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The Cyclist's Behavior in Yogyakarta's City Landmark

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ABSTRACT

The paper explores cyclists' behavior in Yogyakarta's Tugu area, a popular destination for cyclists on Sunday mornings. The analysis in this study was carried out quantitatively by mapping the number of cyclists' movements recorded during their peak periods at the place. This study maps out the behavior of cyclists, forming certain patterns and habits in the place. The research mapped that the peak activity is between 06:00 am and 08:00 am. They enter and exit the place in the four cardinal directions. Most of them come to the place from the east and exit to the south. The study also highlights the specific cyclists' behaviors, such as pausing to enjoy the atmosphere, gathering in groups, and taking pictures with the Tugu monument in the background. The southern part is the area where the most activities are concentrated. The research findings also show that some of the cyclists have a unique behavior when taking themselves pictures by choosing a spot as close to the Tugu monument as possible, even though it is dangerous because it is at a crossing point for motorized movement, to get a stunning photo due to the strong attraction of the monument. Furthermore, this study's findings can be utilized by city managers to organize the Tugu area as a landmark of Yogyakarta City.

Keywords: The cyclists' behavior; Tugu pal putih; Urban place; Yogyakarta

INTRODUCTION

The modern lifestyle makes many people feel bored and seek physical activity and other experiences to maintain their life quality (Zarotis & Tokarski, 2020). Recreational sports such as walking, jogging, gymnastics, cycling, and so on (Encyclopedia.com, 2023) (Agus, 2010) can be a fun experience. The cycling phenomenon and its accompanying activities on holidays have become part of the urban lifestyle and encourage people to cycle together to their favorite places.

In Yogyakarta, Tugu Pal Putih is a favorite destination for cyclists on Sunday mornings. This place is unique and better known as 'Tugu.' This location is an open space of a road surface at a busy intersection, surrounded by two to three-story buildings with a Tugu monument in the center. The cyclists do various activities, such as pedaling to other destinations, stopping and parking around the monument to enjoy the atmosphere, gathering at the edge with the group, and taking pictures. This combination of activities looks unique, especially the behavior of the cyclists when taking pictures individually or in groups with Tugu Pal Putih in the background. The combination of activities in this busy four-way intersection is a situation that tends to be dangerous for them. On the other hand, it is necessary to accommodate this picture-

making activity because people are eager to take pictures as close to the Tugu monument as an effect of its strong presence as part of the North-South philosophical axis of Yogyakarta city (Karaton Ngayogyakarta Hadiningrat, 2018) (Wardani, 2008). Referring to the statement that the environment and space forms design can affect people's behavior as they are inside the "little world" (Cagney et al., 2020) as the cyclists do in the Tugu area's open space, this cyclist's behavior pattern is interesting to study. Therefore, it is necessary to map people's behavior to determine the use of open spaces and safe and hazardous places for their activities. Based on this situation, the research objective is to discover people's movement patterns and use of open spaces.

(a) (b)

Figure 1. The cyclists activies. (a) Took pictures as close to the Tugu monument; (b) At the boundaries.

Based on the phenomena, the study objective is to map people's behavior and movement, find out how they use the open space, and know the safe and hazardous places to do activities. The behavior patterns and number of people recorded on the map. The results were processed and analyzed to determine the behavioral patterns.

MATERIALS & METHODS

Research Location

Research location is an open space surrounding the Tugu Pal Putih, Yogyakarta, better known as 'Tugu,' with the Tugu Pal Putih monument as the center. It is a busy 540-square-meter road intersection of the north-south philosophical axis of Yogyakarta, namely Pangeran Mangkubumi Street and Margo Utomo Street, with the west-east direction of Pangeran Diponegoro Street and Jenderal Sudirman Street. Tugu is also famous for people to visit and enjoy the atmosphere. The situation makes the Tugu road surface intersection have a dual function, as a crossroads and as a public open space, simultaneously.

(a) (b)

Figure 2. The Tugu Pal Putih and its surrounding. (a) The cyclists' activities; (b) Map of the area.

