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Community Participation in Quality Assessment for Green Open Spaces in Malaysia

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Abstract

This study validates the use pattern scales for green open spaces in Malaysia. The measures on use pattern were developed using three use pattern scales, which are activities, passive activity and active activity. Samples of 414 daily park users were analyzed using Confirmatory Factor Analysis (CFA) to validate the instrument. Results showed good-fit indices on each construct confirming the theory behind each and every item used in the study. Despite several reductions on the items, the CFA on use pattern yield good internal consistencies making it suitable for its use in the research design focusing in measuring the use pattern from the community participation aspect of neighbourhood green.

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Keywords: Use pattern; green open spaces; community participation; CFA

1. Introduction

The lack of consistent association in assessing the use pattern aspects within the area of residential neighbourhood might be caused by the difficulties in defining, measuring, and assessing the usage among

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park users' in neighbourhood parks. However, there are several recent studies that explore and measures green spaces in urban areas. The studies include the development of Urban Neighborhood Green Index (UNGI) as measurement on green spaces in urban areas, the study on quality and quantity public open space (POS), the study on the assessment of quality Neighbourhood Park criteria (QNPC) as well as a study that examines the guidelines and policies in Shah Alam, Malaysia (Gupta et al., 2012; Francis et al., 2012; Abdul Malek et al., 2012; Marzhuki et al., 2012). However, this study differs as it looks specifically in the research design stage, where a confirmatory factor analysis (CFA) method was adopted to validate the instrument used to measure variables associated with only the use pattern indicators. Green infrastructure is believed to offer more benefits; physically, emotionally and socially as well as to encourage urban communities to live healthily by going outdoor (Mansor et al., 2010). Accordingly, community involvement or participation in the design process of a park is highly needed and with assistance from the designers, it could contribute to better quality of park (Anuar & Saruwono, 2013). The main purpose of this study is to gain an increased understanding on the Malaysian use pattern aspects from the community participation of park users in neighbourhood green open spaces. Currently, there is no particular tool or assessment within the Malaysian housing and local authority level to measure the use pattern aspect of the neighbourhood green. It is therefore, important that this validation is well tested using the current and important theories as well as past studies.

2. Important measures of community participation on use pattern

In earlier studies, there are quite a number of significant observable factors that have been indicated in influencing the neighbourhood space utilization. The factors are including the space qualities and quantity; the social makeup of the potential users in which they are diverse from the socioeconomic class, sex, life-cycle stage, ethnicity and region; psychological aspects influencing personal preference as well as, the accessibility of domestic against non-domestic spaces, facilities and services (Hester, 1984). Hence, privatization of open space can contribute towards better quality in terms of design exploration, maintenance and management thus influence in higher users' satisfaction index compared to open space that managed by public authority (Nasution & Zahrah, 2012). Previous research that is relevant and related to use pattern study in the context of residential green open spaces and parks will be precisely categorized into three sub-topics, which are activities, passive activity, and active activity. These three sub-topics were the items tested in this study, and all of the items were collected from literature mentioning use pattern among people who visited the green open spaces as presented in Table 1.1.

This research aims to measures the use pattern scales that are activities, passive activity and active activity. This study was also conducted in order to assist in filling in the gaps based on the elaboration of Bell et al. (2008) in a study which mentioned that additional methods are going to be required to evaluate projects as well as to attain a high quality of data for better methods of action research. Hence, this research explores the relationship between use patterns in striving towards achieving a quality neighbourhood park. It is also important that this study validate the factorial structures of the use pattern using confirmatory factor analysis (CFA). In particular, this research was designed to address the following objectives: (a) to identify the use pattern of park users in a neighbourhood green open spaces; (b) to measure variables on use pattern; (c) to suggest use patterns measures from the resulting data which can be manipulated into improving the planning and design stage as well as the management strategies for neighbourhood park development.

3. Active activity, passive activity and activities

Recently, the preferred uses of outdoor activities are swimming, relaxing, tennis, bicycling and basketball. The variation of activities chosen by users was most likely influenced by the age group. Young people with age ranging from 13 to 18 years old prefer active and water-related activities. On the other hand, adults (19 to 60 years old) and senior citizens (60 years old and above) have higher preferences in passive activities, which could be, referred to as 'relaxing' use, and perceptions of urban greenways (T.W. Zhang and Gobster, 1998; Lindsey, 1999).

The most common activities are walking, running/jogging, bicycling and skating as users were found to be frequently used the trails at least more than three times a week. Health and fitness were among reasons found to the use of greenway trails along with factors such as quality of maintenance and trail features. However, cleanliness and conflict of use seem to be the main problems here. Arnberger (2006) indicated that the peak time for recreation use was usually between late morning and late afternoon mainly during weekends with the presence of joggers, bicyclist, walkers and dog walkers. As well, distance to the resource does not extensively affect park use or perceived park use benefits according to ethnic groups.

