Mapping of Livability Assessment in Recreational Public Space: A Case Study of Titiwangsa Lake Gardens, Kuala Lumpur

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Abstract: Livability and recreational spaces are considered important aspects of urban life. However, there appears to be a knowledge gap in the current field of study of livability, which is the absence of an assessment criteria that can be used to assess/evaluate livability specifically for recreational public spaces. This research aims to address this knowledge gap by devising a custom assessment criteria that can be used to assess livability for a recreational public space and applying it to the selected case study of Titiwangsa Lake Gardens, a popular recreational park in Kuala Lumpur. The custom livability assessment criteria is used through an online questionnaire that serves to gauge the park users’ satisfaction towards livability qualities and was able determine that Titiwangsa Lake Gardens can in fact be considered as a livable recreational public space because the assessment revealed that the majority of qualities exhibited by the park is contributing positively to its livability. This research has also identified ‘comfort’ and ‘visual aesthetics’ as two of the most important aspects of recreational space design for livability suggests reasons for this. The custom livability assessment criteria for recreational public space devised through this research serves to contribute to the field of livability studies and can be used as a guide or reference for better planning, management, and design of recreational public spaces in the future.

Keywords: livability assessment, recreational area, public space, liveable city

1. Introduction

Recreational public spaces play a crucial role in determining quality of life for urban inhabitants, and there are various qualities, features and characteristics that can influence how well these recreational public spaces can function and serve the urban community. The concept of livability tends to come into play when discussing quality of cities and places, where town planners and community leaders strive to create ‘livable cities’ and ‘livable places.’ However, while there may be indexes and criteria for measuring livability of cities and neighbourhoods – such as the AARP Livability Index, EIU’s Global Livability Index and CII’s Model of Livability Index - there has yet to be an equivalent established / internationally recognized index / criteria that can be used to assess / evaluate livability specifically for recreational public spaces.

This paper attempts to address this knowledge gap in the field of urban design study by devising a custom assessment criteria that can assess the level of livability of recreational public spaces and applying it to the case study location of Titiwangsa Lake Gardens in Kuala Lumpur, Malaysia. In
addition to devising a livability assessment criteria, this research also seeks to identify the qualities of
livability that are deemed most desirable / important to users of public recreational space.

This paper aims to contribute to a better understanding of livable public spaces, and to provide insight to developers, urban designers, local authorities and community leaders on the qualities, features and characteristics they need to incorporate into designing and planning recreational public spaces in their city / neighbourhood. It also hopes to serve as a reference for similar research in the future that seeks to learn about better recreational public space design.

This paper is organized into 6 parts. Part 2 explains the selected case study and methods of data collection and analysis. Part 3 explains how the custom livability assessment criteria is devised based on established works on the concept of livability. Part 4 explains how the livability assessment criteria was applied to the case study through an online questionnaire, and how the responses were used to determine the livability of the case study. Part 5 explains how this research was able to identify the aspect of livability considered most important to users and visitors of recreational space. Then finally part 6 concludes how the research objectives were achieved and the implications of the research findings on the field of study of livability and urban design.

2. Data and Methods

The method for devising the custom livability assessment criteria is through literature review of livability followed by selection and aggregation of suitable livability elements to form a custom criteria – this will be explained in part 3. A single case study method is employed with Titiwangsa Lake Gardens being chosen as one of the largest and most popular recreational park in Kuala Lumpur, Malaysia (see Figure 1). This park is chosen because of its popularity, high number of users and good design that provides many amenities and for activities such as exercise, family recreation, children play, community and social gatherings and others. It is deemed to be a good representation of a high standard recreational public space and is thus a suitable location to be studied for its livable qualities.

![Figure 1. Titiwangsa Lake Garden Location](image)

The primary form of data collection for this research is through an online questionnaire where 60 responses were obtained from respondents who are users and visitors of Titiwangsa Lake Gardens. This questionnaire aimed to gauge the perception and satisfaction level of respondents regarding qualities of livability that are included in the custom livability assessment criteria. The responses from this
questionnaire were then analyzed using a rating factor analysis to determine livability of the case study and ranking average analysis to identify the aspect of livability of recreational public space that is most important to users. The researcher also took photographs to which visual content analysis was performed and made observations and notes to support the data analysis and finding.

