



## FORECASTING SCENIC PREFERENCES FOR URBAN STREETScape USING PHOTOGRAPHIC SIMULATION



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### ABSTRACT

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The urban streetscape of Raja Laut is supported with multiple socio-cultural, administrative, educational, and economic activities. As such, awareness for a healthier environment can be promoted by encouraging more community involvement, including public participation in the landscape assessment exercise. It is believed that the charm and rich characters of the non-natural landscape components of the urban streetscape of Raja Laut should be protected, due to their scenic resources. Therefore, this paper documents the public's scenic preferences for future urban streetscape with an aim to identify the landscape components that have potential enhancing the scenic resources. Photographic simulation with small size sampling was used to assess the public's preferences. Interestingly, early findings indicate that colourful streetscape provide high scenic value. The insights also suggest that both natural and man-made attributes have equal scenic importance. Finding further explains the significant influence of natural attribute in the design and planning of the urban streetscapes in Kuala Lumpur and thus, should be further investigated.

**Contribution/ Originality:** This study contributes towards the identification of the landscape components that have potential enhancing the scenic resources which provides an initial understanding of the landscape values that the public might appreciate for as well as to evoke awareness and realisation among the local authorities and professionals in the built environment discipline.

### 1. INTRODUCTION

In the study of landscape assessment, some natural landscape components are accepted contributing to better public space [1]. However, the study can be complicated because there are non-landscape components (e.g., socio-culture, history, economics, art and architecture, tourism and many more) also having equal scenic importance. For instance, a non- landscape component of social-culture is one of them [2]. In many cases, a study on landscape assessment with an urban setting evaluates for better landscape design, planning and, management. Here, an assessment has high consideration for public participation. Public's preferences for quality urban streetscape should be given more priority when it is a publicly owned open space.

The linear streetscape of Raja Laut was selected as the study area, due to its prime location in a city of Kuala Lumpur. Besides being one of the busiest locations, the streetscape has rich socio-cultural heritage and become a

centre of attraction to both locals and foreign tourists. The streetscape runs for about one kilometre of distance, in which the focus study area was between an intersection of Semarang Street and UOB Tower. With a half kilometre of study area, the preliminary findings are significant to support the actual research. More importantly, the area selected showcases relevant natural and man-made attributes assumed implicating the landscape values of the streetscape. The insights would assist to better urban design and planning and protection of scenic resources.

This paper documents the public's scenic preferences for future urban streetscape with an aim to identify the landscape components that have potential enhancing the scenic resources. The study provides preliminary insights, where more comprehensive research is required for effective results. The undertaken study provides an initial understanding of the landscape values that the public might appreciate for. From here, rigorous research should be established to evoke awareness and realisation among the local authorities and professionals in the built environment discipline. Future research requires good collaboration among the agencies, so that appropriate urban design and planning decisions can be established.

### *1.1. Background of Study Area*

The Street of Raja Laut is one of the well-developed streetscapes in Kuala Lumpur. Here, urbanisation includes sophisticated transportation systems (e.g., Monorail and Light Rail Train) having supported by modern landscape amenities and facilities. The development of the streetscape has mix architectural styles, which is unique in this region. The amenities and facilities (e.g., pedestrian walkway, lighting, restroom, rubbish bin, and etcetera) may have scenic importance to the streetscape. Some of the man-made features display fantastic urban image with socio-cultural significance. However, more natural features are still necessary to support better visual enhancement and environmental quality.

A plant is the only natural component found introduced on the streetscape. The planting concept applied is commendable and has good potential to elevate the landscape values of the streetscape. More natural features like water component should be introduced to improve the landscape values for quality urban scape. So far, more man-made landscape components observed dominating the landscape design of the urban streetscape. It would be better to include more water and plant elements, considering that the streetscape is exposed to heavy traffics and carbon footprint.

The streetscape of Raja Laut is exposed to heavy traffics that may lead to urban heat island (UHI). Perhaps, a landscape design solution can be adopted to minimise the impact, and simultaneously, improve the landscape values. A drastic increase in the number of traffics in a big city like Kuala Lumpur would be a challenge to the local authority, landscape architect and planner. Parallel to that, it is timely that the development of the future urban streetscape can collaborate with professionals like landscape architect, horticulturist, arborist, and others.

