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USE PATTERN AND ACTIVITIES: THE EVALUATION OF MALAYSIAN GREEN OPEN SPACE DESIGN

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Abstract

Numerous studies acknowledged green open space (GOS) as part of the sustainable component which promotes livability and active community. GOS offers the opportunity for people to socialise through appropriate outdoor setting. Acknowledging countless GOS benefits, hence it appears relevant to plan for a good quality of GOS (QGOS). A QGOS ensures park users enjoy maximum utilisation and benefit of outdoor spaces. Having a good QGOS is one of the government strategies included in the 11th Malaysian Plan 2016-2020, to improve people quality of life. Numerous urban related studies had shown that proximity, use pattern, sociability, accessibility and varieties of activities are the significant factors for successful parks design with the consideration of needs and preferences of park users. Hence, this paper will focus on park use pattern to access the quality of the neighbourhood park (QNP) in Malaysia. The objectives are; i) to identify park use pattern among Malaysian, ii) to determine influential factors of Malaysian park use pattern. A quantitative method of questionnaire survey was conducted to obtain the data. Factor analysis results generated from the 1,500 respondents surveyed at 15 Malaysian neighbourhood parks indicated that nature appreciation loads the highest (Eigenvalue = 2.067, Variance Explained = 29.534%), social and active activities (Eigenvalue = 1.270, Variance Explained = 18.137%), followed by passive activities (Eigenvalue = 0.825, Variance Explained = 11.785%). Together, this finding provides essential guidance for park planners to plan for future QGOS and as part of the support to the 11th Malaysian Plan (2016-2020).

Keywords: quality neighbourhood park, use pattern, activities

INTRODUCTION

Current statistics release by World Health Organization (WHO) indicates minimal level of people involvement in physical activities around the globe. Lack of involvement in physical activities has led to increasing death rate and non-communicable diseases (NCD). Hence, encouraging more people to actively involve in physical activities is included as one of the four global strategies to overcome this shortcoming. In 2015, all countries, including Malaysia, had taken proactive measures by being signatories to the Transforming our World: The 2030 Agenda for Sustainable Development. The Agenda strives to ensure universal health coverage and decreasing health inequities for people of all ages. Apart from that, enhancing people's well being particularly on community health is one of the main strategies listed in the 11th Malaysia Plan (2016-2020).

To date, previous and current studies have been emphasising on the significant benefits of GOS in terms of active participation in physical activities (PA) for all ages. However, GOS offers countless other benefits including health benefits, social sustainability, and environment and psychological improvement (Warburton, Nicol, & Bredin, 2006; Wendel-Vos, Droomers, Kremers, Brug, & Van Lenthe, 2007). Along with these benefits, QGOS is seen as a significant contributor to promote a healthy lifestyle among Malaysian citizen. QGOS encourage active park utilisation through variety of recreational activities. Several studies have documented that maintenance, safety, facilities, accessibility, distance and natural elements are the significant factors that influence park usability (McCormack, Rock, Toohey, & Hignell, 2010; Chen, Liu, Xie, & Marušić, 2016). Moreover, access to parks and GOS brings positive effects to physical, mental health and human well-being (Sugiyama, Healy, Dunstan, Salmon, Owen, 2008; Park et al., 2011; Houlden, Weich, & Jarvis, 2017). However, this paper narrows its focus on park use pattern and activities upon two measures of the user's needs and preferences, particularly in Malaysia neighbourhood park context.

LITERATURE REVIEW

Needs and Preferences Related to Quality Neighbourhood Park

Recent studies on high-quality park have emphasized the essential of park use pattern, perception and user's needs in an outdoor setting (Lee & Maheswaran, 2010; Goličnik & Thompson, 2010). In the past century, the term 'park quality' addressed the relationship between man and space (Carmona, Heath, Oc, & Tiesdell, 2003; Francis, 2003; Ter, 2011). In the 20th century, guided by this concept, parks are designed to offer various recreational activities, with consideration of user's needs and satisfaction. Needs and satisfaction are two essential measures to ensure social sustainability and enhance people well-being through green open spaces (Kweon, Christopher, Leiva, & Rogers, 2010; Hadavi,

Kaplan, & Hunter, 2017). Meanwhile, other studies on parks and green open spaces have also found that people's needs and preferences on activities conducted within the park area influence the level of park utilisation (Iamtrakul, Kardi, Jian, & Kazunori, 2005; Maulan, 2015; Moulay, Ujang, & Said, 2017; Abbasi, Alalouch, & Bramley, 2016; Paul & Nagendra, 2017). Francis (2003) found out that the identification of user's needs helps in the formation of successful green open spaces design and would prolong the time spend in the park itself. Moreover, other studies found that different countries display different needs and preferences (Priego, Breuste, & Rojas, 2008; Schipperijn et al., 2010). Hence, this implicates that the identification of both needs and preference helps designers to ensure good QCOS and generate high park utilisation among users. When user's needs are fulfilled, the level of satisfaction increases.

