Nearby Pockets for Promoting Students' Social Interaction on Malaysian Campus Ground

Taman Poket Berdekatan untuk Menggalakkan Interaksi Sosial Pelajar di Kawasan Kampus di Malaysia

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ABSTRACT

Recently, nearby pockets on campus ground have become an important tool to improve academic outcomes by enhancing students' social-learning activities. However, nearby open spaces and pocket parks of Malaysian universities lack the promotion of social interaction and informal activities that affect the academic experience, especially in the outdoor spaces. Therefore, there is a need to enhance students' social interaction on campus ground in Malaysian universities. This study aims to understand the preferred attributes of nearby pocket parks in Malaysian universities to predict students' social interaction. This study employed a visual preference survey (VPS) conducted in three Malaysian universities, including Universiti Malaya (UM), Universiti Putra Malaysia (UPM), and Universiti Kebangsaan Malaysia (UKM), to assess the visual preferences of 415 students toward six pocket parks photographs. Multiple regression analysis was used to predict the relationship between students' social interaction and preferred pocket parks. The results indicate that students preferred pockets that provide variety in softscape and activities as well as offer proper hardscape and shade to enhance their social interaction. The results also show that students from different ethnicities, education status and universities have different social interaction levels on Malaysian campus grounds. The current study contributes to integrating nearby pocket parks in outdoor social interaction to improve campus urban design and academic experience. Hence, the study's findings are of great importance for policymakers, architects, landscape architects, urban planners, and researchers in the field in creating sustainable-socially responsive campuses.

KEYWORDS

Pockets on-campus ground, Social interaction, Visual preference survey, Sustainable campus, Malaysian universities

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ABSTRAK

Dewasa ini, kawasan taman poket di kawasan kampus telah menjadi faktor penting untuk meningkatkan hasil akademik dengan menambahbaikkan aktiviti pembelajaran secara sosial di kalangan para pelajar. Walau bagaimanapun, kawasan lapang dan taman poket di universiti di Malaysia kurang menitikberatkan tentang interaksi secara sosial dan aktiviti tidak rasmi yang dapat mempengaruhi pengalaman akademik, terutama sekali di tanah lapang. Oleh itu, terdapat keperluan untuk meningkatkan interaksi sosial pelajar di kampus universiti di Malaysia. Kajian ini bertujuan untuk memahami ciri-ciri pilihan kawasan taman poket di universiti di Malaysia untuk mengetahui cara interaksi sosial para pelajar. Kajian ini menggunakan tinjauan preferensi visual (VPS) yang dilakukan di tiga universiti di Malaysia, iaitu Universiti Malaya (UM), Universiti Putra Malaysia (UPM), dan Universiti Kebangsaan Malaysia (UKM), untuk menilai pilihan visual 415 orang pelajar terhadap enam taman poket bergambar. Keperluan analisis regresi digunakan untuk menjangkakan hubungan di antara interaksi sosial pelajar dan taman poket pilihan. Hasilnya menunjukkan bahawa para pelajar lebih menggemari taman poket yang menyediakan kepelbagaian jenis landskap lembut dan aktiviti serta menawarkan jenis-jenis landskap kejur dan tempat teduhan yang sesuai untuk meningkatkan tahap interaksi sosial di antara mereka. Hasil kajian juga menunjukkan bahawa pelajar dari pelbagai etnik, status pendidikan, dan universiti mempunyai tahap interaksi sosial yang berbeza di dalam kawasan kampus di Malaysia. Kajian semasa menyumbang untuk mengintegrasikan taman poket berdekatan dalam interaksi sosial luar bagi meningkatkan reka bentuk bandar dan pengalaman akademik. Oleh itu, penemuan kajian ini sangat penting bagi penggubal dasar, arkitek, arkitek landskap, perancang bandar, dan penyelidik di dalam bidang ini dalam mewujudkan 'livable-socially' kampus yang paling sesuai.

KATA KUNCI

Poket di kawasan kampus, Interaksi sosial, Tinjauan preferensi visual, Kampus lestari, Universiti di Malaysia

1.0 Introduction

Pocket parks are small-scale nearby open spaces, usually range from less than 5000 m² to linear, irregular paths, greenways, or even roads and railways. They usually have one or two open sides (Swanwick et al., 2003; Nordh et al., 2009; Baur and Tynon, 2010). Pocket parks are also known as “vest pockets” or “mini-parks,” terms that were used earlier in the 1960s in New York City (Pescharadt and Stigsdotter, 2014). Nearby pocket parks can provide a wide range of benefits and services to most nearby communities and neighbourhoods, including environmental, social, recreational, mental, cognitive and even intellectual benefits (Baur and Tynon, 2010; Pescharadt and Stigsdotter, 2014). Nearby pocket parks were most often located in urban areas surrounded by few houses to gathering people for socialization and enjoy the outdoors. Recently, pocket parks have become an essential tool to provide necessary greenery for a small group of people to engage in various types of outdoor activities such as social interaction, recreation, physical and mental activity, as well as rest and meditation (Pescharadt et al., 2012; Pescharadt and Stigsdotter, 2014). Pescharadt et al. (2014) also stated that the pocket park could be located in high-density areas to be used during breaks or lunch. More importantly, nearby pocket parks have become necessary, and they must be readily available due to their contribution to an individual's well-being and social interaction (Nordh and Østby, 2013; Pescharadt et al., 2014).