3. Results and Discussion

3.1 Devising a Custom Livability Assessment Criteria for Recreational Public Space

The concept of livability has various meanings and interpretations that can make it challenging to accurately assess or evaluate, particularly in terms of livability of public space. In the context of cities and urban settlements, [1] defines livability as “the sum of the factors that add up to a community’s quality of life—including the built and natural environments, economic prosperity, social stability and equity, educational opportunity, and cultural, entertainment and recreation possibilities”. Over time, the meaning of livability has broadened to include “a range of different issues that are underpinned by a common set of guiding principles: accessibility, equity, safety, comfort, available services, walkability, transit, and participation that give substance to the concept of livability” [2].

| Source | Qualities / Dimensions / Design Principles to Describe Livability |
|--------|-----------------------------------------------------------------|
| Ahmed et al. (2019) [2] | Accessibility Accessory availability, Equity, Safety, Comfort, Available services, Walkability, Transit, Participation |
| Balsas (2004) [3] | Safe Safe, Clean, Beautiful, Economically vital, Affordability to diverse population, Efficiently administered, Functional infrastructure, Ample parks, Effective public transportation, Interesting cultural activities, Sense of community |
| Wheeler (2001) [4] | An attractive, pedestrian-oriented public realm, Low traffic speed, volume & congestion, Decent, affordable, well-located housing, Convenient schools, shops & services, Accessible parks & open space, Diverse, legible & educational built landscapes, Places that feel safe & accepting to all users, Places that emphasize local culture, history & ecology, Environments that nurture human community & interaction, A clean natural environment |
| Holt-Jensen (2001) [5] | Aesthetics of living environment, Personal & social relations, Functionality |
| Parkinson et al. (2006) [6] | Environmental quality, Physical place quality, Functional place quality, Place safety |
| American Institute of Architects (n.d.) [7] | Design on a human scale, Provide choices, Encourage mixed-use development, Preserve urban centers, Vary transportation options, Build vibrant public spaces, Create a neighborhood identity, Protect environmental resources, Conserve landscapes, Design matters |
| Project for Public Spaces (n.d.) [8] | Access and Linkages Access and Linkages, Uses and Activities, Active, Fun, Vital, Special, Real, Diverse, Stewardship, Cooperative |

Table 1. Summary of Qualities & Dimensions to Describe Livability
### Table 2. Custom Livability Assessment Criteria for Recreational Public Space