Parks Usage and Physical Activity Pattern
Prior studies pertaining neighbourhood park usage have outlined several criteria of active park utilisation. Activities conducted, transportation mode, frequency of usage and travel time are among frequently used measures to determine park utilisation (Parks and Recreation Department, 1989; Yuen, 1996; Bahrini, Bell & Mokhtarzadeh, 2017). Indeed, other studies reported that the facilities provided, park sizes and park distance from home profoundly determine park use pattern (Giles-Corti et al., 2005; Kaczynski, Potwarka, & Saelens, 2008). For instance, the closer the neighbourhood area to the park, the more percentage it is likely to be utilised by the residents. However, there are also studies that measure park use pattern by green infrastructure (Mansor, Said, & Mohamad, 2010), park space quantity and quality, facilities condition, social demographic as well as park management (Nasution & Zahrah, 2012).

Additionally, Matsuoka & Kaplan (2008) reported that the outdoor physical setting, particularly nature elements, has a strong influence on the park user's wellbeing and their responses towards the outdoor setting. In other related studies, Hadavi et al. (2017) found that physical activities performed, frequency of walk and visitation are the crucial measures to park use pattern.

Active, Passive and Social Activities
A study conducted by Carr, Francis, Rivlin and Stone (1992) stated that comfort, relaxation, discovery, and user's engagement with the environment are four significant basic needs of people towards open spaces. Passive includes watching people and the surrounding nature. Meanwhile, active activities involve contact with people, socialising and recreational activities. Hari and Kujala (2009) pointed out that social activity occurs when there are at least two or more people connected to each other with interactivity process and encouragement in an outdoor space. Gobster (2002), characterised three types of activities within the outdoor spaces as i) passive activities (PA), ii) active individual (AI), and active

group activity (AG). He further elaborated that passive activities include relaxation, recreation or socialising such as meeting friends, reading and others. Active individual activities include outdoor sports activity done individually such as jogging and walking. Meanwhile, active group activities are similar to the active individual, except it is performed in a group.

STUDY AREA
A total number of 15 neighbourhood parks situated within an urban area in Klang Valley were selected as the study area (Figure 1). The size of each park ranges between 4 to 20 hectares. A total number of 1,500 questionnaire surveys were distributed randomly among the parks users to determine the use pattern of Malaysian neighbourhood park, particularly on the activities conducted.
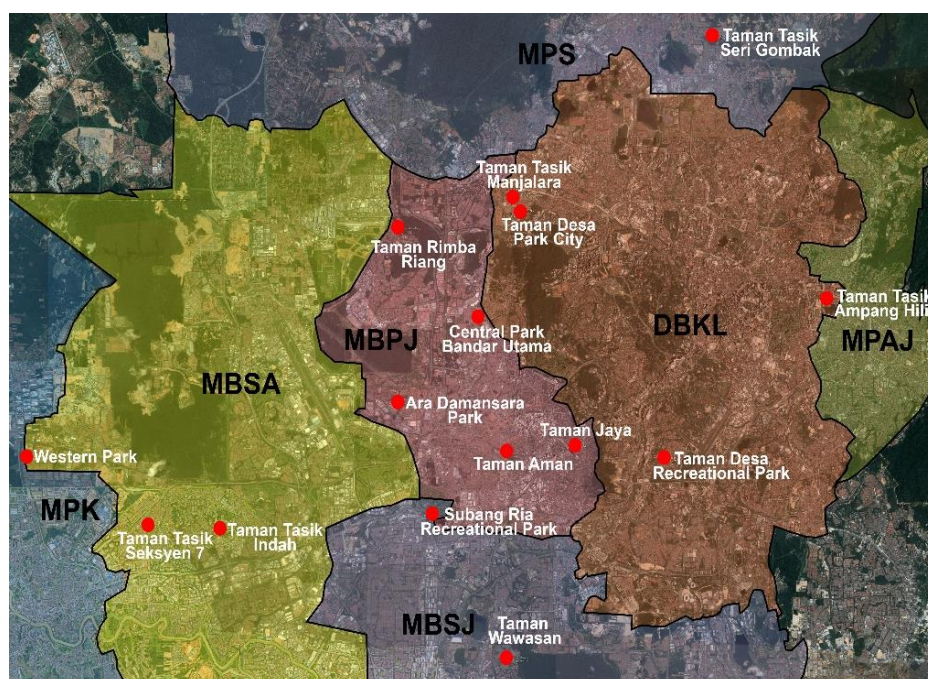

