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Influence of Rules on User Behavior in Public Open Space of Hong Kong

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Abstract Open spaces are valuable public goods in cities. They are conducive to social and recreational behaviors which enhance social capital, health, and wellbeing of communities Hong Kong's open spaces differ from counterparts in other developed economies. The high-density cities experienced rapid economic growth in past decades as well as land scarcity. The majority of open spaces are designed, managed, and maintained by the public sector. Not only are Hong Kong's open spaces in short-supply measured in area per capita, they are also often tightly regulated with explicit rules discouraging behaviors considered undesirable. So, the Questions rise of how does occupant behaviors respond to the rules and design of open spaces in Hong Kong? How well does the current design and management strategy meet the needs of the community? This paper aims at identifying the relation between rules and behaviors in Hong Kong's open spaces. It hypothesizes that the management and design affect user behaviors in Hong Kong's open spaces in measurable ways. Both qualitative and quantitative methods are applied to test the hypothesis. This research observed behaviors in nine open spaces under diverse regulatory conditions. Results show that rules are significantly influential on people's attendance and activities performed in public open space. People's attendance and activity Diversity is higher in fewer rules in open space than over rules. Cultural, political, social trends, and current planning practices are conducive for restrictive design and overrules in the open space of Hong Kong.

Keywords Public Open Space, Rules Design, Public Recreation, Social Interaction, User Behavior

1. Introduction

Urban open space is a vital urban structure of the city that provides social, environmental, and health benefits to society. Open space, parks, streets as elements of the urban structure are the vital place of human contact. It offers opportunities to craft a new relationship with other people through activities. People get to contact each another through these activities and share their experience and values that increase their knowledge. The degree of contact varies according to the activity level in public space. The degree of contact reduces as the activity level gets down. (Gehl, 2001). Public open spaces are the major urban space for performing physical and social activities in the city. (Kooshari, 2015) described that many countries have been dramatically declining in physical activity due to inconsistency among urban designers and policymakers. He also described some measures as size, design features, and access towards open space which significantly with the degree of activity in open space. (Lachowycz and Jones, 2011) indicated that about 40% of access related cause support physical activity in open space.

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Hong Kong's open space is regulated in a way different from other countries. Here, the rules and management policy is more restrictive to use public open space. Besides, the provision of open space is limited as well. Currently, the provision of open space is increasing steadily in Hong Kong. The improvement can be identified in a more quantitative way rather than qualitative development. In this high-density urban context, people are greatly reliant on public open space for their recreation and other social performance. People wish to perform active and passive activities in public open space, but most of the time they are not permitted to perform all the activities as they desire due to rules and regulation of open space. The management authority provides some rules and user guidelines to control the open space. For instance, no person shall walk, run, stand, sit, or lie on any grass. Flying of kites, model aircraft, balloons, or another device may be restricted or prohibited by the Director of Leisure and Cultural Services ('DLCS').

Rules are a common phenomenon of Public Park or open space not only in Hong Kong but in many cities of the world to control the user behavior and benefit the user. But often over-rules and management tendency impact negatively on user behavior and people's participation in open space.

In Hong Kong, the use of public space under the Leisure and Culture Service Department is managed by Pleasure Ground Regulation (PGR) under chapter 132 of the Hong

Kong public health and municipal service.

2. Literature Review

2.1. Urban Open Space in Historical Perspectives

The progressive growth of urban fabric in the twentieth century had made an incremental change of human lifestyle as well as the concept of the city different from its historical background. Different social order and class strengthen the distinction between the private and public sectors. And obviously, the technological advancement in communication and socialization helped to make the difference more strong. People socialize in their home within an introverted character. They no longer depend on communal space for collecting their goods and sharing their views. Class deviation due to economic imbalance reduced the social interaction, where rich people didn't have any contact with the poor. It is quite evident that social, economic, cultural, and political change of human lifestyle over human civilization greatly influences the public open space. (Stanley et al., 2012) argued "urban open space has been critical sites of cultural, political, and economical life from early civilization to the present day" and also "from the alleys of ancient Babylon to culs-de-sac of a modern phoenix, the form and function of open space have varied dramatically, based on the particular cultural arrangement."