Research Methods

This research is quantitative with observational data collection techniques. The researchers followed the explanation of Bechtel., in Ng by recording their behaviors and movements systematically in particular locations into a behavioral map (Ng, 2016) combined with the number of occurrences of the activity. The data collected were the dominant activities that took place at the site. The cyclists' actions were recorded in number and pattern, tabulated, and patterned for analysis. The prevalent activities at the study site were: cyclists continuing to ride, pausing at the location, gathering with their group, and taking photos of themselves with the Tugu Pal Putih in the background. Referring to Lawton and Nahemow's description in Black and Street (Black & Street, 2014) of physical behaviors such as cycling and other behaviors as a product of reciprocal interactions between people and their environment, these data were compared to the existing physical setting of the location to understand how these activities occur.

Data Collection

The research area's spatial layout was drawn as a figure and ground map using Auto CAD software, which converted it to bitmap images and printed onto sheets of paper to record the movement patterns of cyclists and their activities in the location. The Data was collected during the period from May to November 2022. The movement patterns and the number of cyclists were recorded on a map from 6:00 am to 8:00 am. Initially, field data collection was recorded every fifteen minutes interval to obtain sufficiently detailed information. The researcher recorded the cyclist's movement patterns and their numbers on the figure and ground map. The next step is to record the numerical data into a table using Excel software to determine the average number in each period for analysis. To simplify the analysis process, the researcher combined the cyclist count data from every fifteen-minute interval into thirty minutes. Since the study site is an open space in a busy four-way intersection, researchers compared the cyclists' behavior with the time lags of empty or filled roadside areas. Some unique cyclists' behaviors are recorded in pictures and videos to understand the place's use. The movement of motor vehicles through the four-way intersection was video-recorded to measure the time lag available when the open space was empty or filled. These work steps ensured the researcher obtained sufficiently accurate information on cyclist movement patterns, areas where crossings occurred, places used according to activity type, and time gaps where open spaces were free of motor vehicle movement.

RESULT

This study focuses on observing and mapping cyclists' activities and behavior in the Tugu area. The results show a particular pattern of cyclists visiting the Tugu area. The observations showed that cycling crowds at the study site only occurred on Sunday morning for approximately two hours. The period is from 06:00 am to 08:00 am. While in the afternoon and evening, and on weekdays, no similar phenomenon was found.

(a) (b)

Figure 3. The public presence in the Tugu Pal Putih. (a) In the morning; (b) In the evening.

On Sunday morning, the cyclists usually filled the monument area at around 6:00 am, increasing in number and reaching a peak at 07:00 am, then decreasing until very rare at around 08:00 am. Usually, the cyclists enter the monument area from three origins: north, west, and east. When leaving the place, they spread out in four directions: north, south, west, and east.

Table 1. Number of cyclists passing the Tugu by direction and time period.

Direction		Time Period				Amount		
		06:00 - 06:30	06:30 - 07:00	07:00 - 07:30	07:30 - 08:00	Numbers	Percentage*	
To North		4	30	42	22	98	8%	34%
To West		27	36	28	31	122	11%	
To East		46	29	58	47	180	15%	
To South		89	241	305	135	770	66%	
Amount	Numbers	166	336	433	235	1170		
	Percentage*	14%	29%	37%	20%			
		Empty road timeouts: 37 second				-		

Source: Data collection, 2022; *Fractional numbers are converted to round.

Table 1 shows the cyclists' movement pattern recorded in four periods: 06:00 - 06:30 am, 06:30 - 07:00 am, 07:00 - 07:30 am, and 07:30 - 08:00 am. The results show that cyclists start arriving at sunrise at around 6:00 am. Then there was an increase in cyclist arrivals in the 06:30 - 7:30 am period. The 07:00 - 07:30 am is the busiest period visited by 37% of all cyclists, with 433 people. After 07:30 am, the number of cyclists entering the Tugu area began to decrease and was rare at 08:00 am. Looking at the direction of leaving the location, most are heading south towards Margo Utomo Street, which is 66% of cyclists. The remaining less than 34% spread in three directions: east, west, and north. Very few cyclists head north, only 8%.

Table 2. Number of cyclists with activities and time lags of empty roadside area.

Position of Cyclists		Park in the Boundaries		Time Lag		Take Pictures*		Position of Cyclists	
		Enjoy Atmosphere	Gathered with Group	Empty Period	Filled Period	In the Distance	Close to the Tugu		
North – West		17	-	35 sec	57 sec	-	-	North	
North – East		20	-			-	-	West	
South – West		25	-			-	15	East	
South – East		36	62			58	16	South	
Amount	Numbers	98	62	-		58	31	Numbers	Amount
	Percentage**	39%	25%			23%	13%	Percentage**	
		64%				36%			
Total		249						-	

Source: Data collection, 2022; *Largest number of people in 15 minutes duration; **Fractional numbers converted to round.

