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Original Article

Relationship between Behavior Setting and Public Open Space Layout - Condong Catur Public Housing in Yogyakarta as a Case Study -

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The gap between public open space theory and phenomena in Yogyakarta's housing influences the changes in the shape and the use of space. It is important to find a public open space design that is in accordance with the occupants needs for the future project. This study examines the relationship between behavior setting and public open space layout in Condong Catur public housing in Yogyakarta. Place-centered map method was used to identify the activities, user groups, and public open space layout. The results of the study show that there is a relationship between public open space layout and behavior setting. The space that was visually closed from the street was often used by all groups, especially the group of children and women. The visible area from the street was dominated by a group of men users. The closer the space to the middle of the housing, the more varied the user groups became. The closer the space to the entrance and house: the more obscure the physical boundaries became; the longer the surrounding activities were; the more varied the commercial facilities became; the more open the access was; and the more the space was used.

Keywords: *Activity Pattern, Setting, Condong Catur, Public Housing, Behavioral Mapping*

1. Introduction

Public open spaces in Indonesian public housing were provided by the National Housing Agency and constructed independently by residents. These lead to the more possibility of open space changed in public housing with an older age. Based on that condition, Condong Catur Public Housing was selected as a case study because it was the oldest public housing in Yogyakarta that opens up more possibilities of study discussion. The longer the age of occupancy will be more changes possibilities.

Condong Catur public housing is located in Condong Catur Village, Depok sub district, Sleman district, North of Yogyakarta Special Region (Fig.1). It was constructed by the National Housing Agency for the low-middle income groups. Built in 1976, Condong Catur public housing was the first public housing in Yogyakarta as well as the first large-scale housing in the north of Yogyakarta. This housing estate consists of three neighborhoods i.e. RW 13, RW 17, and RW 22. Designed with an 'open and unite' concept to the surrounding areas, the housing boundaries are streets with no guardrails. It has facilities and social amenities such as: places of worship, schools, public health care, and public open space.

Public open space is one of the public and social facilities in this area comprised of sports fields and streets. There are three sports fields scattered in each of the neighborhoods with the biggest provided for all the residents. The land was provided by National Housing agent while the design and construction was done independently by the occupants. The occupant's needs for public open space in this housing estate could not be met by the available space given their social activities and limited space.

The existing theories and Indonesia's policies have not been satisfactory enough in solving this problem. Theories and concepts of public open space are generally associated with the hierarchy (Madanipour, 1996: 144), number of occupants (Carmona, 2003: 188, Madanipour, 1996: 144), area, activities, shape, size, layout, setting and space utilization. Only a few theories look at activity patterns associated with public open space design and housing facilities around it. This phenomenon has

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created a gap between the public open space design and the user's needs which influences the use of space especially for low - middle income groups. Previous studies have examined the value by different groups; use (Yuen, 1996, Zhou, 2006, Cohen et al, 2007), spatial arrangement (Soesanti et al, 2006), and place attachment of housing (Ji, 2009); relationship to the social interaction (Kristin, 2010), the occupants health (Giles-Corti et al, 2005); gender (Wiyatiningsih, 2010); the public disorder consequences (Sampson & Raudenbush, 1999); the recreational walks (Sugiyama et al, 2010); physical activities (Cohen et al, 2007); and the social and spatial implications of the new lifestyles, values, patterns, and models for future urban life (Thompson, 2002).

Basing on the above background, the researcher deemed it necessary and important to find the relationship between behavior setting and public open space layout especially in the low-middle housing. This study is part of the researches that aim at determining the various characteristics and uses of space based on the occupant's socio-economic and cultural perspective. The objective of this study is to explore the relationship between behavior setting and public open space layout in everyday life in Condong Catur public housing over a specific period of time. Research on behavior setting and open space layout were needed to predict more accurately about the behaviors of users trends in their context (Wicker, 1979: 6-7). In architecture, the results were usefulness as a discourse in public open space design that suit to the users need. Focused on sport fields, this study was done through an analysis of public open space settings, user activity patterns, and factors affecting the use of space.

2. Literature Review

The existence of public open space is based on the need to improve the quality of human life, given that humans are social beings. A number of researches found a positive relationship between occupant's need for housing and public open space. Some studies identified the roles of public open space such as: provision of a rendezvous for residents and people from the surrounding communities (Buttimer, 1972, Kristin, 2010); a place for deliberating and celebrating (Saraswati, 2007); improving the physical and mental quality (Hall, 1969, Towers, 2005, Zhou, 2006, Biddulph, 2007); as well as increasing the housing value (Luttik, 2000, Irwin, 2002, Anderson and West, 2006).