The attributes and characteristics of nearby pocket parks affect the users' preference and usage by promoting or preventing social interaction, health and physical benefits, rest and restitution (Nordh et

al., 2009; Lau et al., 2012; Hecke et al., 2018; Balai Kerishnan et al., 2020; Salih et al., 2020). Giridharan et al. (2008) and Nordh et al. (2011) mentioned that pocket parks' softscape, such as trees, grass, shrubs, and water features, are the most predictive of the social and health benefits. Lau et al. (2012) confirmed that building geometry (shading) have a critical impact on the outdoor air temperature and environmental performance of the pocket parks, especially in hot climates. The hardscape and built features of nearby landscapes also have a significant impact on visual preferences to these landscapes (Abd El-Aziz, 2015; Balai Kerishnan et al., 2020). The other attributes of pocket parks that influence users' preferences could include well design and image (Currie, 2016; Tabassum, 2018) and the availability of dynamic activities (Hecke et al., 2018; Balai Kerishnan et al., 2020; Salih et al., 2020). In addition, people from different backgrounds have different visual preferences for the nearby pockets and their design attributes (Hafner et al., 2018; Salih et al., 2020). This indicates that people's age, gender, and education could influence their preferences for nearby landscapes (Hafner et al., 2018).

On the other hand, social interaction refers to interchangeable dynamic activities through which people can respond and interact with each other (Rasidi et al., 2013; Salih and Ismail, 2017b; 2018a). These vigorous activities include any interchangeable exchange of physical or social activities, such as chatting, talking, playing, and refreshments among individuals (Salih and Ismail, 2017a, 2017b). Positive social competition, including sport and learning rivalries, can also stimulate socialization among individuals. Salih and Ismail (2018a) also stated that social interaction could be visual (nonverbal or nonphysical) through clothing, style, gestures, and posture. Public open spaces (POS) and their design approach can contribute to a proper environment that allows individuals to involve in stable and coherent social interactions across different communities and generations (Rasidi et al., 2013). The preferred attributes of POS and landscapes influence people preferences positively, contributing to enhancing social activities in these spaces (Currie, 2016; Salih and Ismail, 2018b). Furthermore, social interactions vary according to the demographic characteristics of interacted individuals. Therefore, successful nearby pocket parks and their design attributes contribute to the social interaction of different people by stimulating their visual preferences and providing various benefits and activities (Salih and Ismail, 2017b, 2019). However, existing evidence showed disagreements about the preferred attributes of pocket parks; this could be due to the climate and social changes of different regions and areas.

Furthermore, higher education has become an urgent need in the communities, as responsible authorities seek to develop various learning settings such as informal social learning (Rea, 2009; Keppell et al., 2012). These settings should provide proper learning environments with proper design approaches to support modern teaching (Keppell et al., 2012). Outdoor learning spaces such as nearby pockets of on-campus ground contribute to a successful social learning setting by promoting informal and formal social learning experiences (Ibrahim and Fadzil, 2013). In the Malaysian context, the responsible authorities are still seeking to develop formal and informal learning settings to promote a modern learning approach. However, extracurricular activities and outdoor social learning settings on the Malaysian campus ground remain neglected or unexplored (Tahir et al., 2009; Ibrahim et al., 2013). Therefore, there is a need to promote students' social interaction on the Malaysian campus grounds. The aim of the current paper is, thus, to understand the preferred attributes of nearby pocket parks in Malaysian universities to promote the social interaction of students from different backgrounds. The current study employed a visual preference survey (VPS) conducted in three Malaysian universities, Universiti Malaya (UM), Universiti Putra Malaysia (UPM), and Universiti Kebangsaan Malaysia (UKM), to assess the visual preferences of 415 students to six pocket parks sceneries.

2.0 Method

This section provides detailed information on the area and sample, data collection and data analysis, as well as reliability and validity of the study.

2.1 Study Area

This study aims to understand the preferred attributes of nearby pocket parks in Malaysian universities to promote students' social interaction. Therefore, the Malaysian universities were selected as a study area. However, the current study only focuses on the universities located in proximity to the capital city, Kuala Lumpur (KL), due to the limitation of the study. The current study also included research universities to reduce external validity threats by collecting accurate data from research universities with better knowledge in various scientific research. According to Sheriff and Abdullah (2017), the research universities focus primarily on innovation and research activities by admitting highly competitive students. There are three research universities near KL, namely UM, UPM, and UKM, included in the current study.

