

The Importance of Shade and Shading Provider in the Creation of Urban Interior in the Tropics

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ABSTRACT

In 2013, the term urban interior was introduced to acknowledge the creation of private space within a public space. An urban interior can take place anywhere in the city from pedestrian to parks, plaza, or any open space. In Indonesia, especially in Bandung, revitalization of public spaces – particularly parks and neighborhood neglected space – has taken place since 2015 to enliven the space and the neighborhood. This research aims to understand the important elements in creating liveable public open space in Indonesia using the new Taman Sejarah in the municipal office complex as our study case. The research was conducted through observation of space use, interview, and activity mapping in the park during weekdays and weekends. We found that weekend is busier than weekdays and that people tend to stay in a shaded area. The interview result also showed a similar thing. The respondents even asked for additional shading within the area. They also often brought food along with them or bought some from the nearby street vendors. We conclude that shade and shading providers are important elements of the creation of an urban interior.

Keywords: *urban interior elements, Taman Sejarah Bandung, importance of shade, urban interior creation, open space shading element*

1. INTRODUCTION

Place making in public space requires specific elements in accordance with local use and needs of public space. As Del Aguila et al [1] described that place-making is a people centred design where public spaces are designed according to people's association of activity and function with physical surroundings. In this case, the public spaces are acknowledged as urban interior.

In their study, Merwood-Salisbury and Coxhead [2] mentioned parks and urban space projects where they found concept of interiority in the urban place making, highlighting the importance of sense of containment and security with visual connection to the surrounding. The interiority was created by elements in the park provided by design. However, Del Aguila et al [1] study on physical setting and behaviour found that there is a preference for natural design elements over artificial one with explanation that grassed areas with shade from trees were used by larger groups compared to the one shaded by buildings which were left vacant. In this study, Del Aguila et al [1] mentioned that shade from building is categorized as "artificial shade" that influence user's behaviour in affective and cognitive process. In this case, the influence was negative because user perceived it as a non-preference.

Bandung possess numerous parks and gardens because the city was designed as a garden city. Numbers of the park were unused by public. There even existed vacant unused space on street edge, building corner, neighbourhood left space, and other voids. These type of spaces were defined

by Shaw [3] as areas left over from planning and can be found anywhere. In other study, Carmona [4] also categorized typologies of open public spaces according to their physical forms which fell into 6 categories and according to function which fell into 8 categories. All categories included amorphous space and undefined space without obvious function in which unused loft over spaces fell into. Carmona [4] stated that function had the strongest impact on the design of space.

Since 2015, unused parks and voids (left over space) were revitalized by Bandung mayor. The revitalization of public spaces, especially parks and neighbourhood neglected space, took place to enliven the space and the neighbourhood. Thematic park model was chosen in the revitalization project which increased public visit to parks and public spaces.

Indonesia is a country with tropical climate with hot humid air and high daylight exposure. These elements influence open space use and formation. In line with theories of place making, interiority, and material preference, there is a question on how people in tropical climate context use urban space. Since Indonesia people love to stay in sheltered cool place.

To complete the study, a case was taken for observations. The study case chosen was the new created Taman Sejarah located in municipal office complex with consideration of area coverage, elements provided, number of visits. The research was conducted through observation of space use, interview, and mapping of movement and activity in the park during weekdays and weekends.

1.1. Related Work

1.1.1. Urban interior, interiority, elements of urban interior

Several studies on term and definition of urban interior, interiority, and elements of urban interior in various scale and model had been done previously by researchers.

Poot et al [5] explained that early stages of urban interior in history can be traced back to the 18th century from the map of Rome created by Giambattista Nolli. The map of Rome was a gestalt map showing urban solid and void where the void was coloured white, marking public open spaces. In this way, the surrounding buildings acted as enclosure to the open spaces that made them an 'interior'. Meanwhile, Merwood-Salisbury and Coxhead [2] stated that early introduction to urban interior started in America in late-nineteenth-century, a period where architects designed lobbies for skyscraper that imitating and contesting with the streets outside.

In 2007, the term urban interior was introduced to acknowledge the creation of private space within public space. An urban interior can take place anywhere in the city from pedestrian to parks, plaza, or any open space which often called 'void'. The urban interior was introduced as an interior design practice, as an interior-making in the urban environment, Attiwill [6].

Stace [7], in her study on urban interiority stated that activities were no longer separated between "indoor" activity (interior) or "outdoor" activity (exterior). The phenomenon was known as urban interior or public interior which was defined as places used as public spaces even though the ownership might be private. Further, Stace [7] argued urban interior as a science viewing the use of urban design and interior that has strong relation to furnishing. Stace [7] regarded interior condition as a frame and enclosure, defined by situation and pre-existing void to be filled. In her research, Stace [7] identified five main ideas contributing to real experience of shelter. The five ideas were creation of individual spaces to rest; creation of buffer as separator between individuals and the outside world; control and limitation of natural lighting; the use of simple forms referencing to early form of shelter; the use of limited material pallets that described the formation and history.