| Quality of Livability Statement | Indicator of Livability Quality |
|--------------------------------|--------------------------------|
| **Accessibility & Safety (AS)** |                                |
| AS1 Accessible to all users (particularly disabled & elderly) with no physical barriers | • Presence of ramps & wheelchair friendly facilities  
• Stairs with railing support  
• Minimal level differences on ground surface |
| AS2 Reachable by a variety of transit modes | • Proximity to train stations & bus routes  
• Presence of bus stops  
• Bicycle parking facilities  
• Walk paths leading to and from the location |
| AS3 Protected from potential injuries, harm, immoral & anti-social behavior | • Design that enables natural surveillance (CPTED)  
• Presence of security guards / gates (if appropriate)  
• Presence of CCTV cameras (if appropriate)  
• Good lighting facilities in the evening/night  
• No hidden spaces, blind spots or secluded corners |
| AS4 Protected against traffic and vehicles hazards | • Clear segregation of pedestrian and vehicle traffic  
• Bollards / other structures to prevent illegal motor vehicle access  
• Well-designed pedestrian crossing facilities (if any) |
| **Comfort & Enjoyment (CE)** |                                |
| CE1 Options for sitting & resting | • presence of benches, chairs, gazebos, picnic tables etc.  
• presence of any other structure that can be used to sit or rest  
• comfortable ground surface suitable for picnics |
| CE2 Options for standing, walking and lingering | • provision of walkways throughout  
• good walkway design with shade & supporting facilities  
• overall good design |
| CE3 Thermal & Psycho-physical comfort in the environment | • good choice of building material & color that reflects / doesn’t retain heat  
• heat relieving facilities (where appropriate) such as fans  
• Presence of greenery & landscape elements  
• Provision of facilities to protect against weather elements (rain, sunlight, strong winds) |
| CE4 Protected against unpleasant sensory experience | • Absence of loud noises  
• Absence of unpleasant smells  
• Absence of unpleasant sights  
• Absence of unpleasant physical surfaces |
| CE5 Good state of cleanliness & maintenance | • Provision of rubbish bins throughout  
• Regularly cleaned and maintained waste disposal facilities  
• Overall cleanliness of the location (absence of illegal rubbish) |
| **Functionality & Variety (FV)** |                                |
| FV1 Activities and uses to cater all types of users | • Suitable provision of activities & facilities for children, youth, adults and elderly |
| FV2 Well-functioning facilities & infrastructure services | • Properly functioning and well-maintained facilities and infrastructure  
• No damaged, broken or impaired facilities |
| FV3 Multifunctionality and adaptability of facilities | • Multi-purpose sport courts  
• Spaces and facilities use open for interpretation by users |
Along with various definitions and interpretations of the concept of livability, there are various indexes and principles that can be used to assess, evaluate, or measure livability of cities, neighbourhoods and urban settlements. However, there has not yet been an internationally recognized guideline / criteria that firmly establishes how to measure and assess livability specifically in relation to public spaces. Therefore, for this research, the researcher has devised a new custom assessment criteria that can be used to assess the livability of recreational public spaces. This custom assessment criteria is devised by deriving common themes from published works of researchers and institutions that have attempted to identify the qualities, dimensions and design principles that can describe livability.
Looking at the list of qualities and dimensions summarized in Table 1, it can be quickly noticed that not all of them can be applied to assess livability for a public space. This is because the majority of them were developed for assessing / describing the livability of an urban neighbourhood or city. From the list of qualities and indicators above, there are several common themes that can be identified, that would be relevant and applicable to assess the livability of a public space. These are accessibility, safety, sociability, local community identity, visual aesthetic & vibrancy and cleanliness & comfort.

These identified common themes make up the core elements in developing the ‘custom livability assessment criteria for recreational public space.’ In addition, inspiration for the assessment criteria is derived from principles and guidelines for good public space design from works of researchers and institutions such as Carmona and Sepe [10,11], as well as from creditable indicators & criteria for good public spaces published by Gehl Institute and Clemente [12,13]. These published principles, guidelines and indicators for public space design were a logical and suitable source of reference in developing the custom livability assessment criteria for recreational public space because the qualities of a livable recreational public space is directly linked to good public space design. This is the case because all descriptions of a livable state / condition consist of desirable, positive, and functional qualities and characteristics, from which can be logically inferred that in order to assess the livability of a space, it should be checked to see whether it has those desirable and functional qualities. Based on this rationale, the ‘custom livability assessment criteria for recreational public space’ is devised and is comprised of 26 livability quality statements along with their indicators, grouped into 5 categories (Table 2).

These categories and quality statements are selected because they are a good representation of the qualities and characteristics that have been acknowledged by researchers and institutions as being associated with the concept of livability and good public space design. The categories are (1) Accessibility & safety, (2) Comfort & enjoyment, (3) Functionality & variety, (4) Visual aesthetics & legibility and (5) Sociability & identity. The qualities presented in the assessment criteria are also in line with and draw inspiration from the definition of a livable place by Zalloom [14] who explains that “livable places are spaces that promote human contact and social activities, safe areas, welcoming, accommodating for all users, visually attractive, encourage community involvement, reflect the local culture or history, and have unique or special characters.” These 26 livability quality statements in the criteria can be considered as the qualities that a recreational public space should have for it to be considered ‘livable.’

3.2 Analysing & Interpreting User Satisfaction to Determine Livability of Titiwangsa Lake Gardens

To apply the custom livability assessment criteria to the case study, the researcher has integrated the components of the assessment criteria into the online questionnaire. In the online questionnaire, the 60 respondents were presented with the 26 livability quality statement from the assessment criteria and were asked to give a satisfaction rating ranging from ‘highly satisfied’ to ‘highly dissatisfied’ for each statement. Numerical values were assigned to each satisfaction rating with a higher satisfaction having a higher value (Table 3). The responses to the rating of each livability quality indicator and the assigned numerical values were then used to obtain the rate factor value to be used for a rating factor analysis.

