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Experiential Contacts with Green Infrastructure's Diversity and Well-being of Urban Community

Mazlina Mansor[a*], Ismail Said[b] and Ismail Mohamad[c]

[a]*Kulliyyah of Architecture and Environmental Design, International Islamic University Malaysia, 53100 Jalan Gombak, Kuala Lumpur, Malaysia.*
[b]*Faculty of Built Environment, Universiti Teknologi Malaysia, 81310, Skudai, Johor, Malaysia*
[c]*Faculty of Science, Universiti Teknologi Malaysia, 81310, Skudai, Johor, Malaysia*

Abstract

The study explores residents' experiential contacts with green infrastructure in Taiping, a small town in Peninsular Malaysia. Green infrastructure network is green spaces linked by streets and waterways encircling and connecting urban areas, at all spatial scales. Questionnaires (n=335) and semi-structured interviews (n=33) explored the diversity of green infrastructure in Taiping and its relationship with well-being. The findings suggested that various green infrastructure afford the residents participation in physical, leisure and social activities. The participations trigger relaxation, comfort and satisfaction. Thus, provision and planning of green infrastructure with care by urban planners and designers are essential for urban fabrics.

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* Corresponding author. Tel.: +006-61964000; fax: +006-6196486.
E-mail address: mmazlina@iium.edu.my.

1. Introduction

Urban space consists of built-up areas that include variety of land uses in commercial, institutional and residential areas. It also consists of non-built area that is mostly dominated by greenery and open spaces. The non-built areas are the urban green infrastructure that is various types of greenery and open spaces linked by streets, waterways and drainages encircling and connecting urban areas, at all spatial scales (Barker, 1997; Tzoulas et al. 2007). Parks, playing fields, pocket spaces, courtyards, bodies of water, incidental spaces, loose-fit places and other residual spaces, home gardens, and streets are the major green infrastructures in which interaction with nature and with other individuals take place. The non-built areas in Malaysian towns are tropical greenery and open spaces consisting of two main categories: (i) green open space, and (ii) green network. Green open space are public park as the largest green space, civic open space, the *padang*, open spaces of public institutions, pocket and incidental spaces, neighbourhood and home gardens. The green networks are street, stream, river, railway and road corridor and reserves. A green infrastructure network is a composite of these open spaces linked by walkways, streets and trails, which enable urban residents to experience the outdoors both visually and kinetically. Green infrastructure network in any urban area is significant because it attempts to provide optimal experiential qualities to urban residents and to overcome the negative effects of living in the urban built environment. It stresses on the holistic relationship of outdoor open space with a range of human activities in unbroken continuity, thereby, facilitating residents' ability to recreate, socialise and perform other regular transactional activities outside their homes. The urban green infrastructure provides nature contact, aesthetic experiences, recreations and play, and social interactions for urban residents. In addition, it adds to the complexity, patterns, richness and intricacy that offer diversity to the urban spaces. Thus, in most countries including Malaysia, the green infrastructure is an essential part of urban planning and design. On that account, in Malaysia any urban development involving various land uses such as residential, commercial, industrial, institutional and mix-development require at least ten per cent of open space and recreational areas (JPBD, 2006).

2. Green Infrastructure and Well-being

Researches in various disciplines (e.g. Landscape Architecture, Urban Planning, Environmental Psychology and Human Ecology) have increasingly recognized that green infrastructure has significant contributions to urban environment and its inhabitants. One of the most relevant topics is the relationship that people have with the natural features, in particular, with its green aspect (Altman and Wohlwill, 1983; Knopf, 1987). For example, green infrastructure acts as conservation from extreme intervention and development of the urban environment, and, most importantly, it enables urban residents to recreate; to play, to relief stress and to socialise—i.e. to achieve well-being. The roles of green infrastructure network to human well-being are essential, yet often forgotten. Studies in environmental psychology have revealed that the physical, psychological and social benefits of human beings' contact with nature are vanishing in towns and cities because of the disengagement of residents from the natural environment (Katcher and Beck, 1987; Axelrod and Suedfeld, 1995). A considerable body of research shows that contact with nature, passive viewing or participating in nature can generate progressive effects to well-being. For example, the field of health promotion views sense of well-being as a dynamic transaction between individuals and groups and their socio-physical milieu (Stokol, 1992). Therefore, experience in the green infrastructure such as passive viewing or active participation gives direct physical exposure and induces psychological processes that benefit physical, cognitive and social well-being (Maller et al., 2005; Groenewegen et al., 2006).