Attiwill [6] showed in her study that interior design within urban environmental context contained potentials as an interior design practice, as interior making within the urban environment. In her references, Attiwill [6] introduced new thinking on interior design not only as a practice within enclosed three dimensional spaces. Further, Attiwill [6] also used 'urban room' terminology introduced by [8]. In this case, urban room is not referencing to people-to-people meeting, but more about composition of space and time bounded with public. Scale and proportion of the space are not specific boundaries, as in large city scale or small park scale, but as a manifested interior thinking on observable and documentable qualities, Attiwill [6].

Farrelly and Mitchell [8] had conducted research at University of Portsmouth through a range of teaching and research projects where students from two departments, interior design and architecture worked together exploring the term 'room' at different scales, interpreting the studies space through drawing, modelling, and mapping. Both interior and urban space can be mapped and described as a journey, as well as understanding of context, which means they share some things in common.

Study of commonalities was also conducted by Grobler and Roux [9] through study of comparative vocabulary of architectural elements. urban, and interior, thus the urban interior. The study used terminology and definition from theories by Krier, Ching, and others. Grobler and Roux [9] concluded that there existed similar spatial vocabulary in defining enclosure criteria of architecture/urban/interior. The vocabulary came from elements of point, line, plane, volume that define physical space of architecture/urban/interior regardless of location.

Another definition of urban interior according to Guinta [10] is artificial habitat created consciously or unconsciously by users as temporary 'inhabitant'.

1.1.2. Shade and shading provider as elements of urban interior

Studies on elements of urban interior, along with its effect to human response or behaviour had been done little. On the other hand, the existing studies concerning shade and shading provider were conducted from thermal comfort point of view.

A study was conducted by S. A. K., and Sabahiah [11], related to shading effects and thermal comfort in hot climate regions. The study calculated solar radiation and air temperature that created thermal discomfort and caused heat stress among people, pedestrians particularly. Thus, the study found that urban spaces were neglected due to heat stress. It concluded that there are a proportion of shades to be provided in urban space to maintain pedestrian activities. Another study on heat and shade was performed by Lee et al [12] who did shading strategy measurement using calculation of thermal comfort index of three (3) types of shades created by different elements. The measurement was performed overheat during sunny daylight. The three types of shades measured came from building, trees, and canopies/umbrellas. The study concluded that from three proposed strategies appeared in urban space, building shade was found to be the most effective cooling strategy, followed by trees and canopies/umbrellas.

Lee et al [12] stated that shade can be obtained in variety of ways through urban spaces design. Lee et al [12] also mentioned findings from other studies on trees shades that have been used to fight hot condition caused by urban heat island effect or UHI.

Study on shade in tropical context was done by Emmanuel et al [13]. The study proposed shading strategies in tropical urban area such as preference on north-south orientation where trees shadows can fall on one side of space in the

morning and afternoon (tress also has cooling effect), additional horizontal shading devices are necessary to provide shade around solar noon. Furthermore, based on height of the sun's angle in the tropics, Emmanuel et al [13] proposed that spaces between buildings should be narrower compared to shadow length which means closer distance between buildings. However, Emmanuel et al [13] reminded that the last should consider neighbourhood scale, building ventilation, indoor thermal comfort, and air quality. It also noted the importance of an urban design guidelines that promote shading in public spaces where people tend to gather.

1.2. Contribution: importance of shade as element of interiority in tropical urban interior

Tropical regions possess humid and relatively hot temperature during the day. This hot temperature causes thermal discomfort to people using public spaces. Thus, people using public open spaces tend to avoid direct sunlight.

It has been confirmed in previous study on the calculation of urban heat island in public spaces using three types of shading, study on shading effect and thermal comfort in hot climate region (not specifically tropical), that shades have different characteristic and cooling effect depend on the object providing them. There exist also people preferences over different type of shades.

This paper aims to understand the importance of shade as element of tropical urban interior. Through mapping of people movement during their activity in the open space, it reviews the relation of shades, space, and people activities.

1.3. Paper Structure

Section 2 presents history, physical situation, and condition of an urban interior of study, facilities provided. Section 3 presents method used. Section 4 describes spatial use, people movement observation during the day, daylight movement, shadow movement, activity pattern. Section 5 compares people behaviour/activity, shading, and existing theories, explains how and why of people movement in relation to physical condition in the selected urban interior, relation between people movement, shading, interiority. Section 6 concludes the paper and presents direction for future research.