2.2. Rule and Management of Open Space

Urban open space, parks, plazas have regulated by the authority who intend to control appropriate use, user, and behavior of public space (Nemeth & Schmidth, 2011). To make sure the safety security, hygiene and proper use of different users may the major reason for regulating public space. But sometimes over-managed with restrictive rules could negatively impact the user and recreational behavior. Therefore it is important to assess the management procedure. Through the research and analysis (Nemeth & Schmidth, 2011) identified some dimension of management as-

- Laws and rules governing the space
- The presence of surveillance and policy in space
- Employment of image technique to literally or symbolically dictate appropriate behavior
- The presence of access restriction and territorial separation.

Both undermanaged and over-managed policies impact user behavior in a public space. (Carmnona, 2010) identified these two as two poles and sides of a coin. Poor design and management encourage other groups to maintain public space sometimes it maintains by a smaller group of people of the community (Carmona, 2010). Often, to change the traditional style of management and provision, the public governance transfer to the private authority to enrich management and variety. In the high-density city rules and regulation of public space is essential to indicate appropriate use but it should optimize the use and make rule and regulation to a more inclusive and less intrusive framework (Cho et al., 2015) they also mentioned that "Good public space promotes inclusive and prevention through management, regulation, and provision rather than the exclusive of unwanted behavior through restriction of people, animals and activities unless they target realistic risk and danger."

2.3. Issues Associated with User Behavior in Open Space

Public Open Space for Different User: The success and failure of public open space can be determined by the presence and behavior of the user. However, it is quite hard to define the exact definition of a good public open space, despite that some scholar as Whyte (1980,1988), Jan Gehl (1987,1996), Bareness (1999), Kevin Lynch (1972,1981), and other scholar identified that "use" is a prime requirement of good landscape (Francis, 2003). Any design and policy for a good public open space should consider the critical user requirements. There some dimension of good open space which is suggested by many planners including (Mark Francis, 2003) are−

- Needs
- Rights
- Means to responsive connection with user

User conflict: User conflict is a common phenomenon in open space. Due to a lack of proper attention to use attitude, poor design, and social conflict could result in user conflict. However, it varies in different cultures or groups, even in different age people. Often, what suits the elderly may not necessary to be suited for adults or children. The researcher found other causes responsible for user conflict as privatization (Kayden, 2000) lack of access (Lynch, 1972) economic factors (Fox, 1990).

Safety and security: To ensure the security and safety of open space is another major concern of vibrant open space. The level or degree of enjoyment is perceived as safe. Commonly, good open space remains underused sometimes for the probability of crime in open space, especially against women. Fear is another concern likely to a crime that could affect people from avoiding open space.

The conflict between use and ecology: Statement, commonly accepted by the researcher is that human use and ecology should be separated in natural space as urban parks. People and wildlife need to be separated and protected from each other. But the desire for human behavior to remain close to nature and to live in natural spaces has been also justified by some growing researchers (Gobstar and Hull 2000). They argued that natural space could be used with human provision without damaging habitat.

Abuse: Mostly, open space remains underused owing to abuse of space. Vandalism and dominance by other groups is a kind of abuse of open space. Often, poor design failed to provide proper distribution of active places in open space so most of the place remains untouched and empty.

2.4. Privatization of Public Open Space

The word "privatization" can be defined as sharing or partnership where the private and public sectors negotiate with each other. Much active research pointed marked the economical factor is the main driver for the privatization of public space. As a land-use urban open space is regarded as non-profitable land and the government is responsible for taking care of this space. Lack of budget for maintenance that results in unused open space in the city made attention for the private sector to redevelop when privatization generally happens. But the problem arises when public dominion enters the private sector which already composes with a traditional market-oriented concept which generates a new order of use pattern for the public, contrasting from public open space behavior. In physical structure, privatization occurs in three ways as-

- Large-scale footprint – contain bank, corporate office, the insurance company, etc.
- Reinforce pedestrian – through corporate or commercial space.
- Large shopping mall with atrium, courtyards, a street inside alternative to the public civic Space. (Cuthbert and McKinnell, 1997).