2.2 Study Sample

The current study utilized a judgment sampling procedure from Creswell (2014). First, the students of Malaysian universities were identified as the population of the study based on the aim of the study. Second, a judgment sample was identified from the three Malaysian research universities near KL. The participants were selected from the nearby pocket spaces in the architecture and engineering schools of the three mentioned universities (judgment sample). Taherdoost (2016) stated that the selected sample should be aware of the subject of the study to provide accurate data in the survey. Thus, architecture and engineering students of the mentioned universities were targeted because they are more aware of the content of this study. The simplified Formula of Yamane (1973) was also utilized to identify sample size from the population of Malaysian universities. Based on the result of the Simplified Formula, 420 questionnaire forms were self-administered in April 2019 to the mentioned universities (140 questionnaire forms in each university). The self-administered questionnaire was applied within the context of a face-to-face survey with users in the nearby pocket spaces of the selected schools during weekdays between April and July 2019. It took about 10 minutes to be completed. In total, 415 questionnaire forms were returned and included in the current study; five were incomplete and excluded in the analysis.

2.3 Web-based (Imported) Photographs

A visual preference survey using web-based (imported) photographs were utilized in the current study based on the recommendation of Zheng et al. (2011), Kaboudarahangi et al. (2013), and Mertens et al. (2019). Visual preference surveys using web-based (imported) photographs usually employ in the preference surveys, where the landscape photographs can act as surrogates of the natural environment (Zheng et al., 2011; Hafner et al., 2018; Mertens et al., 2019). Web-based (imported) photographs can also be highly controlled, helping to improve the reliability of results (Mertens et al., 2019). In the current study, the photographs were collected systematically from four electronic databases, including Google Images, Pinterest Visual Search Tool, Shutterstock Stock Images, and ArchDaily. The keywords of the systematic photograph search included pocket parks, nearby open spaces, on-campus pocket parks, on-campus open spaces AND tropical climate, hot humid weather AND Europe, Americas, Asia, Africa, tropical region, subtropical region, or hot humid region. The systematic photograph search led to 584 photographs for pocket parks, from which 504 were excluded due to the exclusion criteria. The exclusion/inclusion criteria included; 1) the resolution of the photograph should be more than 700 pixels in width; 2) including one photograph per site/pocket park. 3) The selected photographs should represent pocket parks from tropical or hot humid weather to ensure that the targeted photos represent pocket parks of environmental conditions similar to or close to those of Malaysia. The systematic search led to including only 80 photographs presented to random volunteers from the Faculty of Design and Architecture, UPM, in March 2019. These 80 photographs were presented in two groups (summer climate pockets and tropical climate pockets) in A1 (59.4cm x 84.1cm) fiberboard sheets as coloured

photographs sized 600 x 410 pixels (16x11cm). The volunteers who participated in the early stage of the VPS were 130 respondents, 88 Bachelor students, 25 Master students, 10 Doctoral students, and seven experts (lecturers). This stage led to including six most preferred photographs, three from summer climate pockets and three from tropical climate pockets, for the questionnaire survey (see Figure 1). In a web-based visual preference survey that combines visual and verbal questionnaires, the selected photographs could vary from two to over 20 photographs (Zheng et al., 2011; Hafner et al., 2018; Mertens et al., 2019).

Summer (Hot-Humid) Climate Pockets

a. Photo 1

b. Photo 2

c. Photo 3

Tropical Climate Pockets

d. Pocket 4

e. Pocket 5

f. Pocket 6

Figure 1. Selected (web-based imported) pocket photographs. (a) Paley Pocket Park, New York (NY), USA. (b) Greenacre Pocket Park, NY, USA. (c) Courtyard Pocket, Central and Wolfe Campus, California, USA. (d) Nearby Pocket of South Beach Mixed-Use, Singapore. (e) Proposed Pocket Park in a Tropical Region. (f) Pockets of Masdar City, UAE.

2.4 Visual Preference Questionnaire

The questionnaire was divided into three parts included; 1) demographic characteristics of participants; 2) social interaction on campus grounds; 3) visual preference to attributes of six photographed pocket parks (see Table 1). The content of the visual preference questionnaire was developed after an intensive literature review for original studies published in indexed journals (Nordh et al., 2011; Zheng et al., 2011; De Vaus, 2013; Peschardt et al., 2014; Hecke et al., 2018; Mertens et al., 2019; Salih et al., 2020). Individual descriptions of each photograph are represented in Table 2.