2. OBJECT OF STUDY

2.1. Taman Sejarah: History, Present Condition, Design Concept

The chosen object for case study is Taman Sejarah Bandung. Taman Sejarah is in municipality complex,

integrated with the municipal building, municipal park, and city park. In its history, this small new park was nothing but a 'void', unused open space, a left over on the corner of the street, an empty meaningless blank spaces, as defined by Shaw [3] from various sources.

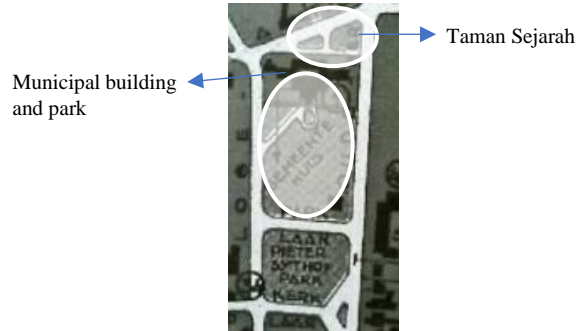


Figure 1 Map of Taman Sejarah environment in 1933, KITLV

The previous situation of Taman Sejarah can be seen from Figure 1 where the current park is marked by white oval, a little bit separated from municipality complex on the South. The area is surrounded by academic facilities, public and private schools of all levels, as well as course centre and university. It is also surrounded by shopping malls nearby. In the 90's and early 2000's, the void was used as parking space. Mentioned situation remained until 2015, when new mayor of the city took over every neglected corner, left over spaces, unused spaces in the city and transformed them into thematic public parks, though not necessarily an urban interior. It included the present Taman Sejarah that was opened for public in 2017. Thus, the void, that used to be private, became public. The ownership however remained private to the municipal.

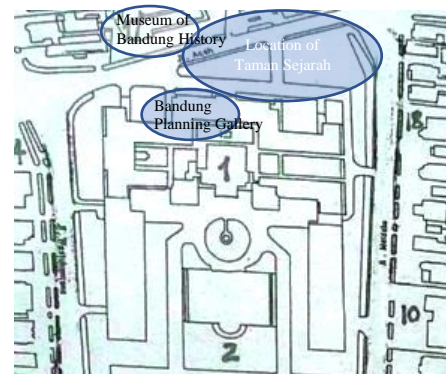


Figure 3 Taman Sejarah Plan, Katam 2014

Taman Sejarah (History Park) was conceptualized by integrating its function as historical source with Museum Sejarah Bandung (Museum of Bandung History) and Bandung Planning Gallery which are located across and next to each other. The concept of the area itself is from past (the museum), present (park), to future (planning gallery).

The park opens daily from 7 a.m. to 10 p.m. from Tuesday to Sunday. It is closed on Monday, following the opening schedule of the museum and the gallery, which is also used for park maintenance.

As a parking area, a void, the original space of the present park had no name. The new park was named Taman Sejarah (Park of History) according to the concept of its creation to support Museum Sejarah Bandung (Museum of Bandung History) located right across the park, to provide information related to the history of the city.

2.2. Elements and Furnishing, Taman Sejarah as Urban Interior

The new park's design elements consist of hardscape, softscape, water (a pool), and equipment (furnishing). It has neither form of shelter nor vertical coverage at any part of the park. Large existing old trees are located on the eastern and southern side of the park, on street side. Height of trees are almost even, about 20 metres in average with different shade diameter. The diameter of trees was not measured since the focus of research is on shading and people movement within the place. Large trees can also be found on the street side, on the North side of the park.

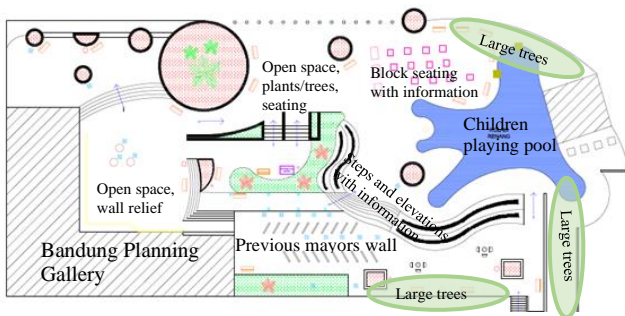


Figure 5 Present Day Taman Sejarah Plan

The form of the new designed park is organic, forming enclosures in different scales and sense of micro shelters or sense of containment. The first enclosure is around the pool area. The second enclosure is on the West side of the pool, by the softscapes. The third enclosure is near the relief of Bandung history, near large tree. These enclosures were created by different floor levelling, steps, and planters for trees and softscapes, thus each part of the park is visually connected while physically distanced. The visual connection to surrounding gives sense of security within the park. Those elements, enclosure, sense of security, micro shelter, which according to Merwood-Salisbury [2] are vital to interiority of an urban space. Though, on the other hand, this park was created from void Shaw [3], thus no place-making took place in its design as described by Del Aguila et all [1] because place making would happen to a design created in a place already has activity and function. This type of enclosure cannot yet contribute to real experience of shelter that an urban interior should provide. According to Stace [7] there are five main ideas contributing to the experience of shelter, in which only three

ideas present in the park. The three ideas are individual spaces to rest, control and limitation of daylight, and buffer between individuals and the outside world.