Some Researcher depicted their worries about the privatization of public open space that would destroy the democratic use and limit the voice of the general people. The trend of privatization would change human independent civic lifestyle to consumerism and materialism lifestyle. On the other hand, both government and private sector make their interest by taking tax from land and imposing market-oriented policy respectively. Despite the negative impact of privatization, it is considered as a way to revive undermanaged public open space, however, it needs more researchers to make a balance among democratic use, ensure independent civic life, and market-oriented policy of public open space owned by the private sector.

3. Methodology

In this paper, the observation of the sample open space has been made to test the hypothesis. Participant observation has been a significant tool of both anthropological and sociological studies for a long time (Kawulich, 2005). In qualitative research observation tools frequently use to understand people's attitudes about some issues. It helps to understand the activities of the people under study in natural settings through observing and participating in those activities (DeWalt & DeWalt, 2002) and provides the context for the development of sampling guidelines and interview guidelines. Nine open space of Hong Kong has been selected as a case study to conduct the observation survey located both in Hong Kong Island and Kowloon side.

The site selection procedure is based on the hierarchy of rules in open space and management policy. Selected open spaces have been categorized as informal, semi-formal, and informal open spaces for easy understanding in this research. Formal opens space indicates the open space with traditional design and more rules for uses. Semi informal open space also holds rules but lowers than the formal open space. Sometimes these spaces are renovated newly for better use of people. Finally, the informal space includes few or no rules where people use to go by their responsibilities. Besides the different category of rules, these open space are also maintained by the various authority as LCSD, district office, and volunteer group. The intention behind selecting the various category of open space is to confirm the people's reactions in various open spaces not only one category of formal open space which is available in Hong Kong purposes for public recreation. Only one case of open space has selected in the informal category may indicate the limitation of site selection.

Four different periods have been selected for the observation in a day. During this time average people's attendance and activity diversity are counted separately from selected open space. Both weekday and weekend are counted in the observation process. Rainy day is not included as an observation period. Since the size of the sample open space is not similar to the observation survey was conducted only in the 3000-meter square area of each park. In this research, activity diversity indicates the total number of activity provision in open space. It is not necessary to perform every activity during the time of the observation process. The attendance of people and activity levels could vary in terms of size of the open space, distance from MTR (Mass Transit Railway) station, and available scenic view from open space therefore all these determinants are counted during analysis including rules of open spaces. Multiple regression models have been used to show the correlation among different variables. The Simple linear regression model is used to show the relationship between rules and user behavior in the public open space of Hong Kong. Especially the relation with rules of open space with people attendance and activity diversity are showed individually by the linear regression model. The linear regression model can be represented by-

$$y = a + bx$$

Where y is the dependent variable, x is presented as an independent variable, a is the intercept of y and b represents the slope of the line.

The above method describes the correlation between two variables but there may be other determinants that could impact user behavior as the size of the open space, distance from nearest MTR, and the availability of scenic view. Therefore several variables are included with rules of opens space to measure the significance level. Since there are multiple variables so the multiple regression models have been promoted. The regression model could be enlarged by adding a number in x variable, even some qualitative variables could also be included by binary coding what generally called a dummy variable. In this research the availability of scenic view is considered as dummy variables if the open space has any scenic view as ocean view, it would

be coded as "1" otherwise "0". Multiple regression model can be represented by the equation below:

$$yi = a + b1x1 + b2x2 + \ldots + bixi + ei$$

Where yi represents the dependent variable, xi is the independent variable, a is the y-intercept or constant, ei is considered as the residual or prediction error, b1 is the partial regression coefficient on x1, similarly, b2 is on x2.

An index including p-value and t- statistic has been incorporated with the model that shows the significance of the hypothesis. The large value of t statistic means the low probability to reject the null hypothesis. On the other hand, the smaller value of p indicates the more significance of the individual independent variables. the p-value of an independent variable 0.01 means the coefficient of this independent variable is significant at the level of 99% ((1-0.01) x 100%).

In both linear and multiple regression models, the value of R^2 (the coefficient of determinants) estimates the goodness of fit for the model. It indicates the variation of the dependent variable that correlated with independent variables. For instance, the value of R^2. equal to 9 means that 90% of the dependent variable can be explained by the independent variables. In the study, the impact of rules including another factor on the activity diversity is represented by the following model–

$$\text{Activity diversity} = b1\text{rules} + b2\text{size} + b3\text{view} + b4\text{distance} + C$$

Activity diversity = activity indicates the number of activity provision in open space. The activities are – sitting, sleeping, socialization, exercise, biking, skating, walk, performance, children play, ball games, drinking and eating, etc.