It is accepted that a good image of a city includes universal values, which persist regardless of various trends and degree of development [3]. In his work, Lynch has clearly stated the common landscape features that are highly recommended for establishing effective urban identity. These are the urban image that may increase the scenic value of a cityscape. The features include paths, edges, districts, nodes, landmarks and many more. Some of the elements are evidenced on the streetscape of Raja Laut with landscape values outcomes.

With unique architectural image and aesthetics quality, the urban features may increase the landscape values of the streetscape. Some of the values are associating with tourism, socio-culture, economics, education, and historic. Despite that, the non-natural attributes of the urban features have also implicated the visual quality of the streetscape. Thus, a suitable combination of softscape and hardscape components may generate scenic potential.

Series of infrastructure networks in the city centre provide efficient public transportation systems (e.g., roads and railways). The streetscape of Raja Laut is supported with multiple socio-cultural, administrative, educational, and economic activities. As such, awareness for a healthier environment can be promoted by encouraging more community involvement, including public participation in the landscape assessment exercise. It is believed that the

charm and rich characters of the non-natural landscape components of the urban streetscape of Raja Laut should be protected, due to their scenic resources.

### 1.2. Scenic Assessment of an Urban Streetscape of Raja Laut

Scenic value is a common term describing aesthetics or beauty in the study of landscape assessment. The outcome of the assessment is considered significant because it assists in the making of design and planning decisions. Secondly, the result of assessment would emphasise on some environmental issues, due to human activities. Concerning that, a quality condition of a developed urban streetscape of Raja Laut can be established through high reliability and validity results. Objective result is an outcome of a sound assessment methodology that is parallel to the aim and objectives of the study.

The work of Lynch [3] can be accepted as the impetus to today's urban studies, though his study has comprehensively elaborated on the subject of urban identity. This study assessed the urban streetscape with similar urban identity as described in Lynch's. The focus study area was zoomed into a streetscape, in which the existing physical features were thought to influence the landscape values including scenic beauty. In line with that, the assessment technique had considered public participation or human perceptions to evaluate the physical features as explained in Coeterier [4] and Garcia-Mira, et al. [5].

An approach supported by photographic simulation using photomontage technique is agreed to produce more reliable and better findings [6-8]. The interactive assessment would assist the local authority to better design and planning with an objective view [9]. Currently, there are varieties of interactive instruments available. For instance, they can vary from a simple sketch to a more complicated computer technology technique. In line with that, Photoshop software was used in this study.

While supporting the landscape management decisions and others related environmental policies, a landscape assessment study is a practical method to evaluate the landscape values of an urban landscape [10]. Some findings may provide information on the economics and social-cultural values, which may benefit the land use and planning policies of a metropolitan city like Kuala Lumpur. In this case, scenic assessment of an urban streetscape determines the level of compatibility of both man-made and natural attributes. Findings may suggest that some physical features are implicating scenic values of the urban streetscape of Raja Laut.

Most scenic assessment methods provide empirical results to solve issues concerning physical space and composition using a specific landscape character like a historic site [11]. In order to assess scenic value in an urban setting, the process requires a scenic framework, in which the landscape values are objectively measured. The framework is then established and analysed by associating human's perceptions of the existing physical features with landscape values. However, issues concerning differences in scenic preferences and physical appearances of a city may influence the outcomes [10].

More concerns for the protection of scenic value in an urban setting may indicate a good sign for quality environment and conservation of landscape values. Thus, the on-going landscape design improvements on the streetscape of Raja Laut can enhance the city of Kuala Lumpur to a more competitive ability. This further revitalises an urban environment for the protection of natural and man-made values. Interestingly, there are examples where urban policy is established in some major cities in New Zealand and Japan.

In New Zealand, an urban policy helps to monitor the height of a structure for beautiful skyline. While in Japan, there is a law to protect the rights of an urban scape under the practice of '*landscape certification program*.' The program seeks for public's assessment on the overall quality of a landscape. Here, the law is widely accepted, which implementation has a significant influence on the urban planning and landscape management [10].

Scenic assessment using computer technologies is now becoming a trend in the discipline of landscape architecture. The relevant technologies include Geographical Information System (GIS), Global Positioning System (GPS) and Digital Imaging (e.g., Photoshop software). For instance, GIS is a capable software to provide

information on the landscape character classification. The application is recommended for landscape management practices and research because it delivers a frame of reference for communication purposes [12]. Recently, a public participatory GIS technique was developed to establish statistical models for landscape character classification [13].