Furnishings and landscape elements are used to present information on history about the city. Some of the examples are 2D drawing of previous mayors of the city. The drawings were printed on free standing glass walls along with information texts telling important events or policies during their era. On the western wall, an exterior wall of Bandung Planning Gallery, a relief of historical event in Bandung is present in large scale, visible from the other end of the park. Other elements used for historical information medium are block seats, stairs, and levelling. However, most of visitors were not aware of the presence of this integrated information systems.

Other furnishing such as lamp, plants' vases, trash bins, benches, extra signages, tables. These furnishings are spread out all over the park. The park extended itself to pedestrian area on the north side. Small bollards separate the park with the street.



Figure 4a Several park's elements that serve as history information: Block sitting and printed glass wall with historical information



Figure 4b Model of enclosure created by different height of floor level; furnishings present in the park; direct connection to pedestrian area.

3. METHOD

The research was done through daily observations, documentation of physical situation, quick survey to visitors, and in-depth interview with few visitors to confirm information from the quick survey.

Documentation and observation were done to the park physical form, visitors behaviour pattern related to daylight and shade, type of activity occurred. Documentation and observation started with photograph, schematic drawing of park's design form and types of park's physical facilities. The data collection continued with observation of spatial use pattern and people movement, and visitors survey on weekend. Weekend was chosen for quick survey due to findings that number of visitors rise on weekends with children and family as majority users. Decoding of keywords were done for analysis of survey result.

Afterward, illustrations mapping on the park plan were made and analysed to understand correlation between shades and people movement, as well as area occupied by visitors.

This study used analysis approach presented by Poot et al [5] on micro-spatial analysis in an urban interior where the analysis is concentrated on specific issue, in this case, the issue is on importance of shading in creating urban interior in tropical climate area.

4. RESULT

4.1. Documentation

People and Space Occupation

Observations was done in one week to understand how the park was used daily. From the daily observations, a spatial occupation pattern was mapped. During weekdays, the parks is dominated by school students, mostly of lower level (elementary), coming from nearby schools. The time of space use started at near noon to late afternoon. Teenagers and young adults were present from afternoon to evening. On weekdays, younger users used the park to play after school. Meanwhile, teenagers and young adults use the parks to meet each other, to gather, to discuss, to relax. On Monday, when the park is officially closed to public, people using the space can still be found even if then they got sent away by securities in patrol. It was also understood that the park tends to be less crowded and less occupied on weekdays. This finding was confirmed by security on duty. They confirmed that the park was relatively vacant on weekdays.

On weekends, the park was being used from the morning. Most of users were family with children, at least a mother with a child or more. They came with main purpose to bring children to play in the pool. Activity started at 7.30 a.m. with only few visitors. More family visitors came between 8 a.m. to 10.30 a.m. After 11.00 a.m. less family came, more young people visited the park.

Duration of stay in the park differs between visitors. Those who took children for recreation in the pool stayed the longest 1 hour to 2 hours in average. Other visitors stayed less than 1 hour.

From the documentation, people behaviour and their way in using the park facilities were observable. People in groups had tendency to gather around, thus creating their own territory. Visitors also had preference to find empty place to sit, in a distance from other visitors. It was common to see benches occupied by one person. When they were not sitting on bench, it was common to see people sit around trees, on floor steps or planters' wall.