Size = the size represents the size of open space in the hector.

Distance = the distance represents the distance from the nearest MTR station to open space.

View = the availability of scenic views. For example, the open space with any scenic view is coded by binary code 1 otherwise 0.

Rules = rules represent the number of rules to use open space. C = the constant.

In the other model, people's attendance is tested in multiple regression models. The model I represented by –

$$\text{People attendance density} = b1\text{rules} + b2\text{sizee} + b3\text{view} + b4\text{distance} + C$$

Where

People attendance density = the average attendance of people in 3000 m^2 of each open space.

Size = the size represents the size of open space in the hector.

Distance = the distance represents the distance from the nearest MTR station to open space.

View = the availability of scenic views. For example, the open space with any scenic view is coded by binary code 1 otherwise 0.

Rules = rules represent the number of rules to use open space. C= the constant.

4. Result and Discussion

The observation is conducted to identify the relation between user behavior and rules in the public open space of Hong Kong. Nine different open spaces have been selected to conduct the research that identifies different issues. It shows how people's attendance in open space varies due to having different rules on weekdays and weekends. Besides, the observation also focuses on the frequency activity in different rules open space.

The graph shows (Figure 1) the relation between rules or excluded activity in open space and the average number of people attendance density on weekday day. Here X-axis has been used as several rules which is the dependent variable and Y-axis represents the attendance intensity which is the independent variable. The graph shows that the relations are negatively associated that means the people attendance density gradually decreases when the number of rules increases informal opens space which does not have any rules as old cargo terminal hold the maximum number of people on weekday whereas the formal open space as Belcher Park, Hollywood Road Park has the lowest number of people attendance density. The open space like Cornwell St Park, Fly the Flyover and Tamar Park also have less attendance density. Interestingly in the weekend, the average number of people in informal open space decreases from 98 to 55 then weekday whereas it increases in semi-formal open space as Cornwell St Park, Tamar Park, and Fly the Flyover. In Belcher Park, Hollywood Road Park, and King George Memorial Park the number is almost similar on weekday and weekend (Figure 2). People used to go with their family at the weekend to the place where recreational facilities and security are ensured.

Therefore a semi-formal place can attract more visitors at the weekend rather than informal and formal spaces. Although formal space also ensures the safety matter availability or scope of different activities is fewer in such places.

The provisions of activities facilitate to the invention of the open space more lively and active. It takes steps as one of the indicators of user behavior. The liking and verities of the activities could persuade the different users to take part in open space. The studies struggle to scrutinize the change of the user activity rate in diverse rules open space. (Figure 3) demonstrates the relation between activity intensity and rules of open space. (Figure 4) shows the different activity types performed by the number of people in different open spaces.

It reveals that activity diversity is negatively associated with rules of open space. The activity rate is high in the old cargo terminal due to no rules. People perform different activities as they wish for. In semi-informal open space as Fly the Flyover, Cornwell St Park, and Tamar Park the Activity rate is lower than the old cargo terminal but much

higher than the Hollywood road park, Belcher Park, and other formal parks. The value of R square .743 represents that the relationship between variables is 74% significant. It also concludes that activity is significantly influenced by rules in a public open space.

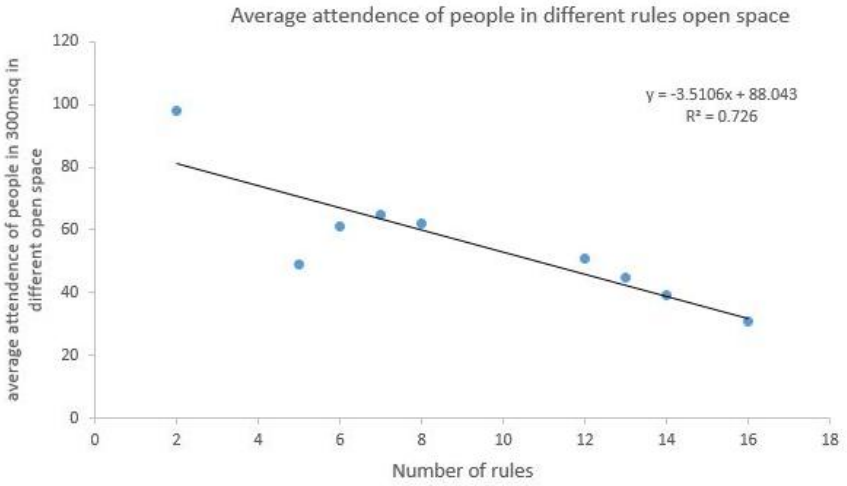

Figure 1. The relation between people attendance density and rules of open space in weekday