Table 1. Questions of the Questionnaire Regarding the Study Variable

No	Variable	Question	Rating Scale	Reference
1	Participant variable: demographic characteristics	Please indicate: 1.1. Your gender 1.2. Your age 1.3. Your ethnicity 1.4. Your educational level 1.5. Your university	<i>Dichotomous nominal scale:</i> 1= male, 2= female <i>Continuous scale</i> <i>Nominal scale:</i> 1= Malay, 2= Chinese, 3= Indian, and 4= others <i>Nominal scale:</i> 1= Bachelor student, 2= Master students, 3= Ph.D. student, and 4= others <i>Nominal scale:</i> 1= UM, 2= UPM, 3= UKM	<i>De Vaus (2013), Hecke et al. (2018), and Mertens et al. (2019)</i>
2	Dependent variable: social interaction in nearby pocket parks on-campus ground	2.1. Please indicate; how long you use nearby pockets/open spaces on campus ground for socialization (chatting and conversation)? 2.2. Please indicate; how long you use nearby pockets/open spaces on campus ground for social-recreational activities? 2.3. Please indicate; how long you use nearby pockets/open spaces on campus ground for social refreshments (eating and drinking)? 2.4. Please indicate; how long you use nearby pockets/open spaces on campus ground for other social activities?	<i>Three-points of ratio scale:</i> 1= never use them, 2= < 30 minutes daily, and 3= ≥ 1 hour daily <i>Three-points of ratio scale:</i> 1= never use them, 2= < 30 minutes daily, and 3= ≥ 1 hour daily <i>Three-points of ratio scale:</i> 1= never use them, 2= < 30 minutes daily, and 3= ≥ 1 hour daily <i>Three-points of ratio scale:</i> 1= never use them, 2= < 30 minutes daily, and 3= ≥ 1 hour daily	<i>De Vaus (2013), Peschardt et al. (2014), Hecke et al. (2018), Mertens et al. (2019), and Salih et al. (2020)</i>

3	Independent variable: pocket parks on-campus ground	Please indicate your visual preference to the following pocket parks photographs (see Table 1)	5-point Likert scale: 1 = strongly not preferred, 2 = not preferred, 3 = undecided, 4 = preferred, 5 = strongly preferred	Kaplan and Kaplan (1989), Nordh et al. (2011), Zheng et al. (2011) Hecke et al. (2018) and Mertens et al. (2019)
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Table 2. Description of the Design Attributes of the Selected Photographs

Group	Photographs	Attributes	Description
Summer Climate Pockets	Photo 1 Paley Pocket Park, NY, USA	<i>Softscape (water and plants) and Hardscape (bench and table)</i> <i>Shade and Shading Device</i> <i>Activity: type of activity</i>	"Some large deciduous trees," "evergreen climbing plants," "waterfall/water feature," "colourful flowers/ plants," "wire mesh movable chairs," "light marble tables," and "concrete planter pots" "Few natural shade" "Sitting," "watching," "chatting", and "rest"
	Photo 2 Greenacre Pocket Park, NY, USA	<i>Softscape (water and plants) and Hardscape (bench and table)</i> <i>Shade and Shading Device</i> <i>Activity: type of activity</i>	"Many different types of plants," "colourful flowers/ plants," "shade large trees," "waterfall/water feature," "wire mesh movable chairs," "light marble tables," "concrete planter pots," "signboards," "tree grates," and "garbage bin" "Heavy natural shade" by the tree/plant "Sitting," "watching," "reading," and "rest"
	Photo 3 Courtyard Pocket, Central and Wolfe Campus, California, USA	<i>Softscape (water and plants) and Hardscape (bench and table)</i> <i>Shade and Shading Device</i> <i>Activity: type of activity</i>	"Many different types of plants," "irregular and domed different types of trees," "colourful flowers/ plants," "green grass," "movable chairs," "different types of bench/ tables," and "movable tables" "Some natural shade" from canopy trees and "some artificial shade" from small wooden frame "Sitting," "chatting," "walking," "studying," and "watching"
Tropical Climate Pockets	Photo 4 Nearby Pocket of South Beach Mixed-Use, Singapore	<i>Softscape (water and plants) and Hardscape (bench and table)</i> <i>Shade and Shading Device</i> <i>Activity: type of activity</i>	"Many different types of plants," "irregular and various forms of trees, shrubs/plants," "water feature," and "some movable chairs" "Strong artificial shade" from wavy ribbons of steel and aluminium louvres supported by pillars "Walking," "watching," "phoning," and "chatting"
	Photo 5 Proposed Pocket Park in a Tropical Region	<i>Softscape (water and plants) and Hardscape (bench and table)</i> <i>Shade and Shading Device</i> <i>Activity: type of activity</i>	"Climbing plants," "many movable chairs," and "movable light tables" "Heavy natural shade" from climbing plants (pergola shading device) "Sitting," "watching," "chatting," "walking," "refreshment (eating and drinking)," and "rest"