Well-being is an inner state of wellness including physical, mental and emotional state of consonance, which exists in a healthy environment (Burns, 1998) in which various engagement and experience with the green infrastructure and its attributes maximize residents' sense of well-being. The mixture of built land uses and green infrastructure that is diverse is enjoyable and attractive and makes for lively environment, hence attracting different people at different times for different purposes. The more diverse the open spaces, the higher the intensity of engagement in physical and social activities. For example, the amount of greenery allows residents to view different landscape elements such as vegetation and water. The experience such as varying canopy forms of trees ameliorates stress (Velarde et al., 2007), induce positive emotional responses and lower blood pressure (Lohr and Pearson-Mims, 2006), thus achieving cognitive well-being. Thus, green spaces and nature have been found to enhance emotional well-being, reduce stress and, in certain situations, improve mental health (Ulrich et al., 1991; Ulrich and Parson, 1992).

Physical well-being is achieved from residents' behavioural responses through recreational activities in the green infrastructure such as jogging, walking and playing, which contribute to mobility, vitality and active living (Booth et al., 2000; Bird, 2004), and hence to a feeling of bodily health.

Cognitive well-being is attained when an individual has the ability to use his emotional capability—to think rationally and logically in order to function effectively and meet the ordinary demands of everyday life. Engagement with the natural environment induces pleasurable feelings, including joy, relaxation, comfort and calmness (Korpela, 2002), as well as physiological benefits like higher energy levels and increased ability to relax (Payne et al., 1998).

Social well-being refers to how an individual gets along with others and how individuals within a community interact and transact affairs. Park is a gathering place and for social events for urban community. Playgrounds provide opportunities for children to engage in healthful outdoor activities and creative play. Streets and pedestrian spaces in neighbourhoods permit residents to meet and converse with one another. Social participation in these outdoor public spaces among family, friends and neighbours stimulates community integration and empowerment, which in turn produces a sense of harmony and creates stronger social ties among residents (Kweon et al., 1998; Kuo, 2003).

Despite the benefits, the green infrastructure network which includes major recreational open spaces, smaller green spaces, river and drainage reserves show no connection to each other (Benedict and McMahon, 2002; Sreetheran et al., 2004). For example, a big metropolitan city such as Kuala Lumpur does not have a proper green infrastructure network that links all the existing open spaces (DBKL, 1984; DBKL, 2002; Sreetheran et al., 2004). The lack of connectivity and diversity between the open spaces in towns and cities is a phenomenon that is prevalent in many countries including Malaysia (JPBD, 2006). This is because, little is known about the quality of experience and effects obtained from attributes of green infrastructure such as diversity. The majority of research in this subject has been carried out in developed countries, especially in Western, Northern and Central Europe, while much less is known about the conditions in Asian region especially in Malaysia. Further research is needed to identify the key elements of healthy landscapes (Priego et al., 2008), particularly in landscape architecture and urban design to help understand which attributes have the strongest positive effects, and what can be done to improve urban settings from well-being perspective. Such understanding would contribute to the search for functional landscape designs (such as the green infrastructure network) beneficial to human well-being and sustainability (Velarde et al., 2007). In addition, until now the possible effects of green infrastructure network developments on well-being of urban residents have not been explicitly incorporated into policy making (Groenewegen et al., 2006) in many countries including Malaysia. As such, policy makers and administrators tend to view green infrastructure more as a luxury good than as a basic necessary for people living in towns, thus overlook the potentially important effects of green space on well-being. Hence, it is vital that these findings become implemented in urban planning and design. At

present, there is not enough knowledge to translate findings into guidelines for urban planning and design of green infrastructure in small towns. In particular, little is known about the strength of relationships of attributes that promote beneficial well-being effects to residents. Therefore, this study aims to fill up these knowledge gaps.