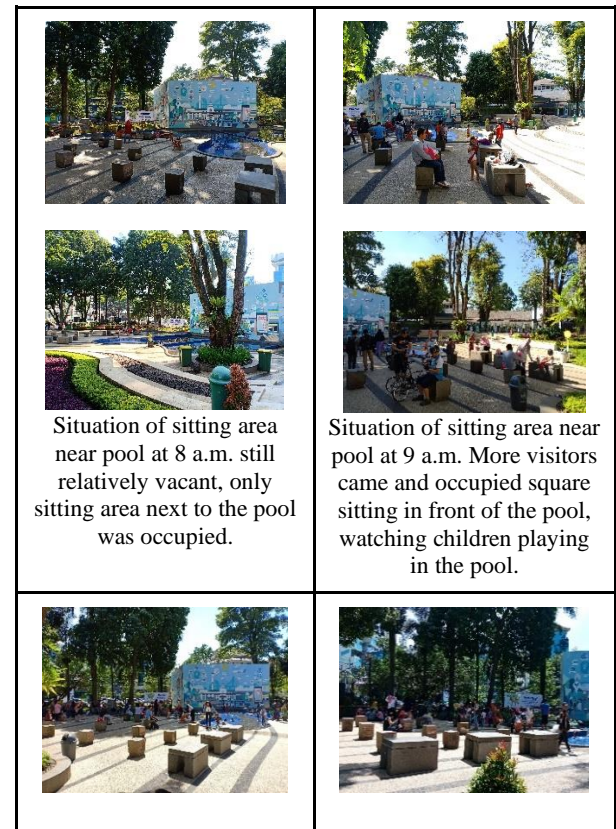
In relation to daylight and shade, sitting facilities exposed to the sun were likely to be left unused. Even when one bench was half shaded and the other half was sunny, people prefer the shady one and left the sunny side empty. When the sun moved, the shadow bellow shifted, thus shifted visitors from their early position to other place with shade.

People had tendency to gather and sit in any facilities under trees' shades. Meanwhile, shade from nearby buildings, which is limited, were not favourable for public to take shelter. This is in line with Del Aguila et al [1] who mentioned that shadow from trees are users' preference in public space.

Studies reviewing elements of urban interior in relation to behaviour only found concerning materials and preference, but not activity movement affected by light and shadow. Studies on shading effect to thermal comfort was conducted by S.A.K. and Sabahiah [11]. Meanwhile, study related to shade and heat was performed by Lee et al [12], and study about shade in tropical context was done by Emmanuel et al [13]. Thus, studies on importance of shades as an element in interiority is very limited.



Figure 6 Visitors' activity



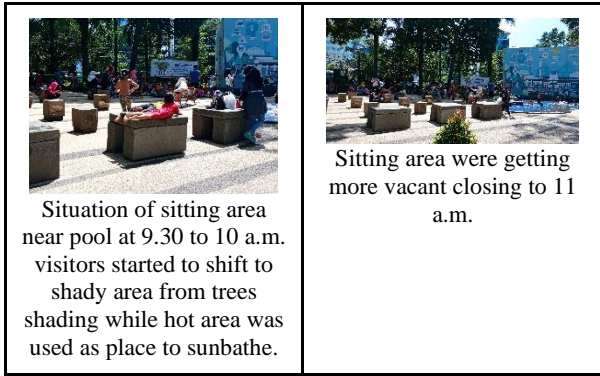


Figure 7 Space and facility occupation pattern 1



Figure 8 Space and facility occupation pattern 2

Pictures on Figure 8 shows similarity in spatial occupation where people preferred empty shaded space where they can sit, whether the space had sitting facilities or not. Left side pictures on Figure 8 shows visitors preference to sit on the floor in shaded area when they came in group, to be able to gather all together, while provided bench was used to place their belongings or left unused. In the activity of recreation and gathering, as seen from Figure 6 to 8, people used the facilities and space not according to its original function. As seen from Figure 7, children users used the block sitting and even tree planters to sunbathe after playing in the pool. From Figure 6, it is seen that mothers and families created a ‘territory’ of their own. In this case, they were being temporary inhabitant as mentioned by Guinta [10].

4.2. Mapping

Daylight Movement

Daylight and shades coverage were observed and mapped. The mapping created by considering the park design and existing large trees present in the park and surrounding streets. As the sun moved during the day, so did shadows from existing trees and surrounding building. In the morning, shades existed on the West part of trees and building. Thus, shades from trees covered more than 50% of the park, mostly around centre of the park. Shades moved to Eastern part when the sun moved West. Less shades covered the park as the sun moved.

Sitting area in the centre of the park never get any shade. While sitting area near pool received shade only in the morning. Length of shade from large trees were illustrated below. The length of shade was influenced by the position of the sun, in this case by the degree of tilt of the sun’s angle.

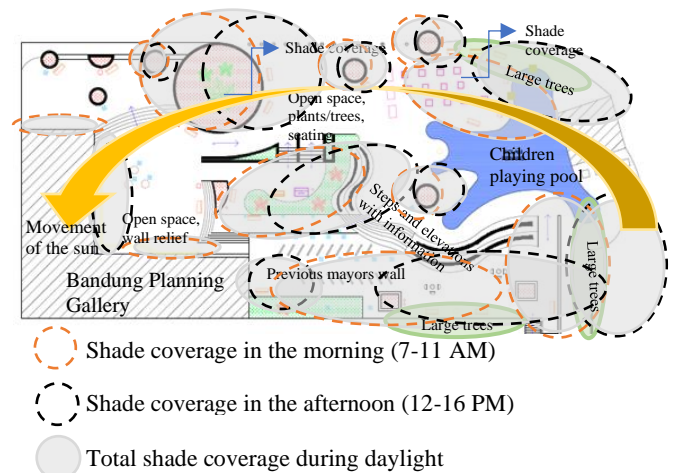


Figure 9 Shading coverage and movement of the sun

Shadow Movement

Shadow moved in the opposite direction of the sun, from West to East. The illustration below shows movement of shadows, from trees and buildings, from morning, noon, and afternoon. Shade coverage depend on the sun’s angle in the time as mentioned previously. As the sun moved West, the shadow moved East. Thus, the park area was more exposed to sunlight.