<p>Photo 6</p> <p>Pockets of Masdar City, UAE</p>	<p><i>Softscape (water and plants) and Hardscape (bench and table)</i></p> <p><i>Shade and Shading Device</i></p> <p><i>Activity: type of activity</i></p> <p>"Green grass," "water feature," and "some date palms". There are "no benches" in the scenery</p> <p>"Artificial shade" from the steel frame and solar panels</p> <p>"Chatting" and "walking"</p>
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2.5 Validity and Reliability of the Visual Preference Questionnaire

A content validity using the Content Validity Index (CVI) was used in the current study to prove the validity of the questionnaire. The visual preference questionnaire was reviewed by a committee of six experts from the field of architecture and landscaping from the Faculty of Design and Architecture at UPM for content validity. The result of the CVI was higher than 0.75 for the three parts of the questionnaire. This result indicated that the six experts agree that the questionnaire items are relevant and valid for the survey (Shrotryia and Dhanda, 2019). A pilot test of the visual preference questionnaire was conducted on 24 participants to check on the timing, clarity, and reliability of the questionnaire used in the current study. The pilot test showed that the visual preference questionnaire was straightforward and took about 10 minutes to be answered. The Cronbach alpha scores for internal consistency reliability was 0.80 (>0.70) for the three items. Thus, the pilot test and reliability test showed that the visual preference questionnaire was reliable and precise. All participants have given informed consent before applying the survey or any related procedure.

2.6 Data Analysis

First, descriptive statistics were used to analyse the primary data of demographic characteristics (participant variable), social interaction on-campus ground (dependent variable), and visual preference to pocket park (independent variable). Second, Pearson's correlation was utilized to analyse the bivariate correlation between the variables of the study. Third, multiple regression analyses were conducted to measure the multivariate relationships between the dependent variables (social interaction) and the participant variable (demographic characteristics), and the independent variable (preferred attributes of the pocket parks). The dependent variable in each stage of the data analysis was the sum of the scores for the four statements on social interaction (overall social interaction). The p-value of < 0.05 was taken as significant. The collected data were analyzed using a statistical package for the social sciences (SPSS) version 23.

3.0 Results

This section explains the results of the current study in detail.

3.1 Participant Demographic Characteristics

A total of 415 participants have participated in the current study; females made up 50.8% ($n = 211$) of the total samples, as the male participants made up 48.9% ($N = 203$) of the total samples. The mean age of the respondents was 23.80 ± 10.80 years, with a range between 18 and 40 years. The majority of the participants were Malay ($n = 201$, 48.4%), followed by 30.1% of Chinese participants ($n = 125$), 14.1% from other ethnicities ($n = 58$), and 7.5% of Indian participants ($n = 31$). In terms of education status, most of the participants were Bachelor students ($n = 205$, 49.4%), followed by 36.4% of Master's students ($n = 151$) and 14.2% of PhD. students ($n = 59$). In addition, most of the participants were from UKM ($n = 161$, 38.8%), 36.9% of them were from UPM ($n = 153$), and 24.3% were from UM ($n = 101$). The participants' demographic characteristics are presented in Table 3 below.

Table 3. Frequency of Demographic Characteristics and Social Interaction

Variable		Frequency	%	Ranges	Total	Missing
Gender	Male	203	48.9	1-2	414	1
	Female	211	50.8			
Ethnicity	Malay	201	48.4	1-4	415	-
	Chinese	125	30.1			
	Indian	31	7.5			
	Others	58	14.1			
Education status	Bachelor	205	49.4	1-3	415	-
	Masters	151	36.4			
	PhD	59	14.2			
University	UM	101	24.3	1-3	415	-
	UPM	153	36.9			
	UKM	161	38.8			
Socialization	Never use nearby pocket parks	226	54.5	1-3	415	-
	< 30 min daily	170	41.0			
	≥ 1 hour daily	19	4.6			
Social-recreational activity	Never use nearby pocket parks	240	57.8	1-3	415	-
	< 30 min daily	141	34.0			
	≥ 1 hour daily	34	8.2			
Social refreshment activity (eating and drinking)	Never use nearby pocket parks	153	36.9	1-3	415	-
	< 30 min daily	176	42.4			
	≥ 1 hour daily	86	20.7			
Other social activity	Never use nearby pocket parks	218	52.5	1-3	415	-
	< 30 min daily	158	38.1			
	≥ 1 hour daily	39	9.4			