The diversity of the green infrastructure plays roles in contributing to optimal experience of the green infrastructure. Diversity in a town refers to a tight-knit urban fabric that has diverse uses, spaces and activities that allow more experiential choice to urban residents. Diversity means variety of experience from places with varied forms, uses and qualities (Bentley et al., 1985). The types of space, scale and distribution of green infrastructure, and the richness of landscape elements in a town afford more choices for residents to engage in and become familiar with different spaces and activities, thus offer more experiential choice of activity to residents to explore. For example, the existence of green infrastructure in the different built land uses such as commercial and residential allow diversity and liveliness of the urban environment. Thus, a well-distributed green infrastructure in a town with diversity influences the wellness of its inhabitants.

3. Methodology

3.1. Study area

Taiping, an old town built during the colonial period is one of the major settlement centres in Peninsular Malaysia. The town environment is a mixture of built and non-built land uses of low-rise residential area, low-density commercial area and numerous green spaces. Its greenery consists of green open space and green network: the Lake Gardens, hill forest landscapes, river corridors, and incidental and undeveloped places in the town centre, such as courtyards within and among institutional and government buildings, pocket spaces and street landscapes. The residential neighborhoods consist of open spaces with playgrounds, open fields and home gardens. The green infrastructure network and recreational development cover a total of 90 hectares of land (Figure 1).
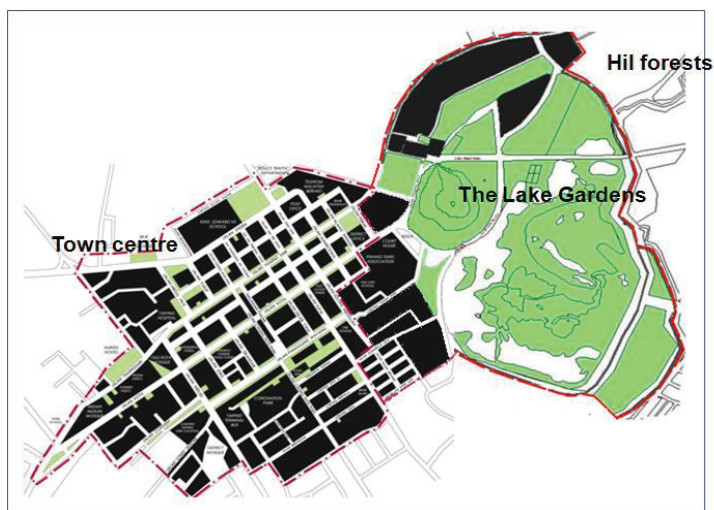

Fig. 1. Distribution of green and pocket spaces in Taiping

The Lake Gardens is a town park near the town centre, with glorious large old rain trees, lakes and small ponds, recreational amenities and a zoo. The town centre consists of pocket spaces between shop houses and street landscapes with trees and shrubs that connect places within commercial areas and to recreational spaces and the neighbourhoods. The neighbourhood green space consists of open field, playground and play lots, paved open space, waste land and streets. Privately owned land is the home gardens of the residents. The largest green infrastructure sits next to the town and small green infrastructures are among a variety of buildings; old public, institutional and commercial with Larut Hill as a backdrop to the town's environment.

3.2. Data collection and analyses

The study used mixed methods approach using questionnaire survey and semi-structured interview as strategies to measure the responses of residents towards the town's green infrastructures. Overall, the mixed methods procedure enable researcher to find out in detail about a phenomenon designed to elicit residents' responses on their experience in the green infrastructure. The procedure involves collecting and analyzing both data in a single study (Tashakkori and Teddlie, 1998; Creswell, 2003). Accordingly, the sources of evidence in the mixed methods approach allow the use of triangulation to be carried out, which is the need for the data to converge for interpretation of results. Triangulation is a principle of combining strengths and neutralizing weaknesses of each data (Groat and Wang, 2002), therefore enabling the benefits of data to complement each other.