Table 2 shows the number of cyclists, their movement direction, and their behavior. On the open space, 64% parked their bicycles and gathered with the group to enjoy the atmosphere, and 36% took pictures in the distance or close to the monument. Those who take pictures from a distance tend to choose locations at the boundaries, while those who want to get as close to the monument as possible decide to walk to the center of the intersection when the intersection is empty of motor vehicles. More specifically, 23% of cyclists took pictures from a distance, and only 13% of people took pictures as close to the monument as possible. Further observation of the video footage shows a pause of 37 seconds where the intersection is empty of motorized vehicles. Cyclists utilized the delay to get as close as possible to the Tugu monument to take pictures.

DISCUSSION

As a public open space, the Tugu area has a unique cyclist visitation time pattern, which on weekends starts around 06:00 am, peaks at around 07:00 am, and becomes quiet at 08:00 am. It means that the peak time in the

Tugu area, Yogyakarta, appears in the morning on weekends. In contrast with the previous study in Zhengzhou, China (Mu et al., 2021), peak times for visitors to urban parks tend to occur in the afternoon and evening on weekdays and weekends. The difference in visit patterns with the previous study shows that in Tugu, the cyclists come only on Sunday morning before 08:00 am. This phenomenon indicates a relationship between the combination of the cyclists' leisure time and the heat aspect of sun exposure after 08:00 am.

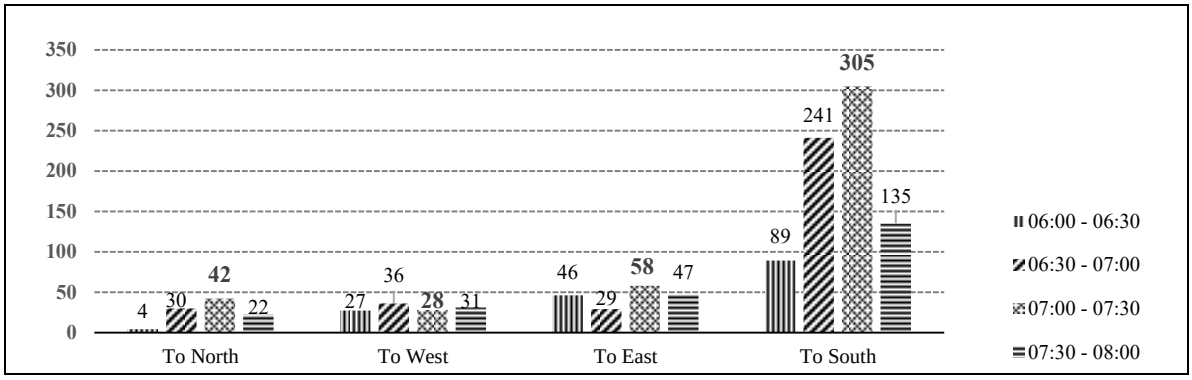

Figure 4. Chart of cyclist arrival patterns in the Tugu area.

The chart in Figure 4 and Table 1 shows the cyclists' movement patterns in the monument area. The chart shows that the southbound destinations to Margo Utomo Street dominate the direction of cyclist movement in each period. Meanwhile, cyclist movement in other directions split almost equally. Table 1 shows that most arrivals are from 07:00 - 07:30, amounting to 37% of all cyclists. The cyclists' activities to the south are 66% of all cyclists, while the remaining 34% is split into east, west, and north. The unique movement pattern of cyclists during peak hours is presented in Figure 5.