Figure 1: Location of 15 neigbbourhood parks selected as study areas

Factor analysis was computed with principle axis factoring (PAF) using SPSS to answer both objectives of this paper. A series of statistical assumptions were met to ensure data appropriateness for exploratory factor analysis (EFA). Kaiser-Meyer-Olkin (KMO) test determined sample acceptability.

A principal axis factoring was computed using Promax rotation to distinguish the measures of Malaysian park use pattern based on park user's needs. Barlett's test of sphericity ($p = 0.000$) and the KMO measure of sampling

adequacy (KMO = 0.636) all quantified that the data satisfy the threshold for Principle Axis Factoring (PAF) (Table 1). The PAF (with Promax rotation) generated three factors based on Kaiser criterion (Eigenvalue = 1.0). The factors were named as nature preferences (NP), passive activities (PA) and active activities (AA) under park use pattern.

Table 1: KMO and Bartlett's test of sphericity

KMO and Bartlett's Test		
Kayser-Mayer-Olkin Measure of Sampling Adequacy		0.636
Bartlett's Test of Sphericity	Approx. Chi-Square	3978.612
	df	21
	Sig.	0.000

RESULTS AND FINDINGS

Nature Appreciation Associated with Park Use Pattern
The result offers important insights of Malaysian neighbourhood park use pattern where out of three factors generated, nature appreciation indicated the most significant criteria, followed by social and active activities and passive activities. The results shown in Table 2 and 3 below, indicate that sound of water (0.864), the number of trees (0.703), and special events (0.694) are among nature appreciation essential factors for park use pattern in Malaysia.

Table 2: Factor analysis on Malaysian neighbourhood park use pattern

Item	Nature elements	Social & Active Activities	Passive activities	Cronbach's alpha(α)	% of total variance
I do not like the sound of water	0.864			0.790	29.534
I do not like this park as it has too many trees	0.703				
I will only visit the park if some special events are going on	0.694				
I do my jogging here everyday		0.812		0.781	47.671
I only come to this park to meet with my friends		0.804			
I often spend time in the wooded/forest of this park only			0.805	0.695	59.456
I like to fish here			0.670		

Several implications drawn from the findings are; firstly, water is one of the nature appreciation for parks which required certain characteristics. Most of the park users prefer water elements with less sound such as pond or lakes. Secondly, it is essential for parks to have an appropriate number of trees. A possible explanation is that, too many trees will reduce user's visual link from opposite spaces and create sense of enclosure. Indeed, a study conducted by Moulay et al. (2017) on open spaces found that legibility and visibility within park spaces are two essential measures to successful park design in Malaysia. The study further elaborated that too many obstacles such as trees and other objects will delay the visibility process within spaces, hence reduce spatial connectivity. Hence, maintenance, continuous vision, safety and security are part of significant measures related to the theory of defensible spaces for the outdoor environment (Newman, 1972). Bounds (2008) also identified spatial continuity, simplicity, clarity and hierarchy of the elements between spaces as part of the measure of QGOS.

Therefore, the finding indicates that trees location and maintenance are two significant measures in park space design. Other studies emphasised that tree characteristic is another aspect which contributes to park user's safety and security (Mohd. Hashim, Othman Thani, Jamaluddin, & Mohd Yatim, 2016). Meanwhile, Krenichyn (2006) found that majority of female users feel unsafe when utilising dark and enclose spaces.

Natural elements particularly trees are part of the prominent features of successful GOS design (Abdul Malek & Nashar, 2018). Hence, together the findings provide an important insight that, choosing the right trees is a key challenge for park planners and landscape architect in park design. It is because tree characteristics will influence user's behaviour and experience towards outdoor spaces, besides offering recreational opportunities for people to enjoy being outdoor (Rahman, Tuan Hussain, & Mohamad Ismail, 2017).