A survey questionnaire measured the responses of residents (n=335) to the diversity of green infrastructure, as well as to the physical, cognitive and social well-being effects from experience with the diversity of the green infrastructure. It reveals residents' use of, experience of and response to the green infrastructure, mainly through closed-ended questions. Semi-structured interview elicited many aspects of abstract experiential qualities on perceptions and feelings of residents towards the experiential contacts with the green infrastructure that could not be elaborated by the questionnaire survey. It is aimed to discuss the deeper perceptions, feelings and meanings of each type of green infrastructure, such as the uses of and experiences in home gardens and neighborhood open spaces. In other words, the results cover how or why residents prefer a particular type of green infrastructure.

A pilot test was carried out on a small sample of residents (n=32) before the actual surveys were carried out on site in order to improve the format, clarity, wording and reliability of the questionnaire. The final questionnaire consisted of four sections: (a) the background information of the respondent, (b) responses to the attributes of the green infrastructure, (c) experiences with the green infrastructure, and (d) the perceived well-being outcomes achieved. Open-ended questions were included to obtain more information about residents' favourite green spaces, to expand on the responses made in the closed-ended questions.

Local residents living in Taiping town and its immediate areas were the unit of analysis for the study. The surveys were carried out in 2008, using a variation of the drop-off method (Kamarul Zaman, 2007). It includes dropping off surveys door-to-door in the neighborhoods and government offices, and intercepting passers-by in public spaces in the town centre and green spaces. Semi-structured face-to-face interview was carried to 33 local residents in Taiping. The items in the questions consist of response on residents experience with the attributes of the green infrastructure. Descriptive statistics that is percentage described the data and compared the experience of using different types of green infrastructure. Correlation analyses using Spearman's rho correlation for ordinal scale data in the survey questionnaire measured the strength of relationship between diversity of the green infrastructure to physical, cognitive and social well-being effects. The interview results were tabulated and triangulated with the questionnaire results for discussion on contribution and relations of green infrastructure to well-being.

4. Results and Discussion

4.1. Experience of diversity of the green infrastructure

The unit of analysis in the surveys consists of 57% female and 43% male respondents living in Taiping and the immediate town areas. The Malays represented the ethnic majority of the respondents. The largest percentage of respondents (86%) was adults between the ages of 19 to 55 years old. Majority of the respondents (68%) have resided in Taiping between 11 to 50 years. The participants in the interviews were selected equally between male and female. The Malay represented the majority of the participants. Adolescent, adult and elderly represented residents in the town, and the majority of them were adults (55%).

As can be seen in Table 1, the largest percentage of respondents (86%) from the survey preferred the town because it offered a variety of green spaces and scenery, and 75% agreed that green infrastructure offered them participation in a variety of activities. In particular, 70% of them participated in physical and social activities because there were green spaces in the town, while 67% agreed that these spaces induced them to spend time outdoors. Hence, the results suggest that the residents responded positively to the diversity of the green infrastructure in the town.

Table 1. Diversity of green infrastructure

Measures	Agreement (n=335)	
	No. of case	*%*
1) Taiping has variety of green space	287	86%
2) Green infrastructure presents variety of scenery	287	86%
3) Green infrastructure offers variety of activity	252	75%
4) Quantity of green space attracts activities	235	70%
5) Green spaces' conduciveness to a variety of activities induces residents to be outside home	224	67%

4.2. Diversity of green infrastructure

Results on reasons of visits to different types of green infrastructure from semi-structured interview are presented in Table 2. Four places are significant to the residents that they were familiar with and frequently visited: the Lake Gardens, hill sites, town, and residential neighbourhood and home gardens.