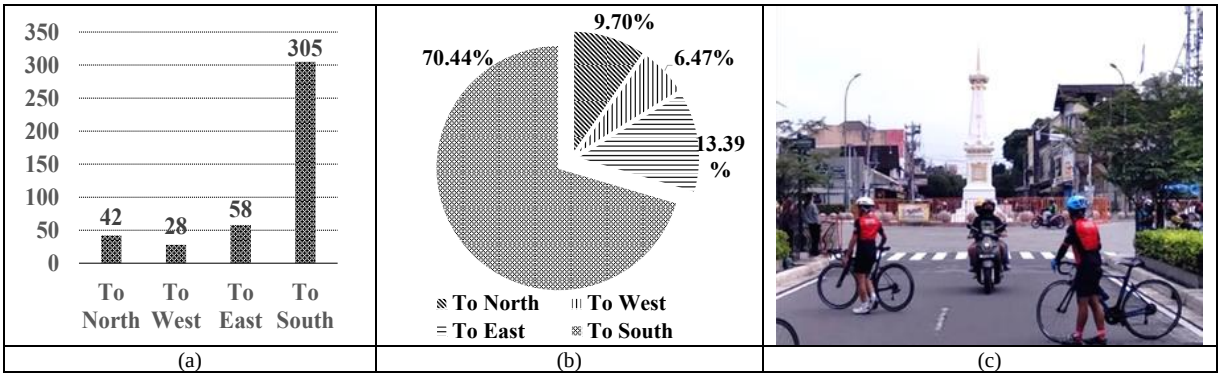

Figure 5. Cyclists' destination in the Tugu at 07:00 – 07:30 am. (a) In number; (b) In percentage; (c) View of the Tugu from the south.

Figure 5a shows the number of cyclists and their destination during the 07:00 - 07:30 am peak hour. Furthermore, Figure 5b shows the percentage comparison, which is 9.70%% to the north, 6.47% to the west, 13.39% to the east, and dominated by 70.44% to the south. The high tendency of cyclists to head south indicates that cycling trips to the south are more attractive than cycling trips in other directions. The visual data in Figure 5c shows that the southbound view provides an enjoyable visual experience. Another positive point is that the southbound road tends to be less crowded and only one-way, making it easier for cycling trips. In addition, the corridor wall on the east side of the road can reduce exposure to sunlight. The combination of

these situations makes cyclists prefer the southbound direction of travel when leaving Tugu. The impact of this tendency is that the open area on the south side becomes more crowded with cyclists, which requires caution for other cyclists who want to rest and cross the road on the south side.

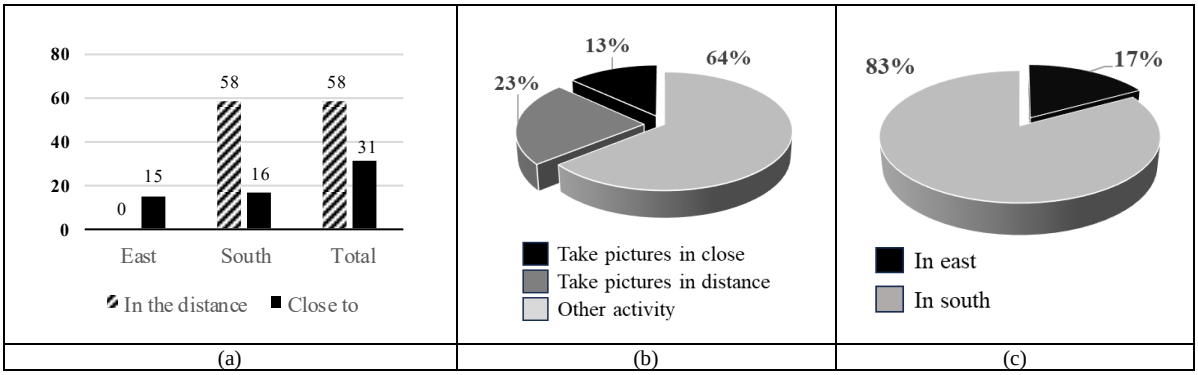

Figure 6. Selection of photo locations in the Tugu area. (a) Number comparison; (b) Percentage by distance to the monument; (c) Percentage by direction.

Figure 6 compares the percentage of cyclists based on where they take pictures. The chart shows that 23% of people chose to take pictures in the boundaries area, and 13% chose to take pictures as close as possible to the monument. Considering that the nearest possible location to the monument is a crossroads with only 37 free from passing motor vehicles, the actions of 23% of them who utilized the delay to get as close as possible to the monument tend to be dangerous. Related to these conditions, the visual data presented in Pictures 1a, 2b, and 3a, shows the situation of people taking pictures as close as possible to the Tugu during the intersection free from motor vehicles to get the best shooting angle. In the ask and answer session with some people who took pictures, there was a desire to get as close as possible to the Tugu because the Tugu is an icon and memory of Yogyakarta for them. This situation is undoubtedly a dilemma between the risk and the chance of achieving impressive and memorable picture results.