In the study of the relationship between space and user behavior, Gehl (2007) found that design actually influences user behavior. Carmona (2003: 267) observes that user behavior can change the physical space, while Lefebvre (1974: 416) reinforced this premise on discovering a reciprocal relationship between space and user behavior. Moreover Madanipour (2003:140)

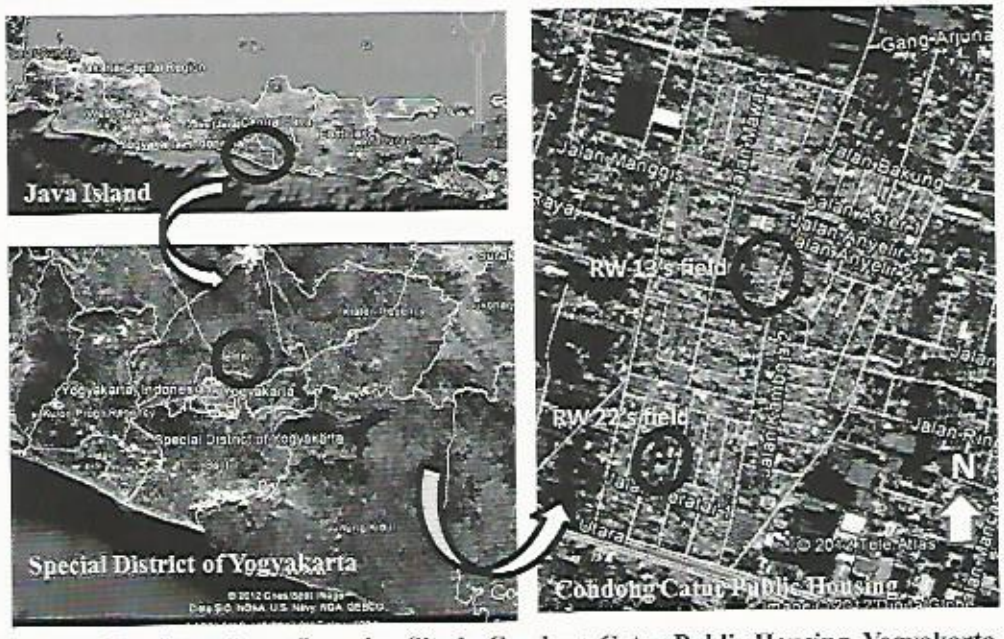

Fig. 1 The Open Space Location Site in Condong Catur Public Housing, Yogyakarta

suggested that space creates social relationships and vice versa. The linkage between space and user behavior can be found through behavior setting.

According to Lang (1987: 110), behavior setting is used for analyzing and designing space. Wicker (1979: 12) explained the behavior setting as a bounded, self-regulated and ordered system composed of replaceable human and nonhuman components that interact in a synchronized fashion to carry out an ordered sequence of events called the setting program. It reinforced by Sommer and Sommer (1980: 160) that defined behavior setting as a geographically pattern behavior. This setting is strongly influenced by repetitive activity, environmental layout, relationship between layout and behavior as well as time (Moore, 1979: 49, Lang, 1987: 113). Lang (1987: 114) asserted that the same physical setting can be a part of several behavioral settings associated with activity and time patterns. Thus, behavior setting can be formed on the basis of repetitive activity (activities and time), users, and layout such as setting boundary, fixed element, semi-fixed element, and non-fix element (Fig.2).

2.1 User

Smith (1995: 916) stated that as users, humans can create a livable space. Based on several previous studies, user groups can be distinguished based on age, ethnicity, or social group (Lang, 1987: 120, Madanipour, 1996). Each individual or group of users has different needs and usage patterns (Lang, 1987: 115) which is influenced by environment quality (Moore, 1979: 49). A study by Sugiyama et al (2010) for instance showed that groups of adults preferred large and high quality gardens.

Based on gender, Mozingo (1989: 46) identified the different uses of space between men and women. Men use the park as a place to exercise two times more than women did (Cohen et al, 2007). They tend to use the front space (Mozingo, 1989: 46). On the other hand, women tend to come together in groups (Mozingo, 1989: 46) to places that have visual protection (Wiyatiningsih, 2010), especially at the back space (Mozingo, 1989: 46). Women groups were also found to have smaller territories unlike their male counterparts (Mozingo, 1989: 40). Based on this fact, the different uses of space by different groups should be accommodated in a public open space. This is confirmed by Yuen (1996) who contended that a park or field in a housing estate must be used for interaction by everyone both young and old, groups and individuals, as well as men and women.

2.2 The Layout

The layout consists of space-forming elements and setting boundary. Hall (1969: 101) classified the space-forming elements into three groups i.e. fixed elements, semi-fixed element, and non-fixed element. The fixed elements are elements that are difficult to move such as permanent walls, floors, windows, sculpture, electrical networks (Hall, 1969: 101), permanent trash, stand or light poles, benches, playground equipment, and plants (Booth, 1983). A semi-fixed element is an element that can easily be moved such as the traditional Japanese walls (Hall, 1969: 101), non permanent garbage, tables, and benches. Non-fixed elements are all human activities and behavior that take place in the space (Hall, 1969: 101).

The functions and layout of some space can be changed to accommodate various activities. According to Lang (1987: 119), this space type is referred to as adaptable or flexible space. Referring to Johnson (1993: 30) and Darjosanjoto (2007), space layout can reveal the relationship within communities. Thus, the flexible space shows the flexible relationship between societies who have different interests in it. Public open space layout should ensure the user's safety and comfort (Abu-Ghazzeh, 1996). Besides layout, there are other factors that influence the use of space for example area, facility, and distance to the house. Research conducted by Giles-Corti et al (2005) showed an increase in the use of space in large and attractive facilities. In addition, research conducted by Cohen et al (2007) showed that the distance between houses and open space are closely related to the physical activity and the use of space.

