

Factors Influencing Diversity in Urban Park Utilization in Nairobi City County, Kenya

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Abstract

The relationship between the diversity in urban park utilization and variables that influence it has so far been expressed in heuristic terms which lack the rigours of statistical analyses. The current study investigated factors affecting diversity in urban park utilization in the gazetted urban parks within Nairobi City County in Kenya. Survey method was used, employing observation and interview checklists in data collection. The study targeted a total sample size of 185 park spaces out of a population of 341 spaces. Data collected was analyzed quantitatively, using the Statistical Package for Social Science (SPSS) software, version 21. Multiple regression analysis results revealed that diversity in urban park utilization is critically influenced by three factors namely; accessibility to park spaces, built environment and park features. Therefore, to promote diversity in park utilization, the study recommends integration of park features, built environment and accessibility concerns in park design and development process by designers and planners.

Keywords: Accessibility, Built environment, Diversity in park use, Engagement in park activities, Park features, Park utilization, Participation in parks.

INTRODUCTION

Low et al. (2005) define an urban park as a piece of public green open land for recreational use in an urban area. Common features of urban parks include walking trails, benches, picnic tables, playgrounds, and public restrooms. Urban parks are crucial to the lives of the citizens. They have the capacity to offer settings for diverse categories of activities ranging from social, physical, economic, ecological, psychological and cultural (Mehraneh et al., 2016). According to Kaczynski & Havitz (2009), the provision of appropriate facilities and features within parks increases opportunities to engage in physical activities. Bedimo-Rung et al. (2005) argue that the presence or absence of a variety of attributes can be an important determinant of park's ability to promote park use and more specifically engagement in physical activities in the park. They identified park features such as facilities, programs and diversity as contributing factors to park quality. Such facilities refer to the physical facilities available in parks for use by park users such as tennis courts, picnic tables or security lighting. Corti (1996) in his study to investigate the factors influencing use of local parks in Australia identified the availability of

amenities such as swings and barbecue as among the key factors influencing park use. In addition, he found out that variety in recreational programs or organized activities in parks to influence use. Kaczynski & Havitz (2009) associated specific park features with park use and specific park-based activities. For instance, Baran et al. (2014) associated certain park features such as playgrounds, shelters, water features, pools, basket ball courts and picnic areas with park usage among youth and adults. Kaczynski et al. (2008) concur with these findings by revealing that some park features are likely more important than others. For example, areas designed for active use are somehow more important than park features that support physical activities in the park. Veitch et al. (2012) found that improvement of park features increased park use and park-based activities.

THEORY

Diversity in parks, a key determinant of park use is a concept that comprises the mix of park facilities, programs, users and location. Jacobs (1993) indicates that a park with diversity is one that is used for a variety of purposes at different times of

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the day, week and year. Olmstead (1999); Francis (2003) point out that, preference for parks and other open spaces increases with increase in the diversity of physical and social activities. Thompson (2002) grouped parks into two broad categories in terms of intended occupancy namely: active and passive areas. Thompson (2002) indicated that user satisfaction level increases through involvement in active and passive experiences in parks. Bedimorung et al. (2005) ranked physical activities into three intensity levels, sedentary, moderate and vigorous. Thompson (2002) considers the park as a visual resource for passive activities and experiences that promote socialization in parks hence promoting sedentary behavior besides physical activities. Thus, inclusion of a wide range of park features, facilities, amenities and adequate access points attracts a diverse category of users and consequently a variety of activities.

Park features can influence park use positively or negatively. A study by McCormack, Toohey, Rock & Hignell (2010) revealed the importance of access to a variety of park features that support both active and passive recreational activities for both structured and unstructured activities. McCormack et al. (2010) also found out that some facilities were more important than others. For instance, facilities that supported children's play such as trees for climbing and playgrounds played a very important role. Conversely, some equipments were found to negatively affect park use. For example; poorly equipped, outdated, age-inappropriate, mentally or physically unstimulating equipment, as pointed out by caregivers and children (Vitch et al., 2006). Other features were found appropriate to specific age sets. For instance; Lloyd et al. (2008) established that both constructed and natural trails among adults and adolescent girls influenced park use. However, other amenities such as barbecues, water fountains, seats, and picnic equipments appeared more important regardless of age.

