7	30	1.60	0.69	1.73
Scenic Areas	0	3.3	23.3	23.3	13.3	10	20	36.7	30	56.7	46.7	36.7	0.67	0.73	1.19

[a] The weights given to the frequency categories are: Never=0; Monthly=1; Weekly=2;Daily=3.

Chart4.Use Frequency and Scores of Seven Major Open Spaces by Ch, Ca, Us

Polychronic Time and Monochromic Time Activities

Findings from the face-to-face interviews(Figure2) shows that Ch has particularly high frequency of participation in daily use of tot lot and neighbourhood parks, with the morning time 6:00-8:00 to after work time section after 18:30. While Ca and Us both have comparably average use with all open space types, covering all day time section. The reason behind the phenomenon is based on how different groups realize recreation activities and its role in daily life. Most Ch interviewers cannot clearly separate recreation activities from life indispensable activities, such as shopping, sending children to schools. There are vague boundaries between doing exercises, communicating with friends and food-buying. Among all these

activities, walking is the most important one which can easily connects all these different activities. Although all groups showed a particularly high participation in walking and hiking (Figure4), it could be wrong to conclude this as a direct result of the common favor for all groups. For Ch, walking can be treated as either a kind of exercise or a way of transportation, and it can also be accompany with walking dog, chatting, sight-seeing or other activities. A typical example given by a 65-year-old Chinese lady illustrates this. Early every morning, she brings her dog and walks along the loop in the community, on the way, she can easily meet her neighbours and chat with them. They go together to the tot lot or small garden area , which are in the centre of the community ,sit there watching her friends doing exercises or dancing, while walking her dog. Then she goes to the market on the street to buy breakfast, fresh food for her family and goes back home. This routine is the morning beginning of her life. All the activities-walking, chatting, walking-dogs, watching, buying food all have comprehensive meanings and it is difficult to tell separate property for each. They are tied up to be a "package". This description closely matches with routine of Chinese Americans of Chicago's Chinatown (Tingwei Zhang and Paul H. Gobster,1998), and also has similarities with Hall and Hall's(1990) conception of "polychronic time, where multiple activities are engaged in simultaneously"(T. Zhang and Gobster1998). And from most Ca and Us groups, the results showed agreements to the monochromic time typical activities, "are dealt with in a discrete and linear fashion"(Hall,1990), and "Anglo American culture and clearly separate recreation activities from necessary life activities" (Tingwei Zhang and Paul H. Gobster,1998). Although in Ca and Us, there're several interviewers, especially females, show similar trend in polychronic time use, but they show totally different intention when arrange shopping and walking together. They treat mall as a "good place" for recreation. An 54-year-old US lady say it is "better than parks" because "they have restrooms and facilities", and "you do not have to worry about the weather". "You cannot buy anything but just walking." The interviewer clearly separated walking from shopping, even when she describe a shopping place, and only treat it as a place for walking.

	Ch							Ca							Us						
	P1	P2	P3	P4	P5	P6	P7	P1	P2	P3	P4	P5	P6	P7	P1	P2	P3	P4	P5	P6	P7
6:00-8:00																					
8:00-12:00																					
12:00-13:30																					
13:30-18:30																					
18:30-24:00																					

*The colors stands for the degree are: deep gray=High; light gray=Medium; White=Low.

Figure2. Daily Recreation Time Section and Open Space Selection

Latent Needs

Based on the outdoor recreation needs degree of park quantity in the city, 5 choices have been made to describe the demand rate , which are "extremely need", "need", "not to matter", "just enough", "do not need at all". 4 degree has been used to denote the percentage of choice, with 50% to 100% rated as high, 20% to 50% as medium, less than 20% as low. (Figure3)

High percentage of choice of Ch has expressed the "extremely need" and "need" in increasing the quantity of tot lot, neighbourhood park, urban park and parkways. Increasing the quantity of scenic areas have less demand in regional recreation area. Most of the heavy demand parklands are within urban areas. On contrary, high and medium percentage choice of Ca expressed little demand in increasing the quantity of tot lot, neighbourhood park and community park, with more demand in scenic areas and urban park.