Behavior setting boundary is a place where the behavior stops. The ideal boundary especially in open space according to Booth (1983: 129) is a wall.

Exterior space is created when two or more buildings are clustered together.

Here, Booth implied that the walls of the clustered buildings form the space boundary. Besides a wall, another element that can constitute boundary is a plant (Booth, 1983:74) identified through the floor coverings, vertical elements, and roof limit (Booth, 1983: 74).

2.3 Relationship between Behavior Setting and Public Open Space

Relationship between behavior settings and public open

space can be identified through several variables such as access, privacy, and distance to building height ratio. These variables influence the use of space and the space atmosphere. Public housing open space access should be open and easily accessible for the public to perform their individuals or groups activities. Some researchers have indicated that a good open space should have an easy access (Thompson, 2002); a wide sidewalk with a narrow street; green surroundings; spread over several locations (Wu and Plantinga, 2003), and in accordance with local environment (Gyuse and Gyuse, 2008). This space should be placed in the middle of housing estate (Towers, 2005, SNI 03-1733-2004). The relationship between public open space access and occupant's physical activity was reaffirmed by Witten's et al (2008) research.

Next, Lang (1987: 146) states that physically, the use of walls, symbols, borders, and distance affect the degree of privacy that in turn influences public open space's behavior setting. This in a way is a gesture of appreciation for the group who succeeded in creating the space (Lefebvre (1974: 416). This may affect mastery of space by individuals or groups to satisfy basic human needs like identity and security (Lang, 1987: 148).

Lastly, different space atmospheres can be created through varying building height ratio. According to Booth (1983: 132), a ratio of 1: 1 to 1: 3 will produce a familiar atmosphere. Ratio of 1 : > 6 generates public mood while ratio of the ratio 1 : < 1 produces a crowded and uncomfortable atmosphere. Furthermore, Booth (1983: 177) suggests that various materials can create different atmospheres and a change in color, texture, and material can be used to distinguish between areas meant for walking, resting, sitting, or meeting. For example, higher plants that block view into or out of space produce space privacy as well as direct views to the other open direction. Canopied trees function as a shade that produces a private and isolated space from the surroundings.

3. Method

Two sports fields located in RW 13 and RW 22 neighborhood were used as case studies in this research. Both of them are in Condong Catur public housing, Yogyakarta. As the first public housing in Yogyakarta Special Region, built on a medium-scale, Condong Catur public housing was selected as the most appropriate

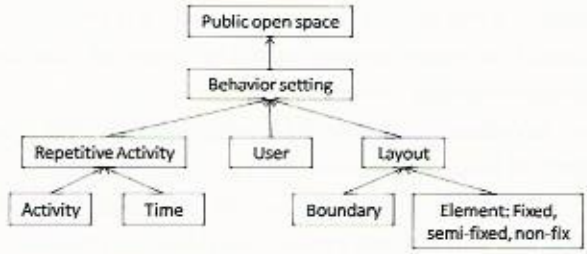

Fig. 2 Relationship between Public Open Space and Behavior Setting

research location for this particular study.

Behavioral approach through place-centered map is used in this study. This mapping suits the objective and the case study located in a public area. Referring Sommer and Sommer (1980: 161), this method has superiority over other methods because the observer is considered as part of the users which makes the observation process more natural without having to interfere with the user's activities. The observer records the user's location and activities at the venue into a diagram prepared beforehand. Generally, this research was conducted through several steps that included: literature review, field surveys, data analysis, and conclusions.

The literature review step was conducted to get the research variables that are to be used to identify and analyze the data. Then, field survey is carried out to obtain the behavior settings' factual conditions that consist of space-forming elements, users, activity, and activity layout through a space sketch. Place-centered map method is done by observing the activities that take place in open spaces and mapping. The observation were done during a week in March 2011 from Monday to Sunday, a week in August 2011 during the independence day of the republic of Indonesia's, Eid al-Fitr day in August 2011, and Eid al-Adha day in November 2011. The investigation day that took place in both Indonesian season (dry season and wet season) from March 2011 to November 2011 and in the important events such as Independence Day, Eid al-fitr, and eid al-Adha opens up many possibilities of the use of space.

The sketch is used to show all architectural elements such as chairs, tables, trees, and signage that influence user behavior. According to Sommer and Sommer (1980: 162-166), a specific symbol is used to mark the element and behavior that is described at the bottom of the map. The data recording process was done through photos and videos taken in daily life and at specific times; interviews;

as well as user activity diagrams.

Finally, the data analysis is done by making the location, activity, and user groups mapping. The results were analyzed based on the previous variables consisting of activities, user groups, and the layout of space to find a relationship between behavior setting and layout on Condong Catur public open space.

4. Results

Management of Condong Catur sports fields is handled by the neighborhood board. The maintenance funds are generated from educational institutions and contributions from the community living around the space. There are similarities and differences between the characteristics of RW 13 and RW 22 sports fields. The difference between the cases lies in the additional funds derived from vendors in RW 13 neighborhood and the maintenance done by RW 22 occupants who live around the space. The results produced some findings that were grouped into physical character and activity patterns.