Correspondingly, parks with extra features were more preferred to be used for physical activity as the park facilities such as wooded area and paved trails have the most powerful relationship with the park use. In contrast, size and distance to the park itself were not significant (Kaczynski, Potwarka, and Saelens, 2008). Location of greenway trails and accessibility as well as, equality of access, are the significant factor in perception of use among visitor. Even a 5 mile local trail, would be too far, especially, for older adult users (more than 55 years old). The design consideration of the trails too should be sensitively and responsive to meet various users' needs and expectation (Gobster, 1998; Shukur, Othman & Nawawi, 2010; Kurniawati, 2012). Hence, the dependent and independent variables as well as the attributes were further expanded as shown in Table 1.1 below.

Table 1. The dependent variables, independent variables and attributes used in this study based on Use construct derived from the literature review findings

Dependent Variables	Independent Variables	Attributes	
Use Pattern	Active Activity	• Cycling • Skating • Walking • Jogging	• Swimming • Pets walking • Basketball & Tennis
	Passive Activity	• Relaxing/Fishing/Playing Board Games • Celebrations (Birthdays/parties) • Picnic & Barbecuing	• Meet Friends • Spend time in open air • Rest by water & green
	Activities	• Wooded area • Smaller lot size area • High green coverage • Accessibility • Quality of ambience	• Trail location • Design & management • Paved trails

Consequently, all reviewed items on use patterns in neighbourhood green open spaces from the literature in this paper were analyzed to assess the overall use pattern aspect. These new measures of use patterns under analysis include three constructs representing use pattern in a neighbourhood park are; activities (10 items); passive activity (3 items); and active activity (2 items) as presented in Table 1.4.

4. Research methodology

4.1. Participants

The total participants for the study were 414 park users daily, in two local neighbourhood parks in Malaysia. Two study areas were used, the first one is Taman Lembah Kiara, in Taman Tun Dr. Ismail, Kuala Lumpur and the second one is Taman Rimba Riang, in Kota Damansara, Petaling Jaya. Both parks were located in two different local authority jurisdictions but accessible in so many ways within a short distance of 10km between each other. The two sites were selected because the similarity of both community characteristics which are mainly occupied by middle low to upper or high income group, neighbourhood housing areas that were heavily connected to a commercial area and that the neighbourhood developments is well connected to neighbourhood parks.

4.2. Characteristics of sample

This section describes the socio demographic profiles of all four hundred and fourteen (414) respondents who took part in this study. The majority of the respondents or 64.3% (n=266) were those from Taman Rimba Riang, Kota Damansara and 35.7% (n=148) were from Taman Lembah Kiara, Taman Tun Dr. Ismail. Table 1.2 shows the sample site of the respondents' survey.

Table 2. Sample size by park

Park	Number of participant respondents	%
Taman Lembah Kiara, Taman Tun Dr. Ismail	148	35.7
Taman Rimba Riang, Kota Damansara	266	64.3

Note. Total sample size for the study = 414

4.3. Development of the instrument and procedures

The research instrument was developed based on the literature analysis as well as the items tested on use pattern attributes. Then, integrating various useable items from use pattern studies further developed it. Every measurement were structured using 5-level Likert scale which are 1: Strongly disagree; 2: Disagree; 3: Neutral; 4: Agree and 5: Strongly Agree.

4.4. Confirmatory Factor Analysis (CFA)

An explicit goal of CFA according to Byrne (2001) is where there is some knowledge of the theory or empirical research where the relationship between the observed measures and the primary factors is known and that it is tested statistically. Thus, the fundamental method of CFA estimates only unexamined associations among factors and not the direct underlying effects (Kline, 2005). Critical ratio (CR) is used to test the significance of each path coefficient. According to Bryne (2001), CR or estimated path coefficient is significant when it is more than 1.96 at .05 levels.