Activities Related to Park Use Pattern in Malaysia
Different user's have different preferences and needs. The second highest theme extracted was social and active activities (Eigenvalue = 1.270, Variance Explained = 18.137%), followed by passive activities (Eigenvalue =0.825, Variance Explained = 11.785%). Majority of park users in Malaysia prefer social and active activities such as jogging and meeting friends rather than passive activities. The findings also indicate that age strongly influences activities selection. Descriptive analysis computed on age factor indicates that majority of 93% of park users are below 45 years old. Meanwhile, about 17% of park users age from 43 years old and above.

Table 3: Frequency analysis on park user's age

Age	Frequency	Percentage
16-25	643	41.5
26-35	459	29.5
36-45	348	22.4
45 and above	103	6.6

Indeed, this finding is also supported by other studies that suggest it is important for park designers to consider types of activities based on age group factor as it will influence park use pattern (Veitch, Bagley, Ball, & Salmon, 2006; Lloyd, Burden, & Kiewa, 2008; Adams, Harvey, & Brown, 2012). Moreover, a variety of activities offered is one of the criteria for a successful park, where such events will contribute to social sustainability and enhance social interaction through participant involvement.

On the contrary, lack of participant involvement cause challenges for cities to develop a successful park design. This statement is supported by a recent study conducted, which indicates that lack of participant participation, social interaction and common experiences between park users lead to discouraging of social sustainability process and social cohesion (Al-Bishawi & Ghadban, 2011; Harun, Zakariya, Mansor, & Zakariya, 2014). Therefore, it is important for Malaysian park planners to design park spaces for social oriented program or group based activities. Lack of social sustainability among park users is one of the alarming current issues that need to be taken into consideration for future benefits of the society (Neutens, Farber, Delafontaine, & Boussauw, 2013; Feng & Astell-Burt, 2016). Besides, other influential factors such as maintenance, facilities condition and sufficiency are also among successful park planning criteria that need to be taken into consideration (Giles-Corti et al., 2005; Wilhelm Stanis et al., 2009).

CONCLUSION
Figure 2 below shows the summary of park use pattern of neighbourhood park in Malaysia. In summary, the findings shown in Figure 1 provide important information on current park use pattern in Malaysia. The identification on park use pattern will, later on, assist park planners to determine suitable park facilities as well as appropriate design settings which are concurrent to user's needs and preferences. Indeed, it is also evident in other studies that park use pattern is one of the prominent factors to successful neighbourhood park design in Malaysia (Abdul Malek & Nashar, 2018). Park utilisation will increase when user's needs and preferences are met. The findings also support the theory of human needs of open spaces which highlighted two important measures of human needs on nature and recreational opportunities. Therefore, it is hoped that all of the findings

discussed earlier will contribute to planning for better quality of neighbourhood parks, particularly in Malaysian context.
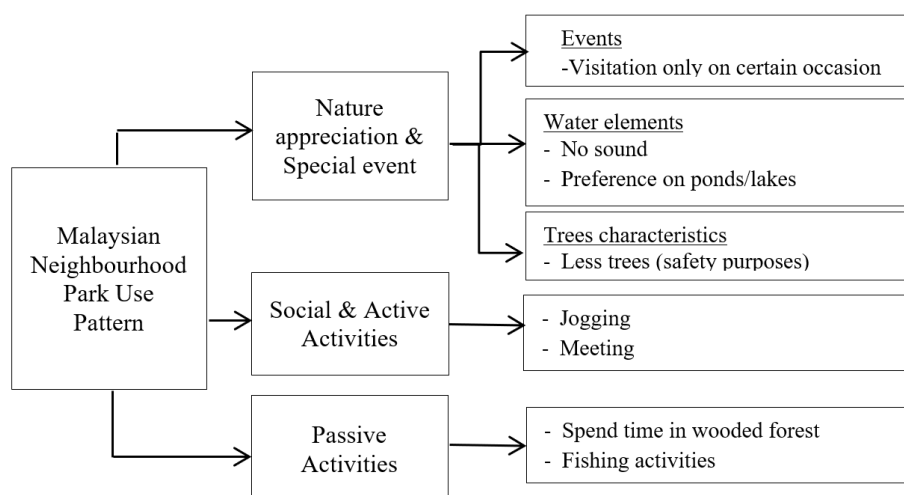

Figure 2: Summary of park use pattern in Malaysia neighbourhood park

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