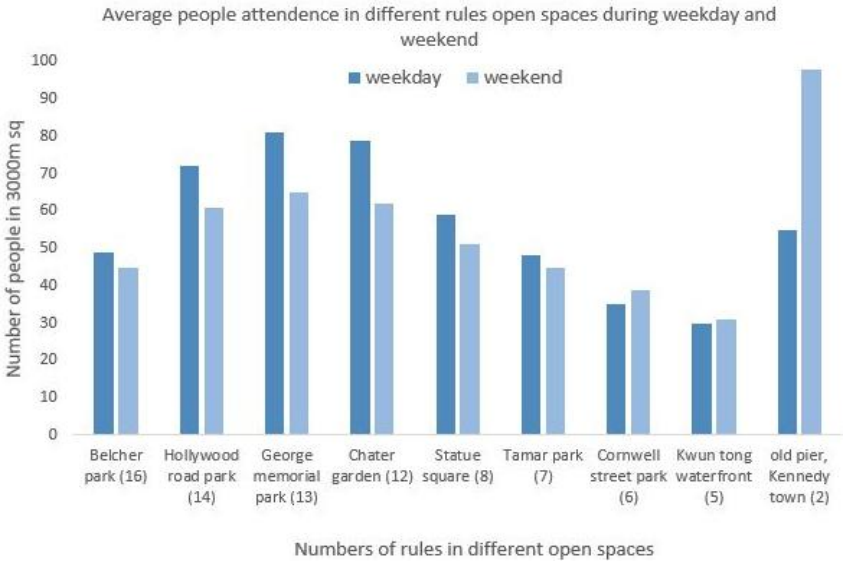

Figure 2. Comparative diagram of the relation between people attendance density and rules of open space in weekday and weekend