| Satisfaction Rating        | Assigned Value (x) |
|----------------------------|--------------------|
| Highly Satisfied (HS)      | 5                  |
| Satisfied (S)              | 4                  |
| Neutral (N)                | 3                  |
| Dissatisfied (D)           | 2                  |
| Highly Dissatisfied (HD)   | 1                  |
Table 4. Rating Factor Value Derivation for Each Livability Quality Statement

| Assessment Criteria Category | Livability Quality Statement                                                                 | Number of Responses for Respective Satisfactory Rating (f) | Rating Factor Value (Σ xf) |
|------------------------------|------------------------------------------------------------------------------------------------|-----------------------------------------------------------|-----------------------------|
|                              |                                                                                                 | HD (x=1) | D (x=2) | N (x=3) | S (x=4) | HS (x=5) |                                                                                           |
| **Accessibility & Safety (AS)** | AS1. Accessible to all users with no physical barriers                                           | 0        | 6       | 16      | 26      | 12       | 224                                                   |
|                              | AS2. Reachable by a variety of transit modes                                                    | 4        | 20      | 16      | 14      | 6        | 178                                                   |
|                              | AS3. Protected from potential injuries, harm, immoral & anti-social behaviour                  | 0        | 2       | 26      | 18      | 14       | 224                                                   |
|                              | AS4. Protected against traffic and vehicles hazards                                             | 0        | 2       | 20      | 28      | 10       | 226                                                   |
|                              |                                                                                                 |                                                     |                            |
| **Comfort & Enjoyment (CE)** | CE1. Options for sitting & resting                                                                | 0        | 0       | 6       | 30      | 24       | 258                                                   |
|                              | CE2. Options for standing, walking and lingering                                                 | 0        | 0       | 6       | 22      | 32       | 266                                                   |
|                              | CE3. Comfortable temperature condition                                                            | 0        | 0       | 14      | 24      | 22       | 248                                                   |
|                              | CE4. Protection from unpleasant sensory experience                                               | 0        | 0       | 16      | 28      | 16       | 240                                                   |
|                              | CE5. Good state of cleanliness & maintenance                                                     | 0        | 0       | 10      | 30      | 20       | 250                                                   |
| **Functionality & Variety (FV)** | FV1. Activities and uses to cater all types of users                                              | 0        | 8       | 14      | 30      | 8        | 218                                                   |
|                              | FV2. Well-functioning facilities & infrastructure services                                        | 0        | 2       | 16      | 28      | 14       | 234                                                   |
|                              | FV3. Multifunctionality and adaptability of facilities                                            | 2        | 14      | 16      | 22      | 6        | 196                                                   |
|                              | FV4. Variety of options & choices for recreational activities                                     | 0        | 0       | 12      | 20      | 28       | 256                                                   |
|                              | FV5. Encourages exercise & physical activity                                                     | 0        | 2       | 8       | 22      | 28       | 256                                                   |
|                              | FV6. Activities available throughout the day                                                     | 0        | 10      | 20      | 18      | 12       | 212                                                   |
| **Visual Aesthetics & Legibility (VL)** | VL1. Pleasant visuals and landscape                                                                | 0        | 0       | 4       | 10      | 46       | 282                                                   |
|                              | VL2. Presence of open green spaces                                                               | 0        | 0       | 4       | 16      | 40       | 276                                                   |
|                              | VL3. Presence of water bodies & features                                                          | 0        | 0       | 6       | 24      | 30       | 264                                                   |
|                              | VL4. Ease of navigation and movement within the park                                              | 0        | 2       | 12      | 22      | 24       | 248                                                   |
|                              | VL5. Ease in seeing and discerning all areas surrounding the park                                 | 0        | 4       | 24      | 16      | 16       | 224                                                   |
| **Sociability & Identity (SI)** | SI1. Suitable environment for talking and listening or hearing                                   | 0        | 0       | 4       | 30      | 26       | 262                                                   |
|                              | SI2. Availability of opportunities and incentive to socialize                                     | 0        | 0       | 16      | 30      | 14       | 238                                                   |
|                              | SI3. Reflection of local heritage, culture and history                                            | 0        | 18      | 28      | 12      | 2        | 178                                                   |
|                              | SI4. Fosters sense of community and belonging                                                     | 2        | 20      | 16      | 16      | 6        | 184                                                   |
|                              | SI5. Opportunity to contribute and participate meaningfully to the space                         | 6        | 18      | 12      | 18      | 6        | 180                                                   |
|                              | SI6. Sense of originality                                                                        | 0        | 4       | 26      | 20      | 10       | 216                                                   |