5. Result

5.1. Socio-demographic characteristics

Table 3. Socio-demographic characteristics of respondents by parks

Description	Variable	Taman Lembah Kiara, Taman Tun Dr. Ismail n (%)	Taman Rimba Riang, Kota Damansara n (%)	Total n (%)
Gender	Male	73 (49.3)	108 (40.6)	181 (43.7)
	Female	75 (50.7)	158 (59.4)	233 (56.3
Age	0 – 19 years	15 (10.1)	54 (20.3)	69 (16.7)
	20 – 25 years	30 (20.3)	96 (36.1)	126 (30.4)
	26 – 30 years	21 (14.2)	50 (18.8)	71 (17.1)
	31 – 35 years	20 (13.5)	22 (8.3)	42 (10.1)
	36 – 40 years	19 (12.8)	7 (2.6)	26 (6.3)
	41 – 45 years	17 (11.5)	10 (3.8)	27 (6.5)
	46 – 50 years	12 (8.1)	6 (2.3)	18 (4.3)
	51 and above	14 (9.5)	21 (7.8)	35 (8.5)
Marital Status	Single	67 (45.9)	160 (61.8)	227 (56)
	Married	75 (51.4)	96 (37)	171 (42.2)
	Widowed	4 (2.7)	3 (1.2)	7 (1.7)
Income	No income	29 (7.7)	63 (16.6)	92 (24.3)
	Less than RM1000	6 (1.6)	20 (5.3)	26 (6.9)
	RM1000 – RM2000	22 (5.8)	104 (27.4)	126 (33.2)
	RM2000 – RM5000	51 (13.5)	36 (9.5)	87 (23)
	RM5000 – RM10000	14 (3.7)	12 (3.2)	26 (6.9)
	RM10000-RM15000	7 (1.8)	8 (2.1)	15 (4.0)
	RM16000 above	6 (1.6)	1 (0.3)	7 (1.8)
	Missing	-	-	*35 (8.5)*
Education level	No formal education	2 (0.5)	1 (0.2)	3 (0.8)
	Primary school	1 (0.2)	12 (3.0)	13 (3.2)
	Secondary school	28 (7.0)	98 (24.5)	126 (31.5)
	Diploma holder	36 (9.0)	75 (18.8)	111 (27.8)
	Degree holder	68 (17.0)	57 (14.2)	125 (31.2)
	Post-graduate degree	12 (3.0)	10 (2.5)	22 (5.5)
	Missing	-	-	*14 (3.4)*
Occupation	Self_employed/Business owner	21 (5.3)	30 (7.6)	51 (12.9)
	Government worker	18 (4.6)	37 (9.4)	55 (13.9)
	Private sector worker	63 (15.9)	99 (25.1)	162 (41.0)
	Student	26 (6.6)	70 (17.7)	96 (24.3)
	Housewife/not working	8 (2.0)	15 (3.8)	23 (5.8)
	Retired	5 (1.3)	0 (0)	5 (1.3)
	Other	2 (0.5)	1 (0.3)	3 (0.8)
	Missing	-	-	*19 (4.6)*

5.2. Frequency of visitations

The basic demographic questions in this study also asked about the frequency of visitations to both parks. About 30.3% (n=116) of the park users visited both of the parks on every weekend. Most of the users or about 30% (n=115) also happened to be visiting the park every 1 to 3 times in a month. Only 1.8% visited Taman Lembah Kiara every day while 4.7% visited Taman Rimba Riang on a daily basis. It was also surprising that about 8.4% (n=32) had never visited both of the park before, and that, it was their first time to the parks.

5.3. Length of stay

Nearly half or 43.2% (n=168) of the park users were identified to be using the park within one-hour time. About 29.6% (n=115) were identified to be from Taman Rimba Riang while about 13.6% (n=53) were those from Taman Lembah Kiara. In the other hand, the second largest groups were identified as those who visited the park between 2 – 4 hours at every visit. This was about 17.2% (n=67) in Taman Lembah Kiara and 21.9% (n=85) in Taman Rimba Riang. Similarly, only 15.4% (n=60) visited the park lesser than one hour and only 0.8% visited the park full day. This could be indicated that outdoor green open spaces still seem to be important recreational venues among neighbourhood park users in this study.

5.4. Distance to neighbourhood park

The length of stay to both of the parks does not seem to be related to the distance of the neighbourhood park from the park user's home. This is because, most of the respondents were identified to be staying more than 5km from the park (n=97; 24.9%) and yet, they still visit the park at least on the weekend. Most of the neighbourhood park visitors mentioned that the distance between their home and the park is about 1km – 2km (n=23; 5.9%) for Taman Lembah Kiara and (n=74; 18.9%) Taman Rimba Riang. Only about n=49 (12.6%) stayed at a distance of 4km – 5km from the neighbourhood park. This shows that distance do not play an important role for park visitations among park users.