Access to park spaces encourages user participation in a wider range of activities. Park connectivity to its immediate environs affects the levels of access and use of its spaces. Important to consider also is the visual access as adequate visibility encourages user participation in park activities and reduces uneasy feelings, hence creating a sense of safety.

A study by Tabassum et al. (2013) found out that, if properly accessible and connected with their surroundings, parks can increase in use and the range of activities engaged in. The ease of accessibility also determines use of parks such as the presence of circulation paths, cycle paths and less conflict points or obstruction in movement within the space. Increased access to park spaces can also lead to increased use of park facilities and engagement in diverse activities (Abubakar et al., 2006).

RESEARCH METHODS

The ultimate objective of the current study was to identify critical factors that affect diversity in park utilization within Nairobi City County and rank the factors with respect to their contribution towards diversity in park participation. It also aimed at developing a model of significant factors that can be used as a guide towards policy development in diversity of park utilization. The study was conducted within the six gazetted urban parks in Nairobi County in Kenya which include Jevanjee Gardens, City Park, Uhuru Park, Uhuru Gardens, Nairobi Arboretum and Central Park. The target population for the study was the convex spaces within the six parks which included both the access routes into and within the park and the sub-spaces therein. The study's unit of analysis was the convex space.

Data types and sources were primary, constituting of first-hand field data collected from the sample size of 185-unit spaces obtained from the six urban parks. The nature of data collected for the dependent variable included the diversity of activities in park spaces. For the independent variable, the type of data collected included size of space, accessibility to the space, visual connectivity, built environment, security in space and park features. The study employed two major methods of data collection namely; observation method and interviews. Observation schedules and checklists were used as guide to gather relevant information along the above park spatial variables. Instruments used include counting machines and cameras. Other related techniques integrated by the study included behavioural mapping to capture the user behaviour in the space. Information collected was entered on the observation schedules and checklist.

The study is quantitative in nature using observation and interview schedules to obtain data from within the six gazetted urban parks in Nairobi City County. Since the number of gazetted urban parks within Nairobi City County was found few, the study considered the entire population. To establish the study's population, convex map analysis advocated for by space syntax theory was undertaken to develop convex spaces from the six urban parks. A total number of 341 convex spaces were developed forming the study's population.

Observation and interview schedules were administered to a sample size of 185 convex spaces obtained from the study's population. Proportionate distribution was then used to determine the sample size of convex spaces per park since the study area comprised several parks that are different in number in terms of convex spaces. The number of convex spaces from each park was determined by their number relative to the entire population. Further, proportionate distribution was employed to determine the sample size of convex spaces per space category of park spaces namely; Access into the park; Access within the park and green sub-spaces. Thereafter, using the standardized random tables as recommended by Mugenda and Mugenda (2003), the study applied simple random sampling technique in sampling representative samples for each park and space category out of the overall sample size of 185 convex spaces.

Guided by study maps generated for each park with well-defined convex spaces, information was sought through direct observation on the specified park spatial variables. One observation schedule per convex space was administered capturing information under each variable. The observation schedules were structured under the following sections; size of space, visual connectivity, security, accessibility to the space, park features, and the built environment. Structured interview schedules were used to gather any relevant data in relation to the above park spatial characteristics. An on-site participation approach was applied in completing the interview schedules.