4.1 The Sports Fields Physical Character

Physically, there are similarities and differences in hierarchy, area, spacing, layout, boundary, material, and fixed and semi-fixed elements between the two cases. Initially, both of the fields ranged from 1085 m^2 to 2457 m^2 in width giving them a housing scale hierarchy status. Based on Indonesian housing standard (SNI 03-1733-2004), both of them are eligible with the maximum distance requirement of not more than 1000 m to the farthest unit (the furthest distance is 530 m). On contrary, only RW 13 sports field met the minimum width requirements i.e. 1250 m^2.

The sports fields are an open layout, free of barriers to the street making them easily accessible by residents or locals; and surrounded by houses, schools, mosques, and shop houses or semi permanent kiosks. The Mosques in both cases were located in the Southeast and oriented to the field. The difference lies in the number of commercial activities and building functions around the field. RW 22's field only has one commercial activity called angkringan in the Southeastern edges while RW 13's field has more than 10 commercial activities in the Eastern and Southern edges in form of semi-permanent kiosks. Most buildings around RW 22's field function as residential spread in the East, South, and Western sides. In contrast, only RW 13's Southern edge has buildings for residential purposes.

These fields have clearly defined boundaries formed by a wall or steel wire for the educational activities; a floor level and a row of kiosks for the street, and rows of shrubs for the houses and streets. The shrubs are only found in RW 22's. The floor materials consist of pavements made up of cement or paving block; and nature in form of grass, shaded trees, or shrubs. Both fields have goalposts, flagpole, and benches. However, only RW 13's has kiosks around it.

4.2 The User Activity Pattern

There are various user groups and activities patterns in both cases in daily life or during specific times like religious days or Independence Day of Republic of Indonesia. Users are categorized based on age such as children, teenagers, parents, and maids; or social groups such as a group of residents; educational institution; and commercial. Residents consist of groups of children, parents (father and mother), teenagers, and maids. Educational institution consists of groups of teacher, students, and student's parents. Commercials consist of groups of permanent and temporary vendors.

Table1, Table2, Fig.3, and Fig.4 show various user activities in both cases that can be categorized into eight patterns i.e. playing, taking care of children, physical exercising, trading, racing, praying, and slaughtering sacrificial animals. The occupant's playing pattern takes place three times a day from 06.30 to 07.00, 12.00 to 14.00, and 16.00 while the educational institutions activities take place from 08.45 to 10.45. The taking care of children pattern takes place twice a day from 06.30 to 07.00 and 16.00 to 17.30. The physical exercising pattern for educational groups takes place from 07.00 to 10.00 and for residents from 15.00 to 21.00. The trading pattern takes place from 08.00 to 17.00 at RW 22's and to 20.00 at RW 13's. The racing pattern takes place from 09.00 to 11.00 and from 15.00 to 19.00. The Eid al-Adha and Eid al-Fitr praying pattern takes place from 06.00 to 07.30 only at RW 13's field. The slaughtering of sacrificial animal pattern on Eid al-Adha day takes place from two days before Eid al-Adha way through to the D day starting at 08.30 until 14.00.

5. Discussion

The RW 13's and RW 22's sports field phenomena became the main focus in the research findings. This section discusses the research results with reference to the theories

Table 1 Activities and Settings Pattern in Daily Life

Time Monday to Friday	RW 13's sports field		RW 22's sports field	
	Activity	User group	Activity	User group
20.00-06.00				
06.00-07.00	Playing (Eastern, Southern, centre), eating, and taking care of children (Eastern, Southern)	Children, parent, maid	Playing (Northern, Southern), eating, and taking care of children (Northern)	Children, parent, maid
07.00-08.00	Physical exercise (centre)	Teacher, student	Physical exercise (Southern), playing (Northern, Southern), eating, and taking care of children (Northern)	Teacher, student, children, parent, maid
08.00-09.00	Trading (Eastern), physical exercise (centre)	Teacher, student, permanent vendor	Trading (Eastern), physical exercise, playing (Southern)	Teacher, student, father, temporary vendor
09.00-10.00	Trading, playing (Eastern, Southern), physical exercise (centre)	Teacher, student, permanent & temporary vendor	Seeing, trading (Eastern), physical exercise, playing (Southern)	Teacher, student, student's parent, father, temporary vendor
10.00-11.00	Trading, playing (Eastern, Southern)	Student, permanent & temporary vendor	Waiting (Eastern, Northern), trading (Eastern)	vendor
11.00-12.00	Waiting, trading (Eastern, Southern)	Temporary vendor, student's parent	Trading (Eastern)	Temporary vendor, teacher, father
12.00-13.00	Trading (Eastern)	Permanent vendor,		
13.00-14.00	Southern), playing (Eastern, Southern, centre)	children		
14.00-15.00	Trading (Southern)	Permanent vendor		
15.00-16.00	Trading (Southern), physical exercise (centre)			
16.00-17.00	Trading, playing, taking care of children (Southern), physical exercise (Southern, centre)	Permanent vendor, children, parent, teenager	Trading (Eastern), playing, taking care of children (Southern, Northern), physical exercise (Northern)	Temporary vendor, teacher, children, parent, teenager, maid
17.00-18.00			Playing, taking care of children (Southern, Northern), physical exercise (Northern)	Children, parent, teenager, maid
18.00-19.00	Trading, discussing	Permanent vendor,		
19.00-20.00	(Southern)	teenager, men		