5.5. Use pattern in neighbourhood park

Table 1.4 indicates the responses on community participation on use pattern in Neighbourhood Park; about 65% agreed that a neighbourhood park should have Food and Beverage (F&B) kiosk while 54% disagree that they will only visit the park when there is a special event going on. On the reverse statements given in the questionnaire, about 72% enjoyed the sound of water in the park, 67.2% prefer many trees in the park; 59.4% do not like to fish in neighbourhood park; 63.3% prefer larger parks; 43.3% only come to the park to meet friends. About 58% disagreed when asked if they have often celebrated birthday parties or even BBQ with friends and family in the park. In the other hand, only 10.6% walk their pets to the park; 20.5% walk in the park every day; only 23.4% jog in the park every day, which indicated that Malaysian park users do not normally recreate actively in the outdoors. The responses whether they usually relax alone by the pond or sit on the grass does not give any strong indication about their usage in the park as the results turn out to be about the same throughout the range.

Table 4. Distributions of park users' use pattern in neighbourhood parks

Use Pattern Items	Agreement Level[1]		
	Disagree	Neutral	Agree

I will only visit the park if there is some special event going on	54.1	25.1	20.8
I do not like the sound of water	72.2	14.5	13.2
I do not like this park as it have too many trees	67.2	19.1	13.7
I walk my pets to this park ever yday	71.0	18.4	10.6
I enjoy skating with my friends here	57.7	24.6	17.6
I often celebrate birthday parties or have BBQ with friends and family in the park	57.9	23.7	18.4
I usually relax alone resting by the pond or sit on the grass	38.4	25.8	35.8
I only come here to accompany my children to the playground	43.2	25.1	31.6
I like to fish here	59.4	22.0	18.6
I prefer smaller parks	63.3	21.0	15.7
I only come to this park to meet with my friends	43.3	22.7	34.1
Watching people is the only thing I do here	45.2	23.7	31.2
I often spend time in the wooded/forest area of this park only	35.3	30.9	33.8
I think some kind of F&B kiosk is an absolute requirement for this park	14.8	20.8	64.5
I walk in this park every day	48.8	30.7	20.5
I jog here every day	48.1	28.5	23.4

Note: All entries are percentage; n = 414.

[1] Agreement level are based on Disagree = Strongly Disagree + Disagree; Neutral = Neutral; Agree = Strongly Agree + Agree. It was based on the original scale of 1=Strongly Disagree, 2=Disagree; 3=Neutral; 4= Agree; and 5= Strongly Agree.

5.6. CFA on use model (U)

A confirmatory factor model was also tested on the three use pattern sub-scales, namely: a) Activities; (b) Passive Activity and (c) Active Activity. All factors are inter-correlated, indicated by two-headed arrows. There is a total of 16 observed use pattern variables. They represent various use pattern items selected in the green open spaces literature. The observed variables load on the factors in the following pattern: USE_1 until USE_10 load on Factor 1; USE_11 until USE_13 load on Factor 2; and finally USE_14 until USE_16 load on Factor 3. All USE factors were correlated and inaccuracy of measurement associated with each observed variables (err01 – err16) are uncorrelated.

The model was also considered being a fit model with standardized estimates of RMSEA value (0.064), CFI (0.942), GFI (0.935) with p=.000. Table 1.3 specified that all factor loadings of USE indicators were significant at 0.005 levels. Based from the confirmatory model, only USE_14 under use pattern construct was deleted because the factor loading was below 0.40. Among other important additional measurement were NFI (0.912), IFI (0.942), AGFI (0.902) and TLI (0.923). This has remained to only 15 items in USE confirmatory factor analysis model.

Table 5. Estimates of Regression Weights or Significant estimates for use's CFA model

Items - Constructs[1]			Estimate[2]	S.E.[3]	C.R.[4]	*p*[5]
USE_1	<---	F1	1.000			
USE_2	<---	F1	.862	.105	8.252	***
USE_3	<---	F1	.877	.103	8.484	***
USE_4	<---	F1	1.303	.133	9.779	***
USE_5	<---	F1	1.409	.143	9.835	***
USE_6	<---	F1	1.416	.144	9.847	***
USE_7	<---	F1	1.142	.135	8.459	***
USE_8	<---	F1	1.131	.140	8.050	***
USE_9	<---	F1	1.308	.143	9.179	***

Items - Constructs[1]			Estimate[2]	S.E.[3]	C.R.[4]	*p*[5]
USE_10	<---	F1	1.118	.128	8.746	***
USE_11	<---	F2	1.000			
USE_12	<---	F2	.884	.099	8.895	***
USE_13	<---	F2	.700	.083	8.405	***
USE_15	<---	F3	1.000			
USE_16	<---	F3	1.072	.071	15.069	***

Note:
[1] Constructs are represented by: : F1=Activities; F2=Passive Activity; and F3=Active Activity;
USE 1 – 16 are the use pattern items;
[2] Estimates of the regression weights;
[3] Approximate standard error;
[4] Critical ratio. The critical ratio is the parameter estimate divided by an estimate of its standard error.
[5] These are based from the standardized estimates values; *** p < .005