The independent variables included the size of spaces, accessibility, visual connectivity, built environment, security and park features. Size of

the space refers to the area of a space calculated in square metres. Accessibility to spaces (AS) refers to the connectedness of parks spaces to the adjacent environment. It was measured as a ratio of the total number of access points that connect directly to this space and the area of space in square metres. This was presented as a percentage:

$$AS = \left(\frac{\text{Total number of access points}}{\text{area of space } (M^2)} * 100\% \right)$$

Visual connectivity (VC) refers to the visual connectedness of a space to the adjacent environment. It was measured as the level of visual connectivity of the space to the adjacent neighbourhood in percentage on a Likert scale of 1 to 5. The measurements were as follows: 1 = 0 - 20% - Extremely low connectivity; 2 = 21 - 40% - Very low connectivity; 3 = 41 - 60% - Moderate connectivity; 4 = 61 - 80% - Very high connectivity; 5 = 81 - 100% - Extremely high connectivity.

The construct of the built environment (BE) was taken both as temporary and permanent physical structures in the spaces. It was calculated as the overall density of structures in the space. This is as illustrated below:

$$BE = \left(\frac{\text{Total permanent \& temporary structures}}{\text{area of space } (M^2)} * 100\% \right)$$

Security in park spaces (SE) was taken as user's perceptions and feelings of safety in park spaces. It was measured on a 5-point Likert scale where the respondents were asked to give their opinion on security issues to the space of visit. 1 represented strongly disagree while 5 represented strongly agree. An average score was used to represent the overall security in the space. Park features (PF) refers to facilities such as tennis courts, picnic tables, benches, dust bins, lighting fixtures. This was taken to be the overall density of features in space and calculated as follows:

$$PF = \left(\frac{\text{Total number of park features in the space}}{\text{area of space } (M^2)} * 100\% \right)$$

The dependent variable diversity in park utilization refers to the variety of activities in a space. It was measured as the overall density of activities in a space.

$$DA = \left(\frac{\text{Total number of activity types in space}}{\text{area of space (M}^2\text{)}} * 100\% \right)$$

The data was categorized in five groups based on equal percentiles of the cases (NB: not equal width but percentiles). A score of 1 to 5 was then accorded as follows:

- 1= Below 0.02931 - Extremely low diversity
- 2= 0.02932 - 0.18804 - Very low diversity
- 3= .18805 - .47422 - Moderately diverse
- 4= 0.47423 - 0.87351 - Very high diversity
- 5= Above 0.87351 -Extremely high diversity

To achieve the study's objectives, two analyses were carried out namely; correlation and Multiple Regression (MR) analyses. Firstly, correlation analysis was performed to determine the strength of the relationship between the factors and diversity in park use. Regression analysis was used to measure the contribution of the factors to diversity in park utilization and to formulate a model of significant factors to guide policy development in diversity of park utilization within Nairobi City County. The Statistical Package for Social Sciences (SPSS) version 21 was used to perform all the data analysis procedures.

RESULTS

The study obtained the factors influencing diversity in park utilization from literature review, observation and interview checklists administered in park spaces and users within urban parks in Nairobi City County. A total of six factors were identified namely; Size of park spaces, accessibility to spaces, visual connectivity, built environment, security and park features. Correlation and Multiple Regression analyses results are as follows;

Correlation analysis results in **Table 1** show accessibility in park spaces as the strongest predictor of diversity of activities in parks ($r=0.747$), a relationship which is positive and highly significant with significant level ($p=0.000$). Park features was the second strongest predictor of diversity of activities in park spaces depicting a strong, positive and significant relationship ($r=0.525$; $p=0.000$). The built environment depicted a moderate, positive and significant correlation with diversity of activities in parks

($r=0.348$; $p=0.000$). A weak, positive and significant relationship were posited between diversity of activities and visual connectivity in park spaces ($r=0.170$; 0.012). A positive sign of correlation coefficient between accessibility, park features, the built environment and diversity of activities in the park implies that provision of adequate, designed and good conditioned access routes, park features and built environment within park spaces increases the range of activities a user would engage in a park space. A weak, negative and significant relationship was reported between diversity of activities in park spaces and size of spaces ($r=-0.219$; $p=0.001$) and security ($r=-0.180$; 0.007) respectively. A negative sign of correlation coefficient between size of spaces, security and diversity of activities in the park implies that provision of large spaces and increased security in spaces lead to a decline in the range of activities available for users to engage in park spaces.