Table 2 Activities and Settings Pattern at the Certain Time

Time	RW 13's sports field		RW 22's sports field	
	Activity	User group		Activity
August 17th				
00.00-03.00				
09.00-11.00			Trading (Eastern, Southern), playing, racing, watching (Northern, Southern)	Temporary vendor, resident, local
15.00-17.00	Playing, trading, watching (Eastern, Northern), racing (centre, Western)	Temporary vendor, resident, local teenager's	Trading (Eastern), playing, racing, watching (Northern), taking care of children	
17.00-18.00	Playing, trading, watching (Eastern, Northern, Southern), racing (centre, Western)	organization, race committee & participant	(Western)	
18.00-21.00				
21.00-00.00				
06.00-08.00 Eid al Fitr and Eid al Adha	Eid praying (sports field area), trading (Eastern, Southern)	Resident, local		
08.00-18.00 Eid al Adha	trading (Eastern, Southern), slaughtering sacrificed animal (centre)	Resident, locals, slaughtering committee, vendor	trading (Eastern, Southern), slaughtering sacrificed animal (centre)	Resident, locals, slaughtering committee, vendor
A day before Eid al-Adha	Animal tethering (Eastern)	Slaughtering committee	Animal tethering (Eastern)	Slaughtering committee
17.00-21.00 per weekend			Physical exercise, watching (Northern)	Parent, teenager, children,
11.00-00.00 Long holiday	Fun (all ends)	Background employee, Vendor, resident, local		

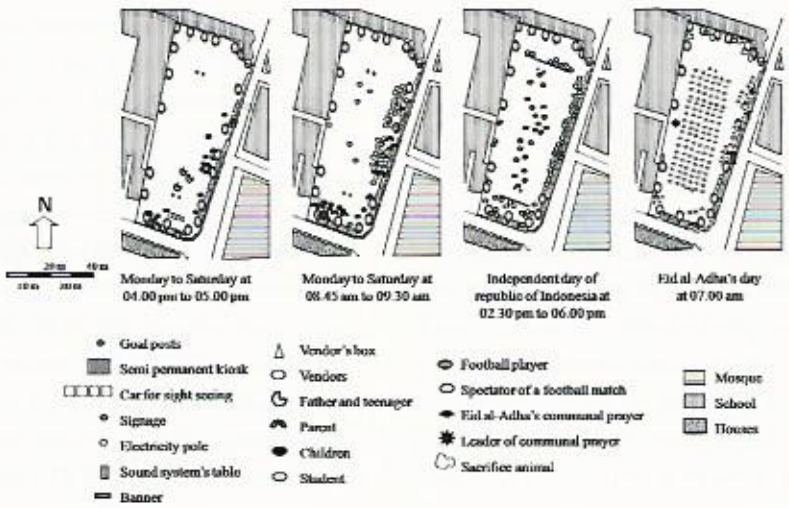

Fig. 3 Place-Centered Map in RW 13's Sports Field

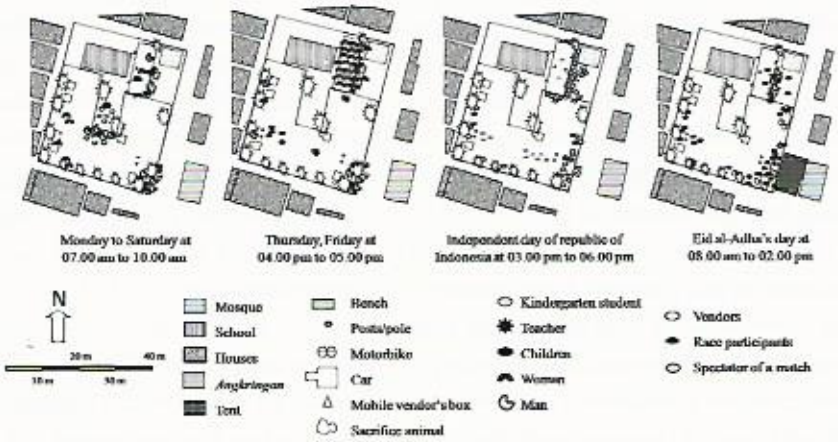

Fig. 4 Place-Centered Map in RW 22's Sports Field

already discussed.

5.1 User Activity Pattern

Activity patterns that occur in both cases taking place either daily or at certain times but repeatedly reflect the activity systems that are influenced by the occupant's culture. Table 1 and Table 2 show the various usage patterns among groups in harmony with Sharpen Lang's (1987: 115 - 120) and Madanipour (1996) observation that several uses of space pattern are affected by age, gender, and social groups. Besides that, the result showed that occupant's ethnicity did not affect the use of space pattern.

Related to the user activities as shown in both Table, these findings conform with the results of some previous researchers i.e. Kristin (2010), Buttimer (1972), Saraswati (2007), Biddulph (2007), Zhou (2006), Towers (2005), Hall (1992) about activity type. In both cases, all these activities take place alternately or simultaneously in the same place. However, unlike previous findings by Irwin (2002), Luttik (2000), and Anderson and West (2006), the public open space existence in Condong Catur public housing has no effect on housing value.