The results suggest that the Lake Gardens and hill forests afforded them diverse physical attributes preferable for visits. This is because the Lake Gardens is the largest recreational green infrastructure in the town, therefore offer various attributes preferable for visits, and the hill forests including Larut Hill are semi natural areas rich with natural landscape features including hill sceneries, undulating topography, forest environment and waterfall recreations. The diversity in the Lake Gardens is seen from its various spaces suitable for different activities. It has amazing views towards the water (lakes and small ponds), the tropical greeneries, the hills and the sky as the backdrop. Majority of participants preferred variety of spaces inside the Lake Gardens because it enabled them to participate in different types of activities. They had variety of choices of favourite spots for kinetic activities such as walking, jogging, and static activities that includes sitting and enjoying the environment. The Larut Hill is just a walking distance from the Lake Gardens that offer different kind of experience—active water recreations and the feeling of forest. As such, the Lake Gardens and the hills accommodate a wonderful variety of landscapes and built

features that are cherished by the local residents. It has environment, which is of a mixed-use in nature and rich and varied in character.

Table 2. Diversity of the green infrastructure attributes enjoyed (semi-structured interview)

Properties and Attributes enjoyed	Participant	
	%	*n=33**
1) THE LAKE GARDENS		
Lakes and fish in the lake	100%	33
Variety of activities	88%	29
Beautiful scenery and view to the hills	85%	28
Variety of spaces inside the garden	79%	26
Greenery and the old Rain trees	67%	22
Expansive lawn	55%	18
Variety of facilities-e.g. parking space, gazebo	45%	15
Streets/path/jogging path/paved	30%	10
Cool and refreshing weather	18%	6
Open, blue sky	15%	5
Various people	15%	5
2) HILL SITES		
Cool, clean and refreshing weather	76%	25
Forest-like scenery and naturalness	61%	20
Waterfall /water recreation	42%	14
Activities with family/friends	30%	10
3) THE TOWN		
Eating places/food	76%	25
Shop houses and shopping places	48%	16
Variety kinds of buildings	30%	10
Greenery and flowering trees	6%	2
Peaceful streets	6%	2
4) NEIGHBOURHOOD OPEN SPACE and HOME GARDEN		
Proximity to home	51%	17
Open field and playground for children	15%	5
Fruit trees and flowering trees	21%	7
Shades for home compound	15%	5

*Participant indicated more than one attribute

More than half of participants suggested that the places they favour in town centre were the eating places and the shop houses instead of activities related to the use of green infrastructure such as green spaces in between building. However, they also like the greeneries and the streets in town. As such, activities in the town centre are related to necessary and social activities than leisure in the green infrastructure. Therefore, to encourage more leisure and recreational uses of the smaller spaces in town centre and to induce greater diversity, the small spaces need to be enhanced with landscape elements and greenery, and to be linked with tree-lined streets to the larger recreational green infrastructure. Therefore, the spaces act as nodes of activities with connectivity and comfortable environment. According to Garvin and Berens (1996), larger numbers of residents always come together in many other places that are publicly owned but not have been designated as recreational purposes. They are streets, incidental spaces, pocket spaces and market places. For example, incidental spaces allow a variety of activities to flourish in a complex web of networks and sustain the lively and colourful town fabric (JPBD, 2006). Streets and the five-foot walkway along the shop houses are usually the least appreciated form of green infrastructure land uses. However, residents congregate in places like these that are sometimes privately owned but widely used for recreation by the general public. Thus, these active frontages should be revitalized in the form of tree-link thoroughfares that connects them to small pocket spaces and spaces in between

buildings. In effect, the pocket spaces enable to be a vibrant focal point with greenery and landscape features that breaks up the monotony of built up environment in the town.

According to the interview results, the neighbourhood open space lacks of diversity, however it has the advantages of bringing in residents together because of its proximity to residents' homes. Its users often consist of children for active and passive recreational activities such as playing football on the open field and playing in the playground. However, adults use it for walking, jogging or leisure and socializing as they watch their children play in the open spaces. The home garden is planted with the greenery and fruit trees mainly to shade the compound of residents' houses. The neighbourhood open spaces may have more diversity if the maintenance and facilities were improved to make the green spaces more usable and attractive to the residents.