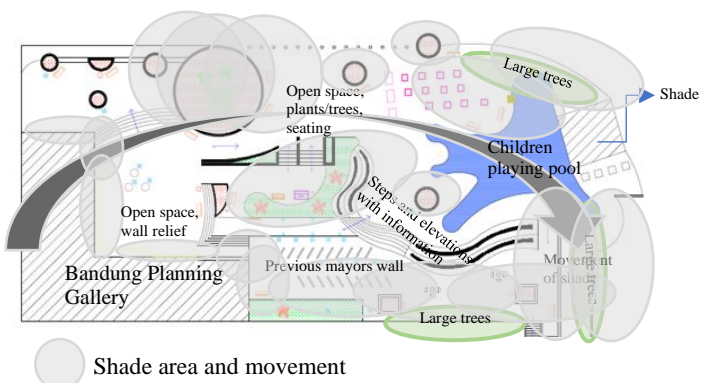


Figure 10 Illustration of movement of shade from trees and building

People Movement

The following illustration shows how people move in the park. Previously has been mentioned that people had tendency to occupy areas with shades and sitting furnishing. During observation, it was understood that people who stayed longer than 1 hour had tendency to change their position following available shadows. Meanwhile people who came in different time had similar behaviour in looking for empty sitting under shadow, in a position distanced from others already presented. Bellow on the park plan, people movement pattern is presented in blue arrows that show movement pattern. These movement patterns were in line with shadow movement during the day.

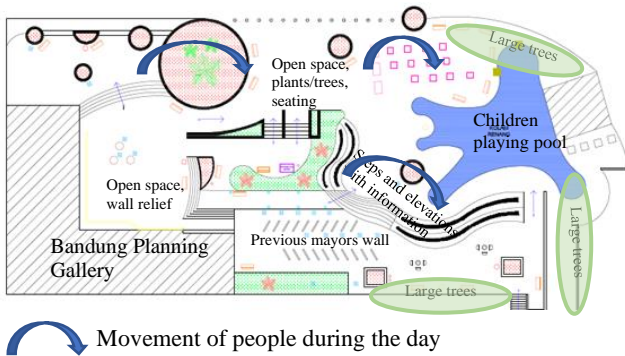


Figure 11 People movement during the day

Occupied Areas

During observation on weekends and weekdays, sitting area near pool were dominantly occupied. On weekdays, sitting area occupation was more prevalent. On weekends, sitting area and stairs near pool were heavily occupied. Those were most dense area of the park. Other more open spaces exposed to daylight with less sitting furnishing were unlikely to be visited.

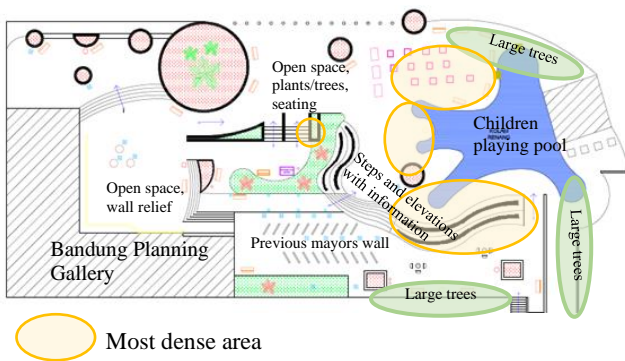


Figure 12 Area most occupied (most dense)

It was understood that majority of visitors of Taman Sejarah were mothers and children who were attracted to the pool

they used to play. Therefore, the densest area of the park was the pool, stairs to the pool, and square stone sitting area. This area and stairs were two favourite sitting area because they were shady and provided ease of physical and visual access to the pool. That way, parents can easily monitor their children playing in the water.