3.2 Social Interaction in Nearby Pocket Parks on-Campus Ground

The frequency statistics of the social interaction in the on-campus pocket parks in the Malaysian universities showed that about half of the participants (54.5%) had never used the on-campus pockets for socialization (chatting and conversation, see Table 3). Only 4.6% of the participants performed socialization in nearby pockets for 1 hour or more daily. More than half of the participants (57.8%) reported that they never use the on-campus pocket parks in the Malaysian universities for group recreational activity. Only 8.2% of them used these spaces for group recreation for 1 hour or more daily (see Table 3). About 42% of the participants reported that they used the on-campus pockets for less than 30 minutes per day for group refreshments (eating or drinking with friends). Besides, more than 35% of them never use the on-campus pockets for group refreshments, and only 20.7% used on-campus pockets for 1 hour or more daily for group refreshments. Almost half of the participants (n= 52.5%) also never use the on-campus pocket parks for other social activities; only 9.4% used these spaces for other social activities for 1 hour or more daily (see Table 3). These results indicated that most participants either do not use the nearby pocket park on Malaysian campus ground or only use it for less than 30 minutes per day for different social activities.

3.3 Preferred Pocket Parks Photographs

Table 4 shows the descriptive statistics of the visual preference for the selected pocket park photographs. The highest mean score was registered for the pocket park in photograph 2 (Mean= 4.06, SD= 0.90), which shows a variety of softscapes (plants and waterfall), hardscapes (movable chairs, tables, concrete planter pots, tree grates, signboards and garbage bins, as well as various activities (sitting, watching, reading, and rest), and a heavy natural shade (see Table 2). The second highest mean score of visual preference was reported for the pocket park in photograph 4 (Mean= 4.01, SD= 0.96), which shows variety in softscapes (plants and water feature) and activities (walking, watching,

phoning, and chatting), some movable chairs, and a solid artificial shade. The small standard deviation (<1) referred to a low amount of variation in the answers of participants. In contrast, the lowest mean score was registered for the pocket park in photograph 1 (Mean= 3.49, SD= 1.02, see Table 4), which shows variety in softscapes (plants and water feature), hardscapes (movable chairs and tables and concrete planter pots), and activities (sitting, watching, chatting, and rest) but open to the sky (have no shading device). The large standard deviation ($>, = 1$) referred to a higher amount of variation in the answers of participants. Although the pocket park in photograph 1 showed variety in softscape and hardscape, it also showed a small-sized pocket park with no shading device (opened to the sky) and closed to three sides. In other words, the participants had higher visual preferences for pockets that have a robust shading device. They also might have visual preferences for pockets with variety in softscape, hardscape, and activities.

Table 4. Descriptive Statistics for the Preferred Pocket Parks' Photographs

Variable	Photograph	Mean $\pm$ SD	Ranges	Total	Missing
Visual preference to photo 1		3.49 $\pm$ 1.02	1*-5**	413	2
Visual preference to photo 2		4.06 $\pm$ 0.90	1-5	414	1
Visual preference to photo 3		3.72 $\pm$ 0.94	1-5	415	0
Visual preference to photo 4		4.01 $\pm$ 0.96	1-5	413	2
Visual preference to photo 5		3.74 $\pm$ 0.95	1-5	412	3
Visual preference to photo 6		3.84 $\pm$ 0.94	1-5	413	2

Values: *value (1) = strongly non preferred, value (2) = non preferred, value (3) = undecided, value (4) = preferred, **value (5) = strongly preferred

3.4 Bivariate Correlations between Demographics, Social Interaction, and Preferred Pocket Parks

The Pearson's correlation was utilized to test the bivariate association between the overall social interaction on Malaysian campus ground, the visually preferred pocket parks and participants' demographic characteristics. The Pearson's correlation showed a significant negative association

between on-campus social interaction and visual preferences to pocket parks in photographs 2, 4, and 6 ($P < 0.01$, see Table 5). On the other hand, the Pearson's correlation in Table 5 showed that participants' demographic characteristics, including ethnicity, education status and university, were significantly associated with on-campus social interaction ($p < 0.01$). However, there was no significant association between the participants' gender, photographs 1, 3 and 5 and on-campus social interaction (see Table 5). Therefore, the significant results from the bivariate analysis were only included in the multiple regression analysis. Pearson's correlation also showed few significant results regarding the relationship between participants' demographics (ethnicity, education status, and university) and visual preference to pocket park photographs (see Table 5).

Table 5. Bivariate Analysis for the Relationships between Demographic Characteristics, Social Interaction, and Visual Preference of Photographs

Variables	1	2	3	4	5	6	7	8	9	10
1 Overall social interaction	-									
2 Gender	-.036	-								
3 Ethnicity	-.241**	-.122*	-							
4 Education Status	-.375**	-.115*	.427**	-						
5 University	.240**	-.013	-.039	-.116*	-					
6 Visual preference to photo 1	.075	-.007	-.048	-.026	-.014	-				
7 Visual preference to photo 2	-.167**	-.076	.032	.103*	.040	.054	-			
8 Visual preference to photo 3	-.062	.006	-.102*	-.075	.140**	.228**	.288**	-		
9 Visual preference to photo 4	-.211**	.036	-.038	.086	-.182**	.135**	.328**	.109*	-	
10 Visual preference to photo 5	-.055	-.027	-.002	.080	-.068	.145**	.193**	.348**	.122*	-
11 Visual preference to photo 6	-.134**	-.010	.048	.032	-.004	.226**	.253**	.345**	.304**	.358**

* $P < 0.05$. ** $P < 0.01$.