Regression Analysis

Multiple regression technique was used to measure the contribution of the significant factors to diversity of activities in park spaces. The contribution for each factor was indicated by the percentage contribution of the factor to the overall coefficient of determination (R^2). **Table 2** presents a summary of regression results. Diversity of activities was regressed against six independent variables namely; size of space, accessibility to the space, visual connectivity, built environment, security in space and park features.

Results of multiple regression analysis revealed three critical predictors of the diversity of activities in park spaces namely; accessibility, built environment and park features. The three variables significantly explained up to 87.9 percent variability in the diversity of activities in park spaces. A coefficient determination (R^2) of 0.879 as indicated in the prediction model (**Table 2**) indicated the variability. The model indicates a statistically significant positive linear relationship between the diversity of activities in a park space and accessibility, built environment and park features.

Table 2, which is predictive at 95 percent confidence level, shows that a unit increase in accessibility to a space, the built environment, and park features

TABLE 1: Diversity of activities in the parks

Correlation results								
		DA	SS	AS	VC	BE	SE	PF
DA	r	1	-.219**	.747**	.170*	.348**	-.180**	.525**
	p		.001	.000	.012	.000	.007	.000
**. Correlation is significant at the 0.01 level (2-tailed).								
*. Correlation is significant at the 0.05 level (2-tailed).								

Key: DA – Diversity of activities; BE- Built Environment; PF – Park Features;
 SS – Size of Space; VC – Visual Connectivity; SE- Security

Source: Field survey 2018

TABLE 2: Summary of regression results

Y	β_0	AS	BE	PF	R ²	Sig. P value
DA	-0.067	0.490	0.505	0.273	0.879	0.000 ^b

Note: The model is significant at P- value < 0.05

Source: Field survey 2018

increases the diversity of activities in park spaces by 0.490, 0.505 and 0.273 units respectively. These findings imply that, while holding other factors constant, an increase in either of them results to an increase in the diversity of activities in a space.

As indicated in **Table 2**, the built environment is the most critical predictor of diversity of activities in park spaces explaining up to 0.505 units increase in diversity of activities per unit change. Accessibility in park spaces was found to be the second most critical factor explaining 0.490 units increase per unit change followed by park features which explains just 0.273 units increase in diversity of activities per unit change. Meaning that, park spaces that properly accessed park spaces with adequate and quality-built environment coupled with adequate and a wide range of park features attract diverse park activities. **Figure 1** demonstrates a range of activities in spaces that are properly accessible. Activities ranged from sedentary to active; commercial to recreational. **Figure 2** indicates inaccessible, dormant, neglected unkept and insecure spaces at Uhuru Gardens. Uhuru Park was found to attract diverse categories of activities interchangeably ranging from political and religious rallies and games. Diversity was also characterized in terms of category of activities



FIGURE 1
 Diverse activities in properly accessible spaces within Uhuru Park
Source: Field survey 2018



FIGURE 2
 Inaccessible and dormant spaces at Uhuru Gardens
Source: Field survey 2018

ranging from sedentary to active (Figures 3 (a), (b) and 4).



FIGURES 3 (a) and (b)
 Recreational structures (built environment - pavilion) at Uhuru Park attract diverse activities interchangeably
Source: Field survey 2018



FIGURE 4
 Park features attract diversity in use of spaces at Uhuru Park
Source: Field survey 2018