Overall, the only heavy demand park type both from Ch and Ca are parkways. Ch has more demands on the residential and convenience based parks within urban area. Ca with large abundant parkland used for convenience, have more demands on parks in broaden area, which has more natural status.

Open Space	Extremely Need			Need			Not to Matter			Just Enough			Do Not Need At All		
	Ch	Ca	Us	Ch	Ca	Us	Ch	Ca	Us	Ch	Ca	Us	Ch	Ca	Us
Tot Lot															
Neighborhood Park															
Community Park															
Parkways(trails)															
Urban park															
Regional Recreational Area															
Scenic Areas															

*The colors stands for the degree are: deep gray=High; light gray=Medium; white=Low.

Figure3. Recreation Needs of Open Space

Nature Resource Reliance

The activity pursuits have been described as 20 types according to International Physical Activity Questionnaire (Craig，2003) and divided into 5 degree to denote its frequency rate , with 1 as never, 2 as rare,3 as sometime,4 as often ,5 as very often. 3 degree has been used to denote the percentage of choice, with greater than 60% rated as high, 30% to 59% as medium, less than 30% as low(Figure4).

Most of the recreation activities are not frequently taken for both Ch and Ca, with lower than 50%, with Us has taken the most actively. The top four of most frequent activities of Ch are walking, running, biking and hiking, with Ca are hiking, picnicking, camping and wildlife viewing, with Us are walking, running, biking and gardening.Ch has high degree choice of "never" in eight categories which are instructor-lead activities, tennis, golf, fishing, snowmobiling, skiing, and horseback riding and camping, with Ca in four categories which are gymnastics, instructor-lead activities, snowmobiling and horseback riding, with Us in six categories which are gymnastics, ice skating , tennis ,golf ,snowmobiling and skiing.

Walking is the most frequent activities of Ch, Ca and Us. Hiking are most welcomed for Ch and Us although hiking have different understanding in Ch and Us groups. Ch understand hiking as "more than 40-minute-walk" while without basic demands on views and nature beauty along the way , while Us often expected nature experiences in large nature areas through hiking. Snowmobiling is the least frequent activities for all groups. Overall, Ch has less variety of activity pursuits than Ca and Us.

Activities	Ch					Ca					Us				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Watching TV															
Reading															
Walking															
Gymnastics															
Fitness Training															
Instructor-lead activities															
Swimming															
Ice Skating															
Tennis															
Gardening															
Running															
Biking Activities															
Golf															
Boating															
Fishing															
Hiking															
Snowmobiling															
Skiing															
Picnicking															
Horseback Riding															
Camping															
Wildlife Viewing															

*The colors stands for the degree are: deep gray=High; light gray=Medium; White=Low.

* The degrees of the categories are: 1= "never"; 2= "rare"; 3= "sometime";4="often";5= "very often".

Figure4.Recreation Activity Types and Pursuits of Ch, Ca and Us

The activities are described to denote nature source reliance degrees (Figure4). Ch data line graph (Figure5) shows a sharp notional decay tendency with increase degree in the nature resource reliance activities, with "never" activity pursuits in the highly nature resource reliance activities such as camping and horseback riding. Although Ca and Us data line graph (Figure5) shows the same tendency, it has "sometime" activity pursuits in high nature resource reliance activities, such as picnicking, fishing, camping and wildlife viewing.