5.2 Behavior Setting

Both cases are used simultaneously or alternately by different user groups at the same or different times and place. These activities take place from 06.00 to 18.00 in RW 22's field and to 20.00 in RW 13's field. The dominant activities in both cases are trading that goes on every day especially at a certain time that attracts more users. These activities reinforce Lang's conclusion (1987: 114) that the same physical setting can be part of one or more behavior settings associated with activity patterns and time.

Both fields are bounded by different elements. RW 13's field is bounded by a 4 meter high wall separating the field from educational facilities in the Northern and Western sides and by a sewer and semi-permanent kiosks in the Eastern and Southern sides. RW 22's field is bounded by 1.5 meters of steel wire fence separating the field from educational facilities in the Northern side; by floor level in the Eastern and Northern sides; and by a row of shrubs in the Western side.

The often used areas in RW 13's field are the Eastern and Southern sides. Both sides are used for trade, play, child care, wait, watching, and belay the sacrificial animals during Eid al-Adha. In contrast, the often used areas in RW 22's field are the Northern, Western, and Southeastern sides. These areas are used for playing, taking care of children, trading, watching, physical exercising, and racing. The use of all space sides only takes place in RW 13's field for praying, animal slaughtering, racing, or faire at certain times like on Eid al-Adha, Eid al-Fitr, Independence Day of Republic of Indonesia, or long holidays. The most common use of space is the trading activity done in kiosks and angkringans.

The seldom used areas in RW 13's field are the Northern and Western sides; used for parking or placing the sound system occasionally. On the other hand, the rarely used areas in RW 22's field are the Eastern and Southern side; used for animals belaying or watching the race. Although in similar locations like on the edge of the main street, RW 22's Eastern side is the most rarely used.

5.3 The Things Influencing Behavior Setting and Layout

Users groups consist of occupants and locals with reference to Madanipour (1996: 148) terminology of public open space. Both cases can be accessed and used by everyone at any time. The use of space is closely related to the building function around it, access, width, layout, and boundary.

1) Building Function

Confirming Towers' (2005) and Wittens' et al (2008) observation, residential building around the field makes that space a prime space to play, take care of children, and to socialize with others. The space side with houses oriented to it is more frequently used compared to others. This fact reinforces Cohens' et al (2007) findings that the closer the distance between houses and the field, the more the space is put to use.

In line with this, students use the field because of the field's proximity to their school. RW 13's field is adjacent to an Elementary School and a Junior High School while RW 22's field is adjacent to a Kindergarten. This also impact on the vendor's emergence especially during the school recess that attracts students, occupants, and locals to conduct activities. This fortifies Sugiyamas' (2010) findings that attractive facilities mainly commercial facilities increase the use of space. Next, as a place to belay and sacrifice animals, this space is strongly associated with the existence of the mosque. Nevertheless, only RW 13's field is used for prayers on Eid al-Fitr or Eid al-Adha's.

2) Access and Width

Open access in both cases cause frequent usage of space

especially for trading activities. An area close to the street is more often used for trading activities. This is evident at the Eastern and Southern sides of RW 13's field as well as the Southeastern side of RW 22's field. Contrary to Thompson's (2002) theory regarding the openness and accessibility to space, the Eastern side of RW 22' field is more rarely used than the other sides though it was a main entrance that is direct to the street. The often used area in this field is the North and West side that is closed and not visible from the street.

The existence of RW 13's field, larger than RW 22's and more strategically located made this space a housing scale open space enabling even residents from other neighborhoods use it. However, the field's ownership and management remain on RW 13's neighborhood board. This also confirms the Giles-Corti et al (2005) findings that a larger area increases the use of space.

3) Layout

The activities affect the layout. This is clearly evident at praying, racing, or fair time. At that time, some semi-fixed elements are adjusted and additions made in the field to accommodate the requirements for the activities to take place in it. This phenomenon is in line with Lang's (1987: 119) theory about adaptable and flexible space. Moore (1979: 49) and Giles-Cortis et al (2005) assertion that the use of space increases in public open space with more attractive facilities applies in both cases. The existence of shady trees, goal posts, kiosks, and rabbit train attract the occupants to do activities. This also makes the side's field with its entire attractive surrounding phenomena more often used than the other side.