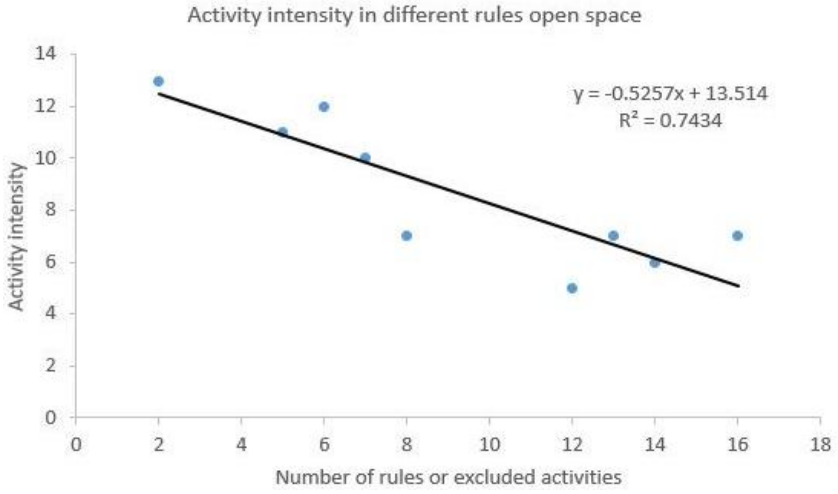

Figure 3. Percentages of people performing different activities

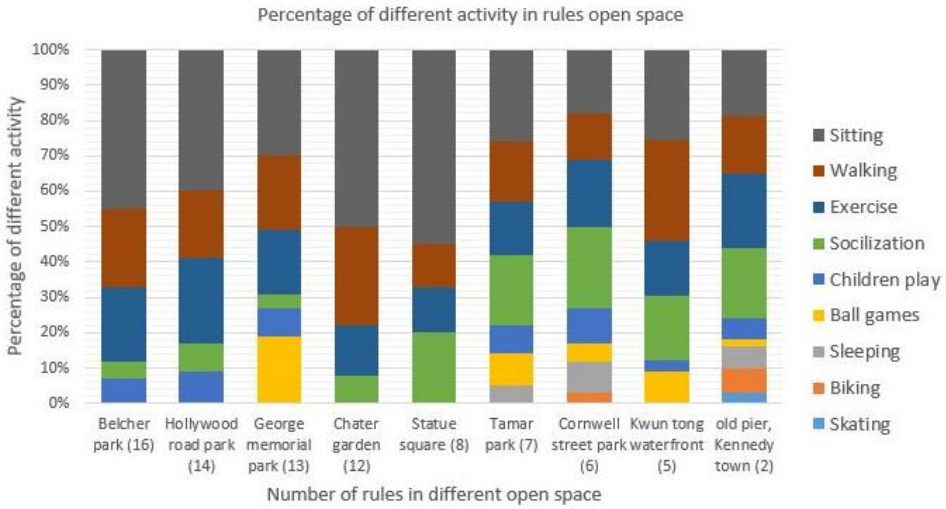

Figure 4. Activity diversity in different rules open spaces

Table 1. The result of the multiple regression model

Dependent variable: Activity Diversity

Regression Statistics				
Multiple R	0.96			
R Square	0.93			
Adjusted R Square	0.85			
Standard Error	1.24			
Observations	9			
		Standard		
	Coefficients	*Error*	*t Stat*	*P-value*
Number of rules	-0.48	0.16	-3	0.04
Size of the park in hector	0.37	0.2	1.81	0.14
Scenic view	1.76	1.55	1.14	0.32
Distance from nearest transit (m)	0	0.01	-0.35	0.74
Intercept	11.8	2.36	4.99	0.01

Table 2

Dependent variable: Average People Attendance

Regression Statistics				
Multiple R	0.86			
R Square	0.74			
Adjusted R Square	0.49			
Standard Error	13.87			
Observations	9			
		Standard		
	Coefficients	*Error*	*t Stat*	*P-value*
Number of rules	-2.82	1.8	-1.57	0.19
Size of the park in hector	0.74	2.26	0.32	0.76
Scenic view	9.93	17.34	0.57	0.6
Distance from nearest transit (m)	0	0.02	-0.22	0.84
Intercept	79.17	26.45	2.99	0.04

The observation data from sample open space show that activity diversity and people attending are correlated with rules of open space but it also influences by the size of open space, scenic view if available, and distance from transit (MTR station). So, a multiple regression model has used to show the relationships among different variable Although the attendance of people in open space is correlated and significant according to simple linear regression model where the relationship between two variables are counted but rules in open space are not significant determinants while the people attendance is measured by multiple linear regression models combining with other determinants (Table 1). On the other hand activity, diversity shows the opposite result in multiple regression models in Table 1. The above result of multiple regression models in Table 1 shows that only the number of rules is significantly correlated with the activity diversity of open space and the negative coefficient indicates that the number of rules is negatively associates with activity diversity. The results are significant after controlling for the size of the park, scenic views, and distance to the nearest MTR station. The value of R^2 (coefficient of determination) means that 93% of the dependent variable can be explained by the independent variable in this model which is satisfactory. The value of adjusted R squared is also satisfactory. In other regression models (table 2) where average people attendance is a dependent variable are not significantly correlated with rules of open space and also other determinants.

5. Conclusions

Rules in public open spaces are important to control unwanted nuisance and ensure the safety and security of people. But over-rules and management tendency can limit the scope of recreation and democratic use of open space. Public open space in Hong Kong is more critical rather any other city due to its high-density context. Some dynamic intervention could introduce to mitigate the problem as time

and space programming. Time and space programming is not a new concept. Often the concept is used to provide maximum facilities to a different user to perform various activities in the same place. The study identifies some area in open space is rarely used for a concert or social performance may use other purposes. Even different users can perform various activities in the same place but at different times by adopting time programming. The intention of management authority should be more conducive to people's needs rather than restrictions. In Hong Kong spaces are precious and valuable, therefore maximum and efficient use of land are necessary to meet user satisfaction.

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