These preconditions were mentioned by an interviewee, a young woman came with her family from Gegerkalong whose name was not asked. She stated *“Yes, we like it here. It is shady, comfortable, and there is a pool for children to play. We like to sit near the pool to watch the children play with water. We usually come on weekends to enjoy the pool (for children) and then continue enjoying the city by Bandros (touristic bus) available at the municipal parking.”* Another interviewee who came from Babakan Ciamis, a nearby neighbourhood, a mother waiting for her son swimming stated *“I come here once or twice a month to take my son play in the pool. I usually come in early morning to avoid people crowd and heat of the sun. I like to sit near the pool, under the trees. Just find a vacant shady sitting”.*

Three areas mentioned above were the shady area during the morning and heats up along with the sun’s movement. Meanwhile, areas exposed to sunlight were almost vacant at all.

A quick survey to 31 people was also done asking visitors favourite part in the park. The result was 22 people (70,97%) answered “pool” as favourite place in the park. The second answer was “shady calm” area mentioned by 7 people (22,58%). This result is in accordance with 2 interviews stated earlier. Only 2 interviews occurred since there were only these 2 visitors were willing to share for the research.

Visitors were also asked about the thing they dislike in the park, as well as the thing they need. From the survey, visitors asked that more shading provider to be presented in the park and that sitting area to be made more comfortable. This result confirmed the need of horizontal shading as advised Emmanuel et al [13]

5. DISCUSSION

5.1. User, Activity, Daylight and Thermal Control

This study documented and mapped people movement and spatial occupation in relation to daylight and provided shades. The documentations and mappings are as seen in Figure 6 to 12 where people movement related to daylight exposure is seen. From Figure 6 it can be seen the spatial occupation pattern according to time in the day. Figure 6 also documented the shade movement pattern in the time being. These patterns are mapped in Figure 9, 10, 11.

From observations, it was noted that there are 3 types of users in Taman Sejarah. All 3 types of users occupied the space in different time of the week. The first group is student who use the park mostly on weekdays between noon to early afternoon. Second group is public in general who come at any time during the day. Third group is family with children who come on weekend and use the facility in the

morning from around 8 a.m. to near noon. It suggests that there is different characteristic of users with different spatial use timing with different interest and purpose. Specific purpose happens on weekend with user group family with children.

In the meanwhile, main activity occurred in the park were recreation, gathering, and waiting. Recreation activity was done by family and related strongly to gathering activity because family came in groups between 4 to 8 people. This recreation activity is only occurred on weekend and does not take place on weekdays. It signifies that family users come to the park for recreation purpose only, in this case to use the pool. Recreation time was also limited around 1 to maximum 2 hour happened in the morning from 8 a.m. up to 11 a.m. This implies that peak time and high density of space use only happens on weekend, from 9-11 a.m., around pool area which is shaded, occupied by families with children. It also signifies that the main attraction of this park happens to be the pool.

The high-density spatial occupation and type of activity were shown in Figure 6 and 12 where most populated space was around the pool which were not present during weekdays. However, this density has tendency to displace where people move away from daylight to cooler area with tree shades still around the pool. Preference over cool area signifies visitors' effort on control to thermal comfort. As vegetation provides oxygen during the day, it creates cooler microclimate for its surrounding even though less cool compared to building shades, S.A.K. and Sabahiah [11]. Nevertheless, vegetation shades are preferable to users than building ones, Del Aguila et al [1].

Gathering activity were also done by other public and students in less frequency. Waiting activities were done by individual public and students. During weekdays, these two activities took place in low frequency, meaning not many people use the park for the mentioned purpose. The spatial use pattern is similar that people chose vacant shaded facility. All activity on weekdays and weekend showed the use of empty shady facility by visitors which indicate people's preference over shady spaces or spaces that have control over daylight exposures and heat or thermal comfort. It confirmed a statement of S.A.K. and Sabahiah [11] that spaces are left by pedestrians during the day due to heat stress. In this case, presence of trees and shades help reduces the heat stress caused by daylight radiation.

Documentation in Figure 6, 7, and 8 shows spatial use pattern by visitors that concentrated under trees' shades. It is interpreted that visitors tend to avoid sunlight. Therefore, eastern area shaded by trees shades were the densest area during the morning. Meanwhile, the western area, more open and less shady were empty area rarely visited by visitors as mapped in Figure 12. Accordingly, shades create a sense of space in the area where it falls, defining micro spaces to be used.

In all the activity, whether coming alone or in group, people have tendency to create territory of their own, detached from other visitors. The consequence is that everyone who come to the park, looks for empty area distanced to other visitors to sit in. The empty area searched is always those unexposed to daylight. Therefore, it was common to see

people sit not on benches, but on tree planters, steps, or even lamp cover, if it was shaded. Again, control over daylight is an important factor for visitors in choosing a space/facility to use.

The use of facilities not in accordance with each purpose or function indicates misconduct of facility/furnishing use. In this case, where people used the floor to sit and block sitting to sunbathe, or bench to put belongings while people gathered on the floor are examples of facilities misuse. Children used block sitting and tree planters exposed to daylight for sunbathing after playing in the pool. It implies the proper use of daylight but improper use of facilities/furnishing which is shown by Figure 7 and 8.