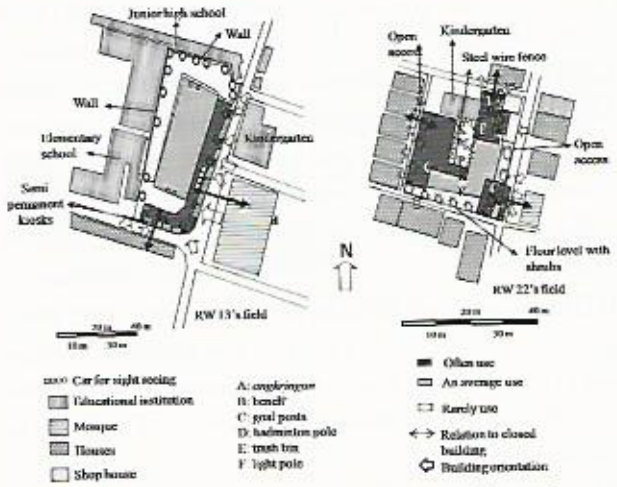

Fig. 5 Relationship between Building Function and Behavior Setting

Consequently, the shady area that tends to be visually closed from the street especially in the Northern and Western sides of RW 22's field is more often used by children and women than the other side. The visually closed area is considered more secure and comfortable primarily for women. This fact confirms Mozingos' (1989: 46) findings regarding increased use of green space and plant canopy; as well as Wiyatiningsih' findings (2010) on the tendency of women to gather in groups in places that have visual protection. However, in the case of RW 22's field, this condition applies to all user groups not only women's. Related to gender, the use of space in RW 13's field is dominated by men groups while RW 22's fields' use is dominated by children and women group. This also reinforces Mozingo's assertion (1989: 46) about the tendency of men group to use the front space that is more visible from the street (RW 13's field is close to the main street); and the tendency of women groups to use the back space that is visually enclosed (RW 22's field is surrounded by houses and located close to the neighborhood street).

At least, another factor that influences the use of space is the space atmosphere created by the building's height ratio and the space separation. In line with Booth's theory (1983: 132), the intimate and private atmosphere more often used in RW 22's field results from the 1: 1 or 1:2 ratio formed by the plant around the badminton area standing 1 meter high. On the other hand, the public atmosphere with an open view to all sides; rarely used in RW 13's field results from 1:> 6 ratio. The space separation on RW 22's field causes the space more often used for the resident's daily activities. On the other hand, RW 13's field that has no separation was less frequently used for daily activities.

4) Boundary

In line with Lang's theory (1987: 146), the rarely used area was caused by strict boundaries such as wall, steel wire fences, or floor level with 1 meter high shrubs. In contrast, the space with vague boundary that blocked visibility to the street is more frequently used than the other especially by women and children. This suggests that although close to the dwelling, the existence of a strict boundary minimizes the possibility of activity around it.

6. Conclusion

Located on RW 13's and RW 22's sport fields in Condong

Catur public housing in Yogyakarta, this research showed a relationship between behavior setting and public open space layout. Initially, there were eight activity patterns consisting of: playing, taking care of children, physical exercising, waiting, trading, racing, praying, and animal sacrificing that took place in the same or different areas in both cases. Playing pattern and physical exercising pattern are performed by residents and educational institution groups in the mornings, afternoons, and evenings. Taking care of children pattern is done by residents in the mornings and afternoons. Waiting pattern is performed by student's parents a few instants before the end of the school days' activities. Trading pattern is performed by permanent and temporary vendors from morning to evening. Racing pattern is performed by residents on Independence Day of Republic of Indonesia celebrations. Praying pattern is done by residents and locals on Eid al-Adha and Eid al-Fitr celebrations while the sacrificing pattern is done by the Eid al-Adha committee, priests, and residents during Eid al-Adha celebrations.

Next, the public open space layout is flexible with semi-fixed elements that can be changed, added, or reduced in accordance with activities that are to take place such as praying, racing, or slaughtering. The most frequently used areas by various groups are those near the entrance, kiosks, or residential buildings without strict boundaries. The most rarely used areas are usually located away from the entrance and have strict barriers such as walls, floor level, or rows of shrubs. The area covered by canopy trees, tend to be to close from street, private, and intimate is more often used for children and women (Fig.5). On the other hand, the area visible from the street is dominated by a group of men (Fig.5).

In brief, the factors influencing public open space's behavior setting and form consist of building function around it, accessibility, layout, and boundary. The use of space increases with increase in the surrounding residential buildings; if is it is: located in the middle of housing, has an open access, a bigger width, shady trees, in addition to a number of various facilities around the field especially commercial facilities and attractive facilities on the site. The space surrounded by houses is used for play, taking care of children, and socializing for children and mothers. The longer the school hours, the more commercial facilities will exist. The more space separation, the more it often used for daily activities. The use of space reduced if bounded by strict physical boundaries such as walls or steel wire fence, floor level, and a row of at least 1 meter high shrubs.

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References

Abu-Ghazzeh, TM. (1996). Human purposes and the spatial formation of open spaces Al-Alkhalaf, Saudi Arabia. *Architecture and Behavior. 10(2)*, p. 169 187.

Anderson, ST. & West, SE. (2006). *Open space, residential property values, and spatial context.* Michigan: Department of Economics University of Michigan. www.sciencedirect.com.

Biddulph, M. (2007). *Introduction to residential layout.* Oxford: Elsevier Limited.

Booth, N.K. (1983). *Basic elements of landscape architectural design.* New York: Elsevier Science Publishing Co., Inc.

Buttimer, A. (1972). Social space and the planning of residential areas. *Environment and Behavior Journal. 4(3)*, p. 279.

Carmona, M., Heath, T., Oc, T., & Tiesdell, S. (2003). *Public places, urban spaces: the dimensions of urban design.* Oxford: Architectural Press.

Cohen, D.A., Mckenzie, T.L., Sehgal, A., Williamson, S., Golineli, D., & Lurie, N. (2007). Contribution of public parks to physical activity. *American Journal of Public Health. 97(3).*

Darjosanjoto ETS. (2007). *Permeability maps of residential settlements within the coastal area of Surabaya Indonesia.* Istanbul: Proceedings, 6th International Space. www.Spacesyntaxistambul.com.