By treating the number of responses as \((f)\) and the assigned value for each satisfaction rating as \((x)\) then the rate factor value can be obtained by calculating \((\Sigma xf)\) for each livability quality statement. Since there were a total of 60 respondents, the possible range of rate factor values is between 60 to 300. Table 4 shows the data of respondents’ satisfaction ratings for each livability quality statement. By asking the respondents to give their satisfaction rating for the 26 livability qualities according to the
custom livability assessment criteria, the researcher has been able to collect data that can be used to
gauge the degree to which Titiwangsa Lake Gardens exhibits qualities of a livable recreational public
space. The rating factor values presented in Table 4 can be treated as a reflection of the collective
satisfaction level of all the respondents towards livability qualities of Titiwangsa Lake Gardens.

This approach is deemed suitable to assess and determine the livability because the 26 livability
quality statements represent the qualities a recreational public space should have for it to be livable, and
because the rating factor values reflect the aggregated satisfaction level of the visitors (respondents) of
the park. These factors serve as a good indication of livability because user satisfaction, experience and
perception are linked strongly with livability of a space. The 26 livability quality statements and their
rating factor values are presented in Figure 2.

To determine whether Titiwangsa Lake Gardens can be considered as livable or not, the researcher
has set a threshold of how high a statement’s rating factor value should be for it to deemed as
successfully contributing to the livability of the park. Given that the possible range of rating factor values
are between 60 and 300, the researcher has decided that for a livability quality statement to be deemed
as successfully contributing to livability, it should have a rating factor value of at least 220. The reason
for this is because a value of 220 would mean that at least 73.33% of respondents gave that statement a
rating of 5 – meaning that at least 44 out of 60 respondents were ‘highly satisfied’ with said statement.
The researcher has deemed that having 44 out of 60 people being ‘highly satisfied’ with a livability
quality statement is justifiable to treat that statement – the quality that statement is representing – as
being a successful contributor to livability. Therefore, livability quality statements with a rating factor
value of 220 and higher is deemed to be contributing to the livability of Titiwangsa Lake Gardens
because their high satisfaction level means they are positively influencing the user experience and makes
them an asset of a recreational public space. Based on this interpretation, it can be counted to see how
many qualities of the case study location are contributing to its livability.

As can be seen in Figure 3, there are 18 statements that have a rating factor value higher than 220.
This means that out of the 26 qualities of livability for a recreational public space, 18 of them are
exhibited by Titiwangsa Lake Gardens, and they are perceived as being ‘highly satisfying’ by the
The majority of respondents (who are users & visitors of the site). Therefore, based on this analysis, it can be concluded that based on the livability assessment criteria designed by the researcher, and on account of the respondent’s satisfaction ratings, Titiwangsa Lake Gardens in Kuala Lumpur can in fact be deemed as a livable recreational public space because the majority of qualities it exhibits are successfully contributing to its livability.

**Figure 3. Rating Factor Values of Livability Quality Statements**

### 3.3 Identifying Aspect of Recreational Space Livability Most Important to Park Users & Visitors

This research also aims to identify the aspect of recreational space livability that is most important to users and visitors. In the online questionnaire, the respondents were presented with 8 aspects of recreational space (livability) design that are in line with the categories of livability quality standards of the custom livability assessment criteria. These 8 aspects are (1) accessibility, (2) safety, (3) comfort, (4) functionality & variety, (5) visual aesthetics, (6) visibility of surrounding areas, (7) sociability, and (8) community identity. The respondents were then asked to rank these aspects in order of their importance to them. With the outcome from this ranking, a ranking average analysis was performed to obtain the weighted ranked average values for each design aspect. This way, the research is able to identify which design aspect is ranked as the most important for a recreational space according to the respondents. The 8 design aspects were then ranked according to their weighted average values and are shown in Figure 4.
Based on these weighted ranking average values, the design aspect with the highest values are ‘comfort’ and ‘visual aesthetics’ which indicates they are ranked as the most important aspect of recreational space livability according to the users and visitors of Titiwangsa Lake Gardens. The researcher suggests that the reason why ‘comfort’ and ‘visual aesthetics’ were chosen as the most important is because they are arguably the most immediately noticeable and impactful design aspect of a recreational public space. Both of these aspects are apparent from the very beginning of a user’s visit to the space, and if there are any flaws or undesirable qualities in comfort or aesthetics – such as overly warm temperatures or offensive views – the user can become immediately turned off and become displeased. Comfort and visual aesthetics can also be thought of as the most sensitive aspects of a recreational space – when compared to the other 6 design aspects. This means that sudden or small changes in them can have a significant impact on the user’s perception and satisfaction; for example, if an unpleasant smell or sound is suddenly detected, it can potentially deteriorate the user’s comfort levels.