Similarly, GPS is software that can detect a location of a photograph taken using coordinates during a field inventory assessment. The result is further enhanced and simulated to establishing virtual landscapes. The technique is considered practical to forecast future landscapes that are highly favoured and valued in the tourism industry. The result allows the local authority to predict and improve the landscape values of an urban scape when they are necessary.

On the other hand, Photoshop software can be used to edit the unwanted images in a photograph. The technology adjusts and modifies the contents of a photograph while producing new visual effects. For instance, there was a case in the University of North Florida, where similar technology was experimented to modify poor visual effect occurred in a medical dressing exercise. In this landscape assessment study, a Photoshop technology was adopted to forecast future streetscape of Raja Laut.

This study forecasted future urban streetscape of Raja Laut, Kuala Lumpur by correlating several modified photographs to the existing physical features. The features describe both natural and man-made attributes (e.g., building, road, plant, and landscape furniture) assumed having scenic implications. Several samples of coloured photographs were taken from the study area and modified using Photoshop simulation. Public scenic beauty preferences were assessed using the modified photographs. It is anticipated that findings would assist the local authority to better design and planning while conserving the sensitive landscape and non-landscape values that have national significance.

## 2. METHODS

The study adopted several techniques when assessing the scenic preferences of the streetscape of Raja Laut. The methods were 1) *Personal descriptive inventory*, 2) *Unstructured interview* and 3) *Questionnaire with photographic simulation survey*. The followings describe the details of the methods.

### 2.1. Personal Descriptive Inventory

The method analysed and determined the potential landscape components assuming associated with the landscape values of the streetscape of Raja Laut. The components were documented using coloured photographs. They were divided into natural (e.g., plant) and man-made (e.g., signage, bollards, lamp posts, fencing, pedestrian walkway) features. The primary purpose of the inventory was to assist for the preparation of the contents of the survey instrument. The effectiveness of the method had relied on the researchers' judgment when selecting the landscape components thought adding values to the streetscape. An expert from the landscape architecture discipline was asked to select photographs with sceneries displayed the most relevant landscape components.

### 2.2. Unstructured Interview

The interview addressed the public on the functions/effects of the natural and man-made attributes found on site. Three respondents were randomly asked about the functions of the relevant landscape furniture and plants along the streetscape of Raja Laut.

### 2.3. A questionnaire with Photographic Simulation Survey

The technique was used to determine the public's scenic perceptions and preferences for the landscape components identified. The survey was divided into three parts; 1) Demographic information of the respondents, 2) Public's scenic perceptions paired with five-point Likert scale and 3) Public's scenic preferences using coloured

photographs paired with five-point Likert scale. Three sets of coloured photographs were used as surrogates of the streetscape. The first set of photographs portrayed the original landscape components of the streetscape, while another two sets were modified and simulated using Photoshop software. The modifications were based on findings discovered from personal descriptive analysis and unstructured interview.

Using coloured photographs would be costly for a more significant sample size. Secondly, any non-quality photograph taken might influence the validity and reliability of results. Thus, to establish quality contents of photographs, the study had engaged a professional photographer. The instrument used was challenging because participations were highly relied on respondents' willingness. The time spent to complete the survey took longer than expected when several potential respondents declined to participate. However, the technique was found convenient and more economics for small sample size. In this preliminary study, the sample size was only 33 respondents.

**Table-1.** Summary of landscape components identified from personal descriptive analysis and supported by findings from the unstructured interview.

No.	LANDSCAPE COMPONENTS	Scenic Value	Functions
1	<b>Natural Attributes</b>		
	Plant	√	Shade
2	<b>Man-made Attributes</b>		
	<b>i) Landscape Furniture</b>		
	<i>Lamp-post</i>	x	Safety
	<i>Fencing</i>	√	Safety
	<i>Pedestrian Walkway (paving)</i>	√	Safety and direction
	<i>Bollard</i>	x	Safety
	<i>Signage</i>	x	Direction
	<b>ii) Architectural Image</b>		
	<i>Mara Building</i>	√	Economics and socio-culture
	<i>UOB Building</i>	√	Economics and socio-culture

**Note:** Identification of scenic value and functions of landscape components

### 3. RESULTS AND DISCUSSION

The results are presented using a tabular format and organised according to the methodology of the data collected.

#### 3.1. Personal Descriptive Analysis and Unstructured Interview

Results of the personal descriptive analysis provided information on the types of landscape components identified on the streetscape of Raja Laut. Findings of the unstructured interview had supported these. **Table 1** summarises the results by categorising the findings into natural and man-made attributes. A plant is the only natural attribute identified, while man-made attributes were sub-categorised into landscape furniture and architectural image.