Figure 9 and 10 explain sun and shadow movement during the day, while Figure 11 explains people displacement or space occupation pattern by visitor, also during the day. The three figures show relation between daylight movement, shadow movement, and movement of space occupation in the park. Figure 9 and 10 show that shade moves in opposite direction with the sun. The length of the shadow fall on the ground is influenced by tilt degree of the sun. The smaller the degree of the sun position, the longer the shadow falls. The shadow falls in vertical position at noon. Figure 11 shows how the shadow movement influence people position in the park during the day. It does not indicate that the same person or group stay in the facility in a long time, then displaced, but it shows position to where people occupy the space available which always follow position of trees shades. This can be interpreted as people's need and attachment to shade in an open space.

From quick survey to 31 visitors and deeper interview to two (2) people, the keyword "pool", "shade" and "calm" arose. Pool is pointing to pool facility in the park used by children to play. The word "shade" was not directly said but translated from visitors answer such as cool place and not hot. In the meanwhile, the word calm refers to spaces less crowded in visitors' opinion. It implies that important elements in Taman Sejarah are pool, shade, and less crowd.

5.2. Shades, Urban Interior, Tropical Climate

Taman Sejarah design is pretty much benefited by the presence of existing large trees in the surrounding. These trees naturally became the buffer to the park's surrounding. The trees also provide shades and sense of enclosures within the park. The shades formed in the park is influenced by the sun's angle, Emmanuel et al [13]. In this circumstance, shades could fall longer on one side in specific time of day and moves along in opposite direction of the sun's movement as discussed earlier. Mapping of this shade's movement is as presented in Figure 9 and 10. From Figure 9 can be seen that shades moved from West to East with quite large area coverage created by the sun's angle, although at noon shades fall vertically on the exact same position and width with the trees. At this time of the day, the park needs an extra horizontal shading device, Emmanuel et al [13]. Presence of trees and shades in the park create the sense of interiority to visitors where trees are interpreted as points and the shades are the planes that

together define physical space of urban interior, Grobler and Le Roux [9].

As a park purposed to introduce history, the pool as an added facility became its main attraction. There is no correlation between the design purpose with activity occurred in the park. In this case, in relation between users' respond, activity occurred, and physical setting provided, the park failed to meet urban interior criteria defined by Stace [7]. However, it does meet the criteria and typology introduced by Farrelly and Mitchel [8] and Attiwill [6] on composition of space and time bounded with public, and observable qualities detached from scale and proportion. The park also meet definition of urban interior by Guinta [10] and Grobler and Le Roux [9] as discussed previously. Figures and illustrations presented from observations shows how people in tropical climate benefit the sunlight in certain time of the day but avoiding it in most time of the day. People enjoy morning daylight, but as the sun goes higher and temperature rises, people have tendency to avoid daylight and take cover in cooler places.

In the case of a public open space, or urban interior in this study, shading is important in creating a favourable microclimate in the space. Urban interior shading strategy can involve three types of shadows formed by buildings, trees, and canopies or umbrellas, Lee et al [12]. However, another study stated that buildings' shades are classified as artificial shades which are not preferred by parks' visitors who favoured trees shades better, Del Aguila et al [1]. The illustration in Figure 11 implies that people were looking for spaces with shadow from trees as there is no other shading element in the park, at any time they come. It also confirms the two theories on urban interior shading strategy.

6. CONCLUSION

From this study, it was found that physical setting by design did not always favourable to facilities and spatial use by visitors. In the case of Taman Sejarah, where its main function is to give historical information about the city, this function became secondary article. The main attraction element is the pool used by children for recreation.

In the meantime, pre-existing design elements, trees in this study, defined micro spaces to visitors as well as creating microclimate in the park. Pre-existing conditions need to be considered, especially when large trees are already available in a void to be designed as an urban interior in the tropics. Positions of pre-existing shades need to be mapped and their movement to be understood to create a sense of interiority in an urban space. Trees, their shadows in this case, directed visitor's behaviour in the park. The behaviour directed was visitors' responds to daylight and spatial occupation pattern emerged in accordance.

Shape of enclosures, types of material use, and position of possible sitting facilities, as well as additional horizontal shading elements where needed, should consider existing trees shades and building shades position according the

sun's movement and angle as primary concern in tropical region.

This study is still limited to one object of study with limited observation time and method. Further study with longer observation in several objects with more diverse type of visitors and different designs is needed to understand if the findings imply to different object. It is also important to deepen the study in a multidisciplinary way to further created a guideline for urban interior design in tropical climate that consider shade and shading provider as an integrated design element.

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