3.5 Multivariate Correlation between Social Interaction and Preferred Pocket Parks

The multiple regression analysis was utilized to predict the multivariate correlation between the overall social interaction on Malaysian campus ground and the visually preferred pocket parks that showed significant results in the bivariate analysis. The multiple regression analysis was also used to confirm the main findings of the current study. Two steps of multiple regression analysis were applied to test (1) the relationship between overall social interaction and participants' demographic characteristics (model 1), (2) the relationship between overall social interaction and visual preference to selected photographs (model 2) as shown in Table 6. The multiple regression analysis produced significant results in model 1 ($R^2 = 0.170$, $F = 40.956$, $P < 0.001$) and model 2 ($R^2 = 0.224$, $F = 19.565$, $P < 0.001$). Model 1 in Table 6 showed that there is a negative association between ethnicity ($\beta = -0.101$, $p < 0.05$), education status ($\beta = -0.310$, $p < 0.01$), university ($\beta = 0.197$, $p < 0.01$) and on-campus social interaction. In the second step of the multiple regression analysis, Model 2 showed a statistically negative association between visual preferences to pocket parks in photograph 4 ($\beta = -0.107$, $p < 0.05$) and photograph 2 ($\beta = -0.94$, $p < 0.05$) respectively with on-campus social interaction. Model 2 also showed a statistically negative association between ethnicity ($\beta = -0.108$, $p < 0.05$), education status ($\beta = -0.289$, $p < 0.01$), university ($\beta = 0.183$, $p < 0.01$) and on-campus social interaction. Both pocket parks in the significant photographs mentioned were characterized by having robust shading devices with an intensive shade, variety in softscapes and activities. These results indicate that a pocket park with a strong shading device and offers various softscapes and activities, predicts on-campus social interaction. Pocket parks that provide variety in hardscape, especially movable benches, might also predict students' social interaction. Therefore, providing nearby pocket parks designed with a strong shading device, various softscapes, activities and hardscapes contribute to enhancing students' social interaction on campus ground. The results of Model 1 and 2 (Table 6) also indicate that ethnicity, education status, and university predict on-campus social interaction, meaning that participants from different races, education statuses, and universities have different levels of social interaction on-campus ground.

Table 6. Multiple Regression Analysis to predict Social Interaction based on the Attributes of Pocket Parks and Demographic Characteristics

Variables	Model 1		Model 2	
	Standardized Coefficients	Sig.	Standardized Coefficients	Sig.
(Constant)		.000		.000
Ethnicity	-.101	.042*	-.108	.027*
Education Status	-.310	.000*	-.289	.000*
University	.197	.000*	.183	.000*
Photo 2			-.094	.048*
Photo 4			-.107	.031*
Photo 6			-.057	.226

* $P < 0.05$. Dependent Variable: Overall social experience. Model 1: $R = .434$, $R^2 = 0.188$, $F = 31.564$. Model 2: $R = 0.474$, $R^2 = 0.224$, $F = 19.565$.

4.0 Findings and Discussion

The findings of the current study confirmed that nearby pocket parks designed with a strong shading device (intensive shade), different types of softscape and activities, and proper hardscapes predict students' on-campus social interaction. Whereby, students who had a lack of outdoor social interaction tend to prefer pocket parks that provide a strong shading device, various types of softscape and activities and hardscapes. However, the participants of the current study showed lower preference to open to sky pocket parks that have no shading device. These findings are in line with the result from Lau et al. (2012), who found that the shading effect is an important attribute in unique urban cities.

Existing literature also revealed that various softscape elements (Nordh and Østby, 2013) and various activities (Abd El-Aziz, 2015) were predictors of social interaction in nearby pocket parks. The visually preferred softscapes included different types of trees and shrubs, colourful flowers, climbing plants, and water features (see Table 1). These findings contribute to the existing result reported by Cohen et al. (2014), who confirmed that the availability of various types of softscape elements such as trees and shrubs and water elements were essential attributes of small parks. However, findings from Nordh and Østby (2013) asserted that users preferred pocket parks that provided grass and trees instead of decorative elements, such as flowers and water features. Nearby open spaces on-campus ground should provide variety of activities such as recreation and social (Ibrahim and Fadzil, 2013; Hecke et al., 2018). The findings of the current study also suggest that activities such as sitting, watching, reading, chatting, phoning, walking, and resting in the nearby pocket parks predict students' social interaction.