#### 3.2. A questionnaire with Photographic Simulation - Demographic Information

Findings were analysed using Microsoft Office Excel, where simple descriptive analysis of frequencies and percentages were used to interpret the results. Males formed the majority (63%) of the respondents. The result shows that adult (48%) was the highest group, followed by the elderly (33%) and finally, the teenagers (19%). A high percentage (70%) of the respondents receives a Master or Bachelor degree. The overall demographic results indicate varieties of age groups with an acceptable educational background. **Table 2** summarises results on the demographic findings.

### 3.3. Questionnaire and Photographic Simulation - Public's Scenic Perceptions

The result shows that a high percentage (70%) of the respondents did not enjoy visiting the streetscape. But more than half of them (64%) enjoyed viewing the streetscape. All of the respondents (100%) agreed that plant has the highest scenic value. The second highest (91%) landscape component that contributes to positive visual impact is a paved pedestrian walkway, while bollard (76%) receives the third highest. Overall, the results suggest that the natural landscape component has a very high influence on the public's visual perceptions, while the current landscape design and planning have a low impact on the public's visitation. **Table 3** summarises the public's scenic perceptions of the natural and man-made attributes.

**Table-2.** Profiles and characteristics of the respondents

Characteristics	Range/ Category	Frequencies	Percentages (%)
Age	18-20/Teenager	6	19
	21-49/Adult	16	48
	50-55/Elderly	11	33
	<b>n</b>	<b>33</b>	<b>100</b>
Gender	Male	21	63
	Female	12	37
	<b>n</b>	<b>33</b>	<b>10</b>
Level of education	SPM	6	18
	Diploma	4	12
	Degree	20	61
	Master	3	9
	<b>n</b>	<b>33</b>	<b>100</b>

n = 33

**Table-3.** Public's scenic perceptions on the streetscape of Raja Laut

Scenic Parameters Perceptions	Frequencies (%)	
	Yes	No
<b>Q1.</b> Do you enjoy visiting the streetscape?	10 (30%)	23 (70%)
<b>Q2.</b> Do you like viewing the streetscape of Jalan Raja Laut?	21 (64%)	12 (36%)
<b>Q3:</b> The scenery of the streetscape can be enhanced by		
Vegetation	33 (100%)	0 (0%)
Paving material	30 (91%)	3 (9%)
Bollard/lighting bollard	26 (76%)	7 (24%)
Lamppost	20 (61%)	13 (39%)
Fencing	18 (55%)	15 (45%)
Signage	10 (30)	23 (70%)

n = 33

### 3.4. A questionnaire with Photographic Simulation - Public's Scenic Preference

The result shows that both stimulated streetscapes sceneries of group A (trees with flowers; 48%) and group B (trees with coloured foliage; 52%) receive almost equal scenic preferences, while the unstimulated streetscape scenery (shrub; 0%) receives none scenic preferences. Secondly, the result shows that the stimulated streetscape scenery with coloured bollards and flower trees (natural + man-made; 64%) receives the highest scenic preferences, while the stimulated streetscape scenery with a black bollard and flowerless trees (natural + man-made; 36%) receives the lower scenic preferences. Unsurprisingly, the unstimulated streetscape scenery of green shrub (natural; 0%) still receives none scenic preference. The final result shows that the stimulated streetscape scenery with a combination of both natural and man-made attributes with more colour effect received higher scenic preferences (58%) than the stimulated streetscape scenery with less colour effect (42%).

In conclusion, the insight suggests that most of the respondents had higher preferences for future urban streetscape sceneries with colourful landscape components including natural and man-made elements. Interestingly,

the insight also indicates that the future urban streetscape design of Raja Laut should consider introducing some landscape furniture like a bench. **Table 4** summarises the results of the photographic simulation survey.