6. Discussion

The results from this study supported and therefore, indicated that there were significant correlations between the qualities of green open spaces with the use and between the use patterns with the satisfaction aspect of park users. This also can be concluded that there is a direct relationship between use and quality green open spaces. Hence indicating that park users' use pattern is obviously an important aspect to consider in relation to assessment and development of quality neighbourhood parks. Overall in Malaysia, it could be generalized that people often come to neighbourhood parks, not only to play games such as tennis, badminton and skating, but they also come to the park to accompany their children to the playground or even just to leisurely meet with friends nor walk or jog in the park every day.

The findings from this study were similar to T.W. Zhang and Gobster (1998) as well as Lindsey's (1999) study where among the usual use pattern in the Indianapolis Greenways were either walking, jogging or running, skating and bicycling, swimming, tennis, relaxing and basketball. In Zhang's study, relaxing includes leisure activities such as people watching, sitting, walking and chatting. Correspondingly, Lindsey's study found that the reasons for using greenway trails are because of health and fitness along with factors such as the quality of maintenance and trail features, which indicate the needs for additional drinking fountains. While, most common activity was found to be the usage of trails at least more than three times per week.

Interestingly, these findings were also in agreement with Wrigley's (2002) study which highlighted the issues of non-use, hence among approaches that could help to boost up the usage are through creating more proper facilities like children's playground, improve safety within space which are very close or near to the surrounding water and bushes, provide diversification to the site such as the addition of gas or electric barbeque facilities near picnic tables which could be said as to provide a multi-purpose space, locating the toilets and picnic tables closer to parking zones, enhance accessibility between spaces for disabled, organize outdoor class and activities for school groups or special occasions such as weddings in the park, lessening in display plant material (to lower operational costs), signage improvement, designate walks or jogging trails which could as well provide educational information about specific plants etc and finally, implementation of guided walks policy 'Friends of the Parks' groups as have been implemented by the Taman Lembah Kiara's 'Friends of Kiara' community group.

Generally, Malaysian park users' do not prefer smaller parks, they do not like to fish in the park or walk their pets to the park. At the same time, the positioning of trails and pavements was regarded to be fairly important, and finally majority of the park users' agrees that the park is useable when the areas within the park are properly designed. Hence, this could answer to the research question that the pattern

of use among Malaysian park users' could be similar to those park users in other Neighbourhood Parks in any other part of the world.

In term of frequency of use among park users', the result from this study confirms the study done by Arnberger (2006), where Arnberger posits that by providing information about daily, weekly or even yearly use pattern could indicate the types and needs for recreation facilities indicating different use pattern towards recreational facilities, plans and management actions. In light of these matters, this study in the other hand indicated that recreation use among Malaysian park users in terms of usage timing is most likely to be at its highest between late morning and late afternoon especially during weekends with the occurrence of many bicyclist, jogger, walker and dog walker. Most of the Malaysian park users also only use the Neighbourhood Park within one hour while only minority visited the park full day. This could indicate that Malaysian warm and highly humid climate could most probably defer park users from using it for longer hours during the day. In the other hand, park distance does seem to be related to the length of stay among Malaysia park users. This is because, based from the result, even those who were identified to be living more than 5km away from the park, and visited the Neighbourhood Park at least on every weekend.

However, there were slight differences between socio-demographic characteristics of 414 respondents from both sites in term of the basic categories in the socio-demographic such as gender, ethnic groups, age groups, marital status, monthly income, highest education and occupation are more or less the same between the two parks used in this study. The park user of Taman Rimba Riang in Kota Damansara seems to be dominating in many aspect of the socio-demographic background.

This result supports the existing study by Gobster (1995) and Kaczynski et al. (2008), wherein Gobster's study found that even 8km of local trail would be too far especially for older adult users (more than 55 years old). Gobster's study persist that local trails should be connected directly to the metropolitan trails scheme because it constantly meets every day users' needs towards recreation, commuting and access to nature. On a daily basis need, small loop trails that pass through parks and neighbourhood will be more useful and cost effective. Alike, Kaczynski's study contends that factors such as size and distance to the park itself were not significant. As the final say, this study has confirmed several use pattern aspect, which contributed from community participation to better usage among residents in the neighbourhood. This study also confirms that the neighbourhood park development does help create a more meaningful experience to park users. Hence, designers should strive to create quality neighbourhood parks not only to boost the value of the surrounding neighbourhood but to also give more overall benefit and experience to the day-to-day users.

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