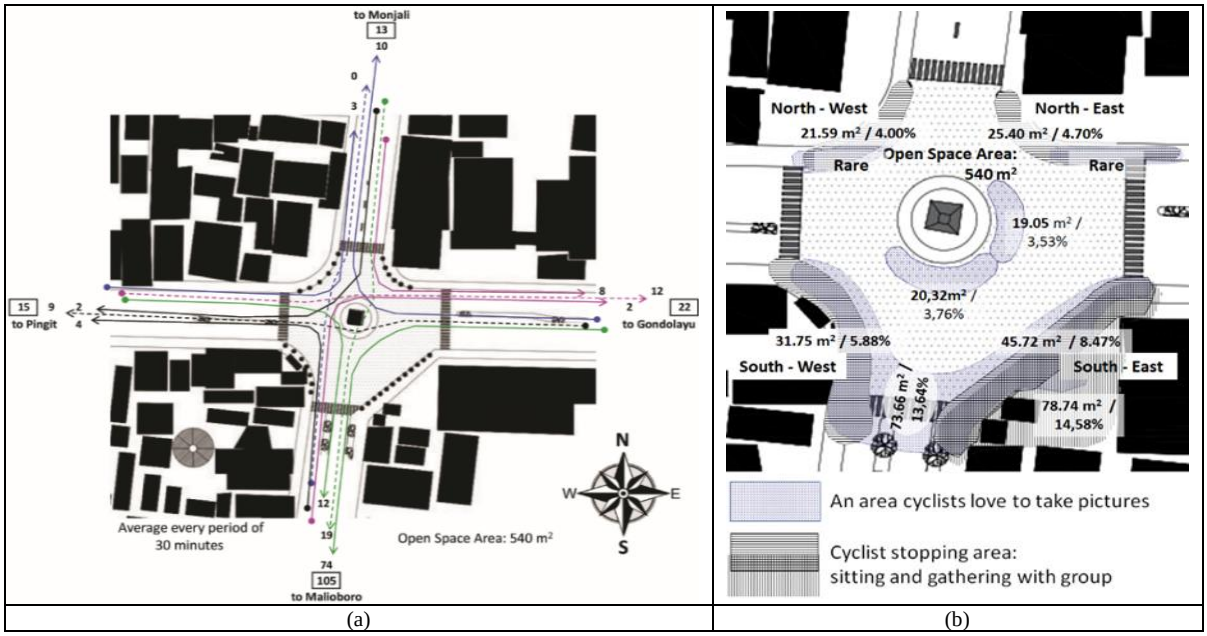

Figure 7. Cyclists' activities at Tugu. (a) The average number of cyclists by direction every period of 30 minutes; (b) Favorite zone map for photo spots.

Figure 7 shows the cyclist movement patterns and open space use in the Tugu area. Figure 6a shows the average number of cyclists' travel directions every 30 minutes. The figure shows that, on average, more cyclists are heading south than in any other direction. This cyclist's behavior indicates that the south side is more attractive to travel on than the other. Next, related to the way of using open space in Figure 6b, it can be seen that the open space on the south side is more used to stop, enjoy the atmosphere, and the location making photos. This behavior causes the open space on the south side more crowded than the other sides. Suppose the situation is connected with the arrangement and arrangement of the space. In that case, the open space on the south side is more expansive and has a more flexible expansion area to accommodate the overflow of visitors. The one-way traffic direction and the empty time lag on Jalan Margo Utomo have attracted cyclists to the south. Referring to Architects' Data (Neufert, 1996) about the need for space for various activities, it can be seen that the minimum space requirement for one person during exercise is 1,125 m x 1,125 m or 1,27 m2. Considering the crowd's density, the land used at the most crowded time is 59% of the entire Tugu open space area is 316,23 m2 of the total 540 m2. In detail, the percentage of space usage is for sitting around enjoying the atmosphere 23,05%, gathering in groups 14,58%, taking pictures from the edge 13,64%, and taking photos near the monument 7,29%, out of a total of 540 square meters of open space in the Tugu area, attracted cyclists to the south. More detailed information on this is presented in Table 3.