One way to investigate the respondent’s reason for giving the highest importance ranking to comfort and visual aesthetics is to consider what things come to the respondent’s mind when they think of these design aspects. It is highly likely that their perception and understanding of the meaning of the words had an influence on their ranking choice. Considerations should also be made of how these 2 design aspects play a role as a factor of public space use. Starting with the comfort aspect, the Cambridge Dictionary defines comfort as “a pleasant feeling of being relaxed and free from pain.” In the context of experience in recreational space, comfort is understood as a pleasant and satisfying feeling gained as a result of being in the given space. Words that are commonly associated with comfort include calm, relief, soothing, pleasant and enjoyable. Gomes [15] writes that “Physical and psychological comfort is a very strong condition for optional and social activities in public space.” He explains that physical comfort encompasses elements of weather, sunlight exposure, noise, ergonomics while psychological comfort entails visual perception, scale and safety. Based on these definitions and word associations, it can be safely assumed that what the respondents had in mind when choosing this aspect is; thermal comfort from an acceptable and pleasant temperature range (not too hot or cold), psychological comfort from a feeling of being at peace (resulting from safe surroundings) as well as physical comfort from a clean and well-designed environment.

Moving on to visual aesthetics, which comes from ‘visual’ which means related to seeing / sight and from ‘aesthetic’ which is defined by the Cambridge Dictionary as “relating to the enjoyment or study of beauty or showing great beauty.” From these basic definitions, in the context of urban design,
visual aesthetics can simply be understood as relating to a pleasant/beautiful sights or views that people can enjoy. Words and terms that are usually associated with visual aesthetics include aesthetics, visual quality and scenic beauty. Yusufzyanova [16] presents in her thesis the works of several authors who have given definitions of the concept of visual quality. One author is Walsh et al. [17] who writes that ‘visual quality of landscape has a significant impact on people’s experiences within the environment.’ Other authors include Cengiz [18] who writes that “visual quality should be considered as the most important feature of landscape that directly affects people’s preferences” and Levy [19] who writes that “aesthetic factors are among the most important in terms of perception and preference and have significant influence on people’s satisfaction and assessment of the quality of an environment.” The works of these various authors support the notion that visual aesthetics/quality can in fact be a very important and significant influence on a person’s perception & satisfaction and in turn their desire for a recreational public space.

4. Conclusion

This research set out to accomplish 3 main objectives; (1) to devise a custom assessment criteria that could be used to assess the livability of recreational public space, (2) to apply the custom livability assessment criteria to a case study to determine its livability and (3) identify the design aspect of livability considered most important to users and visitors of a recreational space. Upon completion, this research has successfully accomplished all 3 objectives. A custom livability assessment criteria was devised based on existing literature on livability, and it was applied to Titiwangsa Lake Gardens where it has been determined that the recreational park can in fact be considered as a livable space. The two most important aspects of livability according to park users has also been identified as ‘comfort’ and ‘visual aesthetic.’

The outcome of this research serves as a contribution to the field of livability and urban design. The custom livability assessment criteria addresses the knowledge gap that is the absence of a criteria/index to assess livability specifically for recreational public spaces and serves as a reference example for the formulation of similar assessment criteria/index relating to urban design for livability. The findings can also provide insight for designers and developers of public space on how to better design, create and manage recreational areas to ensure livability for its users. Finally, this research hopes to provide a better understanding about public space livability and how to create spaces that can improve user experience and enhance quality of life for urban inhabitants.

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