Gehl, J. (2007). Public spaces for a changing public life. In Thompson, CW & Travlou, P. *Open Space: People Space.* Oxon: Taylor & Francis.

Giles-Corti, B., Broomhall, M.H., Knuiman, M., Collins, C., Douglas, K., Ng, K., Lange, A., & Donovan, R.J. (2005). Increasing walking: how important is distance to, attractiveness, and size of public open space? *American Journal of Preventive Medicine 28(2)*, p. 169-176.

Gyuse, RS. & Gyuse, TT. (2008). Kainji resettlement housing: 40 years later. *Journal of Urbanism: International Research on Placemaking and Urban Sustainability. 1(3)*,p. 247-264.

Hall, ET. (1969). *The hidden dimension*. New York: Anchor Books Doubleday & Company, Inc.

Irwin, EG. (2002). The effects of open space on residential property values. *Landscape Journal Land Economics*. 78(4), p. 465-480.

Ji, Z. (2009). *A study of place attachment: the case of public housing residents and neighborhood parks*. Singapore: PhD Oral Defense Examination. www.arch.nus.edu.sg archive PhD/oral/defense zhangji

Johnson, M. (1993). *Housing culture: traditional architecture in English landscape*. London: UCL Press

Kristin, N. (2010). *Public open space utilization as occupant's interaction space in Perumnas Sarijadi*. Mini thesis. Bandung: Architecture Engineering Education Department, Indonesia University of Education. (In Indonesian)

Lang, J. (1987). *Creating architectural theory the role of the behavioral sciences in environmental design*. New York: Van Nostrand Reinhold Company Inc.

Lefebvre, H. (1974). *The production of space*. Oxford: Basil Blackwell Ltd.

Luttik, J. (2000). The value of trees, water and open space as reflected by house prices in the Netherlands. *Landscape and Urban Planning Journal*. 43(3-4), p. 161-167.

Madanipour, A. (1996). *Design of urban space: an inquiry into a socio-spatial process*. West Sussex: John Wiley & Sons Ltd.

Madanipour, A. (2003). *Public and private spaces of the city*. London: Routledge

Moore, G.T. (1979). Environment-behavior studies. In Snyder, J. & Catanese, A. *Introduction to architecture*. New York: McGraw-Hill.

Mozingo, L. (1989). Women and Downtown Open Spaces. *Places. 6 (1)*. Berkeley.

Sampson, RJ. & Raudenbush, SW. (1999). Systematic social observation of public spaces: a new look at disorder in urban neighborhoods. *The University of Chicago Journal. 105(3)*, p. 603–51.

Saraswati, T. (2007). Dome house controversy in Nglepen Prambanan D.I. Yogyakarta. *Journal of Dimensi Teknik Arsitektur. 35 (2)*, p. 136 – 142. (In Indonesian)

Shadily, H. (1992). *Encyclopedia of Indonesia*. Jakarta: PT Ichtiar Baru-Van Hoeve. (In Indonesian)

Smith, N. (19950. Challenges of public housing in the 1990s: the case of Ontario Canada. *Housing Policy Debate. 6(4)*, p. 905-930

SNI 03-1733-2004 (2004). *Urban housing environmental planning procedures*. Jakarta: National Standardization Agency. (In Indonesian)

Soesanti S. & Sastrawan, A. (2006). Zone, mass, and open space pattern in waterfront housing: case study: Pantai Indah Kapuk Surabaya. *Journal of Dimensi Teknik Arsitektur. 34(2)*, p. 115 – 121. (In Indonesian)

Sommer, R. & Sommer, B. (1980). *A practical guide to behavioral research*. New York: Oxford.

Sugiyama, T., Francis, J., Middleton, NJ., Owen, N., & Giles-Corti, B. (2010). Associations between recreational walking and attractiveness, size, and proximity of neighborhood open spaces, *American Journal of Public Health. 100(9)*.

Thompson, CW. (2002). Urban open space in the 21st century. *Landscape and Urban Planning. 60(2)*, p. 59-72

Towers, G. (2005). *An introduction to urban housing design: at home in the city*. Oxford: Architectural Press An imprint of Elsevier.

Wicker, A.W. (1979). An introduction to ecological psychology. Monterey. CA: Brooks/Cole, 1-5. 6 19.

Witten, K., Hiscock, R., Pearce, J., & Blakely, T. (2008). Neighborhood access to open spaces and the physical activity of residents: a national study. *Preventive Medicine*. doi: 10.1016/j.ypmed.2008.04.010

Wiyatiningsih. (2010). *How gender influences the use of space*. Darmstadt: Darmstadt University Disertation

Wu, JJ. & Plantinga, AJ. (2003). The influence of public open space on urban spatial structure. *Journal of Environmental Economics and Management. 46(2)*, p. 288-309.

Yuen, B. (1996). Use and experience of neighborhood parks in Singapore. *Journal of Leisure Research. 28(4)*, p. 293-311.

Zhou, Y. (2006). *Public spaces in Beijing's residential areas*. Stuttgart: Städtebau-Institut Universität Stuttgart Lehrstuhl Städtebau und Entwerfen Disertation. Http//www/uni-stuttgart.de/si/stb/ stb_forhung/stb_start.html.

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