**Table-4.** Samples of photographs used in the questionnaire with photographic simulation survey

Rating	Original Photos	Simulated Photos A	Simulated Photos B
			
<b>Note:</b>	Green shrub	Added trees with flowers <b>Natural Attributes</b>	Added trees with colored foliage
<i>Frequency</i>	0	16	17
<i>Percentage</i>	0%	48%	52%
			
<b>Note:</b>	Green shrub	Added red bollards with flowery trees <b>Natural + Man-made Attributes</b>	Added trees with black bollards
<i>Frequency</i>	0	21	12
<i>Percentage</i>	0%	64%	36%
			
<b>Note:</b>	Green shrub	Added red bollards, bench with colorful plants <b>Natural + Man-made Attributes</b>	Added white bollards with colorful plants
<i>Frequency</i>	0	19	14
<i>Percentage</i>	0%	58%	42%

**Note:** The instruction of the survey was: "Please choose the urban streetscape sceneries that you prefer the most."

#### 4. CONCLUSIONS

The study forecasted public's scenic preferences of the future urban streetscape of Raja Laut, Kuala Lumpur using photographic simulation. Based on the interactive methodology, the respondents agreed that both natural and man-made attributes could increase the scenic value of the streetscape with an intervention of colour as a design element. Thus, the insight suggests that colourful plant species and landscape furniture can influence the landscape values of the future streetscape. Having said that, the study agrees with Moore [9] that the preliminary findings would assist a local authority to deliver an objective urban design with better planning and landscape management decisions. Significant interactive effects can be established in the study of landscape assessment using several simulation techniques. A Photoshop software is among the most straightforward techniques, least time consuming and economics computer technology to forecast the landscape components that may implicate the landscape values of a small size of an area. Thus, further studies with more advanced interactive tools are necessary to help improving the urban design and planning of the city of Kuala Lumpur. This study also suggests that more landscape architects, arborists, and urban foresters should be involved in the planting design and landscape management and maintenance of the city streetscapes for sustainability and best practices.

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## REFERENCES

- [1] F. Steiner, "Landscape ecological urbanism: Origins and trajectories," *Landscape and Urban Planning*, vol. 100, pp. 333-337, 2011. Available at: <https://doi.org/10.1016/j.landurbplan.2011.01.020>.
- [2] A. Jorgensen, "Beyond the view: Future directions in landscape aesthetics research," *Landscape and Urban Planning*, vol. 100, pp. 353-355, 2011. Available at: <https://doi.org/10.1016/j.landurbplan.2011.02.023>.
- [3] K. Lynch, *The image of the city*. USA: The MIT Press, 1960.
- [4] J. Coeterier, "Lay people's evaluation of historic sites," *Landscape and Urban Planning*, vol. 59, pp. 111-123, 2002. Available at: [https://doi.org/10.1016/s0169-2046\(02\)00007-5](https://doi.org/10.1016/s0169-2046(02)00007-5).
- [5] R. Garcia-Mira, C. Arce, and J. M. Sabucedo, "Perceived quality of neighbourhoods in a city in Northwest Spain: An individual differences scaling approach," *Journal of Environmental Psychology*, vol. 17, pp. 243-252, 1997. Available at: <https://doi.org/10.1006/jevp.1997.0058>.
- [6] R. Kaplan and S. Kaplan, *The experience of nature: A psychological perspective*. New York: Cambridge University Press, 1989.
- [7] A. T. Purcell, "Environmental perception and affect: A schema discrepancy model," *Environment and Behavior*, vol. 18, pp. 3-30, 1986. Available at: <https://doi.org/10.1177/0013916586181001>.
- [8] E. H. Zube, *Environmental evaluation: Perception and public policy*. Monterey, CA: Brooks/Cole, 1980.
- [9] G. T. Moore, *Environmental and behavior research in North America: History, development, and unresolved issues*. In D. Stokols & I. Altman (Eds.), *Handbook of environmental psychology*. New York: John Wiley, 1989.
- [10] X. G. and A. Yasushi, "Economic values of urban landscape, centre for spatial information science (CSIS) University of Tokyo. Discussion Paper No. 67," pp. 3-2, 2005.
- [11] R. W. Carter and R. Bramley, "Defining heritage values and significance for improved resource management: An application to Australian tourism," *International Journal of Heritage Studies*, vol. 8, pp. 175-199, 2002. Available at: <https://doi.org/10.1080/1352725022000018895>.
- [12] L. Brabyn, "Classifying landscape character," *Landscape Research*, vol. 34, pp. 299-321, 2009. Available at: <https://doi.org/10.1080/01426390802371202>.
- [13] G. Brown and L. Brabyn, "The extrapolation of social landscape values to a national level in New Zealand using landscape character classification," *Applied Geography*, vol. 35, pp. 84-94, 2012. Available at: <https://doi.org/10.1016/j.apgeog.2012.06.002>.

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