4.3. Relationship between diversity and well-being effects

Diversity of green infrastructure is based from measure of quantity of green infrastructure that attracts activities. Diversity is represented by a Likert-scale format in the survey questionnaire i.e. "Quantity of the green infrastructures attracts me to engage in outdoor activities". Results from test of independence in Table 3 indicate that the significant value of Chi-square for all dimensions are the value of $0.000 \leq p \leq 0.004$ (i.e. $p<0.05$). In other words, the well-being effects of residents are influenced by an array of green infrastructure distributed in the town. The amount of green infrastructure influences vibrant outdoor activities and variety in different sceneries helps influenced residents' perceived well-being effects.

The calculation of Spearman's rho correlation coefficients assesses the strength of the relationships between the diversity and well-being effects. It seems that significant relationships exist between the two parameters as shown in Table 3. In general, a resident's assessment of his or her experience of diversity has moderate to high positive relationship with the evaluation of his or her perceived well-being effects: physically, cognitively and socially.

Specifically, the relationship of diversity to physical well-being effect of green infrastructure experience shows strong positive relationship ($r=0.545$). This means, the amount of green infrastructure that exist in the town is strongly correlated with the willingness to participate in kinetic activities (e.g. jogging, walking and hiking) that resulted to bodily health.

From cognitive domain, a resident's assessment of his or her experience of diversity had small to high positive relationship with the evaluation of his or her perceived cognitive well-being effects. The most significant strong positive relationships exist in two dimensions of cognitive effects. They are—relief emotion ($r=0.457$) and being comfort, relaxed and calm ($r=0.435$). Other cognitive dimensions such as achieving privacy and feeling safe ($0.361 \leq r \leq 0.352$) have moderate positive relationships with the evaluation of cognitive effects. Thus, diversity also helps with the achievement of cognitive well-being. Cognitive well-being effects of resident are influenced by various green infrastructures distributed in the town and by the diversity of spaces and the richness of green infrastructure environment.

From social domain, a resident's assessment of his or her experience of diversity had moderate to high positive relationship with the evaluation of his or her perceived social well-being. The most significant relationships is on social encounters with other residents ($r=0.410$). Moderate positive relationships are found in dimensions: 'interaction with neighbours', 'satisfaction with community' and 'feeling friendlier' ($0.310 \leq r \leq 0.384$). Smaller positive relationships existed between resident's feeling to 'participate in community' ($r=0.291$). As such, the relationships of diversity with social dimensions do exist with moderate to high strength.

Indeed, overall results suggest that diversity gives choice to residents to participate in activities that lead to feeling of bodily healthy, relax, being calm and comfortable, and to ability of residents to socialise with others.

Table 3. Frequency, chi-square test and Spearman's rho correlation for diversity and well-being

Well-being Domains	Measures	Agreement (%)	Diversity (n=335)	
			Sig.2-tailed (p)	*Correlation coefficient (r)*
PHYSICAL EFFECT				
a) Active living	I am active because of physical activities in green spaces	74%	0.000 [x²=114.742]	0.545**
	Sig. (2-tailed)			0.000
COGNITIVE EFFECT				
a) Relief emotion	I can relief emotion (forget worries, relief stress & clear mind from distractions)	84%	0.000 [x²=101.604]	0.457**
	Sig. (2-tailed)			0.000
b) Comfort, relax, calm	I feel comfortable, relax and calm	75%	0.000 [x²=119.924]	0.435**
	Sig. (2-tailed)			0.000
c) Privacy/solitude	I can be alone and be in privacy	64%	0.000 [x²=75.498]	0.361**
	Sig. (2-tailed)			0.000
d) Safety	I feel safe in the green infrastructure	58%	0.000 [x²=69.851]	0.352**
	Sig. (2-tailed)			0.000
SOCIAL EFFECT				
a) Interact with neighbour	Green infrastructure allows me more interaction with neighbours	55%	0.000 [x²=74.379]	0.384**
	Sig. (2-tailed)			0.000
b) Encounter residents	Green infrastructure allows me more interaction with other residents	56%	0.000 [x²=73.796]	0.410**
	Sig. (2-tailed)			0.000
c) Community participation	Green infrastructure allows me to participate in activities with other residents	53%	0.000 [x²=50.772]	0.291**
	Sig. (2-tailed)			0.000
d) Satisfied with community	Social activity+interaction in green space make me feel satisfied with community	54%	0.000 [x²=39.343]	0.310**
	Sig. (2-tailed)			0.000
e) Being friendly	Social activity + interaction in green space made me friendlier with others	55%	0.000 [x²=63.263]	0.344**
	Sig. (2-tailed)			0.000