Table 3. The intensity of space use at the Tugu open space.

Position of Cyclists	**Park in the Boundaries**				**Take Pictures**				**Position of Cyclists**
	Enjoy Atmosphere		**Gathered with Group**		**In the Distance**		**Close to Tugu**		
	Amo-unt*	**Area (m^2) ****	**Amo-unt***	**Area (m^2) ****	**Amo-unt***	**Area (m^2) ****	**Amo-unt***	**Area (m^2) ****	
North – West	17	21,59	-	-	-	-	-	-	North
North – East	20	25,40	-	-	-	-	-	-	West
South – West	25	31,75	-	-	-	-	15	19,05	East
South – East	36	45,72	62	78,74	58	73,66	16	20,32	South
Amount	98	124,46	62	78,74	58	73,66	31	39,37	Amount
Percentage of Total Area	23,05%		14,58%		13,64%		7,29%		Percentage of Total Area
	38%				21%				
Total	59%								-

Source: *From Table 2; **Assumed space requirement of one person 1.27 m^2 (Neufert, 1996).

The most extensive use of space is for bicycle parking, sitting, and then walking around enjoying the atmosphere on the south side. At the same time, some cyclists capture their visit by taking pictures of themselves or with their group with Tugu as the background. Of all cyclists, 36% liked taking pictures with the Tugu monument as the scene. The strong people's desire to make the Tugu and its surroundings a photo background is a favorable situation for tourism development in Yogyakarta. Some take pictures from the boundary, and a few take pictures as close as possible to the Tugu monument, even though the most intimate spot is in the middle of an active road intersection. The cyclists' behavior in taking pictures as close to the Tugu poses a high risk. Still, on the other hand, their desire to be intimate toward the monument produces the best angle for the pictures. The behavior of these people is risky, but that has a high promotional value for the Tugu Pal Putih as the most crucial node di Yogyakarta city. As for the desire of some people to take pictures as close as possible to the Tugu monument, it is a situation that needs more attention, as it is located right in the center of a busy intersection.

The information presented in Figures 4, 5, 6, and 7, as well as Table 3, shows that the area most occupied by cyclists who continue

to pass by, stop and park their bicycles, sit and stroll, and take pictures is on the south side. As a result, the south side is increasingly full of cyclists' activities. The figure and ground map that is seen in Figure 6 shows a slightly different spatial form on the south side, which has a broader niche. In addition, the south side tends to be more shaded, as the row of buildings on the east side blocks sunlight exposure. In this position, the view towards the Tugu becomes more beautiful. Based on this situation, it can be said that the combination of the monument's design and attractive open space setting make Tugu a preferred experience when people observe the environment and take pictures from the south. This situation illustrates Lawton and Nahemow's description in Black and Street [8], which explains that physical activities such as cycling, like all human behaviors, are the product of complex reciprocal interactions between people and their environments. Related to the cyclists' behavior and related to the spatial arrangement of Tugu areas and considering Forsyth and Krizek, and Stefansdottir's description in Liu (Liu et al., 2021), urban designers need to have an understanding of cycling from the cyclists' perspective, especially the relationship between cyclists and the environment mediated through movement.

CONCLUSION

The data collection and discussion results show that the open space around Tugu Pal Putih is very crowded for people, especially the Sunday morning cyclists. More than half of the area is used by cyclists at peak times, especially on the south side, even though most of the open space is an active intersection surface. This study provides results in describing the zones that form naturally in the research location. Finally, the researcher hopes that the open space use zone map produced in this research can be an input for area managers to organize the use of space in the future. The area has many types of activities, and the most extensive activities are just pedaling to various destinations, parking the bicycle, and enjoying the atmosphere. At the same time, some cyclists capture their visit by taking photos of themselves or with their group with Tugu Pal Putih as the background. A few of them desire to take pictures as close to the Tugu monument as possible, even though the most intimate spot is in the middle of an active road intersection. This behavior poses a high risk, but on the other hand, the desire of people to take photos as close as possible to the monument is a high promotional value for the Tugu Pal Putih as the leading philosophical element of Yogyakarta. Finally, the researcher hopes that the open space use zone map produced in this research can be an input for area managers to organize the use of space in the future.

Declaration by Authors

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