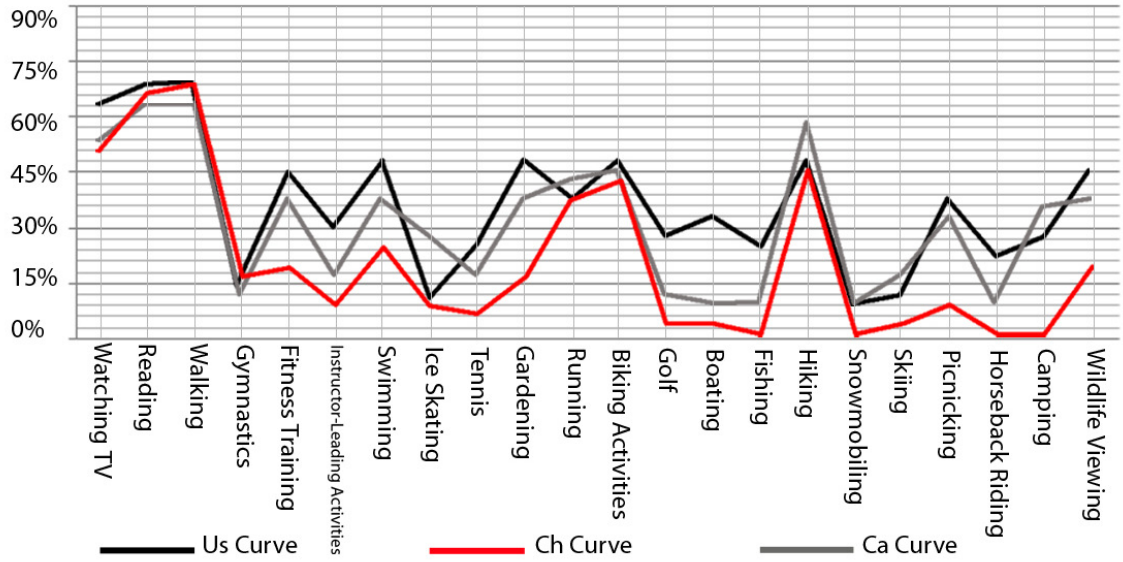

Figure5. Activity participation and nature environment Reliance

Conclusion

According to the data analysis and key findings from interviews, two the park planning constructs are deduced based on the local residents' characteristics of recreation behaviour as follows. Through the comparison, they can help to deepen understanding the park planning of three cities.

Hierarchical Construct

As to the park planning standards in three cities, open space hierarchy is mainly based on service radius, acreage and level of service. In this hierarchical construct, demographics and existing quantity and quality of open space should be treated as important factors for planning.

According to the proximity and acreage, all open space types could be divided into "upper level than urban park"(UUP) and "lower level than urban park"(LUP)types. For present LUP quantity and quality in each city, Ch, Us and Ca can be divided into low, medium and high satisfaction degree. Only if the quantity and quality of LUP has been fully satisfied by residents, they would choose to use UUP frequently. Because the quality and quantity of LUP are the most well-maintained in Waterloo, there's more specialized recreation need of Ca, with more willings to be in real nature. The typical Ca interviewer feel "boring" with the tot lot and neighbourhood parks and describe the urban park as "fake nature". And they prefer searching "real nature" in more larger areas or parkways.

As medium type for park planning, urban park has both function of recreation and keep the original eco-environment in "urban sprawl". Whether it could choose its feature on "really nature" should be based on the users' satisfactions in using the LUP, which are tot lot, neighbourhood park and community park. It could be built into "real nature" and merged into larger scenic areas only if the recreation needs of the residents have been fully satisfied by LUP. UUP includes regional recreation area and scenic areas which can be featured as "real

nature land" with limited recreation facilities, but large amount of nature resource, such as vegetation and river.

Facility-Activity Construct

Facilities design and construction should be based on the corresponding open space type in the planning standards of three cities. Above all, they should also be based on different user groups' activity type and recreation demand under cultural characteristics, which must be a flexible and effect way for filling the gap between user's recreation demand and facility supply. Parkway which has been most welcomed in all the cities could be treated as lined facilities. Since walking is convenient, inexpensive, and the most commonly reported physical activity [US Department of Health and Human Services(USDHHS), 1996; Department for Transport (DFT),2002], it should be carefully designed for improving the quality of recreation activities. Based on monochromic time activities routine under Chinese culture, parkway planning and design should be based on the survey and observation of the activities from different communities and residents' life routines. For example, small market place and walk-based parkway close to communities will be welcomed for residents daily life in China. Based on monochromic time activities and nature-reliance trends, bike and roller skating ways will be more popular in USA. Trails with real nature feature in large natural areas, especially for hiking will be popular in Canada.

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