In the assessment of hardscapes contributing to on-campus social interaction, the current study found that either providing a variety of hardscapes (such as bench, table, planter pot, grate, signboard, and garbage bin) or movable chairs can predict students' social interaction. This result contributes to the existing literature that revealed that hardscape elements such as benches in nearby small parks contribute to enhance users' social benefits (Hussein, 2012; Hecke et al., 2018).

On the other hand, the results of the current study indicated that students' demographic characteristics, including ethnicity, education status and university predicted their on-campus social interaction. Students from different ethnicities, education statuses, and universities showed different levels of on-campus social interaction. This result is in line with the finding reported by Zheng et al. (2011), who stated that users' socio-demographic backgrounds could influence their level of social activities in the nearby pocket parks. However, Cohen et al. (2014) found homogenous responses across demographic variables. These different results may be based on the cultural-demographic diversity of the study area whereby if the respondents were from a diverse cultural demographic, they could have different social experiences. Most importantly, regardless of the socio-demographic, on-campus pocket parks need to promote the social experience of the users (Zheng et al., 2011; Hecke et al., 2018; Salih et al., 2020).

The current study also found that most participants did not engage in on-campus socialization, social-recreational activity or other social activity. Besides, most participants used the on-campus nearby pocket parks for less than 30 minutes daily for group social refreshment activity. These findings indicate that the students of Malaysian universities suffered from a lack of daily social interaction in nearby pockets parks on campus ground. This finding is consistent with the results from Malaysia reported by Ibrahim et al. (2013), who confirmed that Malaysian universities focus mainly on indoor activities and lack the provision of outdoor activities. Existing studies from Malaysia and Europe asserted that young people should engage in outdoor social activities daily to reap the various benefits (Ibrahim and Fadzil, 2013; Cohen et al., 2014; Hecke et al., 2018). Therefore, the findings of the current study indicated that pocket parks designed with proper attributes, including shading devices, softscape and hardscape elements, as well as offer various activities could contribute to enhancing students' social interaction. Existing evidence also highlighted that pocket parks and their design attributes contribute to promoting social experience (Peschardt et al., 2014; Hecke et al., 2018). A study conducted by Kim and Lee (2015) confirmed that nearby on-campus spaces contributed to shared places for enhancing students' social activities. Meanwhile, enhancing social interaction on-campus ground can contribute to strengthening the learning experience (Ibrahim and Fadzil, 2013).

There are some limitations of the study. First, due to the sample selection of judgment sample, this study represented the opinions of 415 students of the architecture and engineering schools of three research universities in Malaysia. However, it is common to use a specific group of students as a study sample to reduce external validity threats, as mentioned by Taherdoost (2016) and Hecke et al. (2018). Second, this study utilized web-based (imported) pockets photographs from different regions; thus, the findings must be dealt with carefully. However, to reduce the implication to the results, a systematic photograph search on summer and tropical climate pocket photographs were used (Zheng et al., 2011; Hafner et al., 2018). Third, this study also focused on investigating the visual preference of four attributes of web-based pocket park photographs. More attributes and variables such as park surroundings and size, traffic, people presence, and stimulation elements could affect the preferences of pocket parks (Polat and Akay, 2015; Mertens et al., 2019). However, many existing studies focus on

design elements attribute (Nordh et al., 2009; Polat and Akay, 2015). The design attributes analyzed in the current study were carefully selected based on the existing literature (Kaplan and Kaplan, 1989; Zheng et al., 2011; Hecke et al., 2018).

Despite the limitations mentioned, the current study contributes to highlighting the preferred design attributes of the on-campus pocket parks that predict students' social interaction for Malaysian and tropical countries. Therefore, the findings of the current study are important for policymakers, landscape architects, urban planners, and researchers in the field, particularly in Malaysia. The current study recommends investigating and including more design attributes, such as park surroundings and size, people presence, traffic, and stimulation elements, of the on-campus pocket spaces for future research. Including more design attributes and parameters would help architects and landscape designers design the right pocket parks for the community.

5.0 Conclusion

This study disclosed the role of design attributes of nearby pocket parks on-campus ground and demographic variables in predicting students' social interaction. Understanding the relationships between design attributes of on-campus pocket parks and students' social interaction was the main part of the current study. The current study showed that pocket parks designed with a robust shading device and proper hardscape as well as variety in softscape and activities are essential to predict on-campus social interaction. In addition, students' demographic variables such as ethnicity, education status, and university predicted social interaction on Malaysian campus grounds. The findings of the current study enhance our understanding of the importance of nearby pocket parks in promoting social interaction. Hence, the study is of great importance for policymakers, architects, landscape and urban planners, and researchers in the field in creating liveable-socially responsive campuses.

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