All dimensions are df=4; 0 cells (0%) have expected count less than 5.

** Correlation is significant at the 0.01 level (2-tailed)   * Correlation is significant at the 0.05 level (2-tailed)

5. Conclusions

The green infrastructure is crucial part of urban fabric that is highly perceived by residents contributing to their physical, cognitive and social well-being. Results suggest that residents perceive the green infrastructure as spaces where they have contact with nature that fulfill nature needs and residents' interaction needs. Diversity afforded the residents' experiential contacts with the green infrastructure that offered stimulations with the outdoor environments to the residents. It allowed them frequent engagements in various activities, made them familiar and felt connected with the green infrastructure. The experiential contacts thus affected the physical, cognitive and well-being of the residents. Engagements with active and recreational activities happen most frequently in large recreational green infrastructure that is, the Lake Gardens, and some in the hill forests. The diversity of characteristics of spaces in the Lake Gardens enabled residents to engage in variety of leisure activities that afford them physical, cognitive and social well-being. The richness and naturalness quality of the green infrastructure environment offer residents frequent contact with nature and interactions with others in a peaceful

environment. Residents experienced moderate to high achievements in physical, cognitive and social well-being because of the experiential contacts with the diversity of the green infrastructure.

What do the importance of physical, cognitive social interactions and effects of residents engaging with greens and open spaces link to landscape urban planning? Provision of green spaces in a town or city affords residents to exercise that directly affecting their well-being, both preventative and curative. Provision and maintenance of open spaces at all spatial scales, from home garden to large town park, afford urban residents place for relaxation from stress, trigger positive emotions such as increase attention capacity and cognitive capacity. Experience of green infrastructure speeds recovery from mental fatigue, stress or even reduces irritability. It provides positive emotions including enjoyment, being relaxed, comfort, calm and feeling of pleasure. Cognitive experience of green infrastructure also evokes a sense of attachment to green spaces and towards a community as a whole. This is because parks and urban green spaces offer people positive emotional states and make available favorite places that are serene, peaceful and restful. These are the places of solitude and contemplation, which afford a sense of escape from urban life. Social experience of green infrastructure offers community integration and empowerment, harmony and cohesion among urban residents since social interaction and transaction in urban open spaces afford opportunities for participation in activities and socializing which in turn strengthen positive social territoriality of a place. Provision of open spaces in a town or city place also affords urban residents informal social contacts. A network of greens and open spaces can influence patterns of these informal contacts through its various functions. For instance, parks are used as places for gathering and social events of community during occasions. Playgrounds are for children to perform healthier outdoor activities and other green spaces in community areas allow children to engage in various creative play. Streets and comfortable pedestrian spaces in neighbourhoods permit residents to meet and converse with one another. Therefore, provision of suitable network of greens and open spaces encourages urban residents' to use these spaces in a variety of manner, hence, improve their social interactions among each other. This as well, strengthens positive social territoriality of a residential community. As a result, community integration, sense of belonging and attachment towards urban places are formed. In short, planning and provision of green open spaces with care by urban planners would ensure that the needs of urban residents to experience social contacts are fulfilled.

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