DISCUSSION

This study sought to investigate the factors that influence diversity in park utilization within Nairobi City County. It found out that diverse

categories of activities that take place in parks are supported by different types of park features that are of good condition. The study also found out that properly connected parks attract diverse categories of users who in turn engage in a wide variety of activities. The built environment was also found to influence diversity in park participation as different park facilities were found to attract and support different activities and users. Correlation analysis results showed strong relationships between accessibility, park features and diversity of activities in a space ($r=0.747$; $p=0.000$ & $r=0.525$; $p=0.000$) respectively while the built environment posted a positive, moderate and significant relationship with diversity of activities ($r=0.348$; $p=0.000$). The high correlation coefficient between accessibility, park features and diversity of activities in a space ($r=0.747$; $p=0.000$ & $r=0.525$; $p=0.000$) respectively supports the premise that the circulation system of a park determines the activities therein. Sakip, Akhir and Omar (2015) observed that properly connected and more accessible parks attract more users as well as improving social cohesion and interaction. They also found out that such parks support physical activities. It was found out that adequate, good quality and diverse features greatly improve park use as they attract diverse categories of users, increase numbers in space, and encourage engagement in various activities.

Multiple regression analysis results revealed that up to 87.9 percent variability in diversity of activities in park spaces, was significantly predicted by accessibility, built environment and park features in parks. Bedimo-Rung et al. (2005) support these findings by positively associating availability of park features with participation levels in a park and provision for broad opportunities to park users to engage in diverse park activities. A study by Costigan et al. (2017) established that lack of park features discouraged users from visiting the park. Other previous studies in support of the current study findings include a study by Corti, Donovan and Holman (1996) on the factors influencing the use of physical activity facilities in Australia. Findings demonstrated that park spaces with a wide range of park features were among the important features influencing the user visitation and engagement in diverse activities. In support of these findings also, Costigan et al. (2017); Kaczynski et al. (2014) associated certain

park features with particular park-based activities. Such features include, swings, barbecues, walking/cycling route, water features, fitness station, basketball pitch, tennis court, skate park, pleasant views, bike racks and car parking. In support of the study's findings on the influence of accessibility to diversity in park use, a study by Sakip et al. (2015) found out that efficient accessibility to parks and their adjacent neighbourhoods attract diverse categories of users and activities engaged in. Tabassum et al. (2013) found out that properly accessible parks have the capacity to improve social cohesion and interaction.

CONCLUSION AND RECOMMENDATIONS

The current study found out that park spaces with proper access, built environment and park features attract a broad category of park users who in turn engage in a wide range of activities ranging from sedentary to active. Properly connected park spaces with adequate access and circulation routes attract a diverse category of users who in turn engage in a variety of activities. Provision of adequate, good quality and conditioned facilities and amenities such as play fields, changing rooms, social halls and programs, on the other hand provide a wide range of opportunities for park users to participate in various activities within park spaces. Park spaces with adequate and a wide variety of park features such as benches, trails, barbecues and water features attract a broad category of users who in turn engage in different activities as per choice. Some park features were found to attract a certain set of user category and activity such as barbecues.

The current study findings therefore suggest that the diverse categories of activities that take place in park spaces are supported by different types of park features, adequate access routes and properly connected spaces as well as a built environment that is in good condition. Therefore, to promote diversity in parks in terms of activities, there is need for a better understanding of the specific park features that are associated with different categories of activities. Also, it is important to consider the condition, adequacy levels and consistency of such features, facilities and amenities in the park spaces. Designers also need to consider and integrate accessibility concerns in their planning process specifically, to consider adequacy in connection to and within spaces and the quality of access routes.

This paper therefore recommends accessibility to park features and built environment as key considerations in the design and development process of parks. It is therefore important for park designers and planners to consider the various park user categories and their recreational needs in their designs to enable users to engage and participate in various activities of their choice. Secondly, the study recommends integration of accessibility, built environment and park feature concerns in the design and planning processes.

CITED REFERENCES

- Abubakar, I.R. & Aina, Y.A. (2006, March).** *GIS and Space Syntax: An analysis of accessibility to urban green areas in Doha district of Danman, Metropolitan Area, Saudi Arabia.* In the proceedings of Map Middle East Conference, Dubai, UAE.
- Baran, P.K., Smith, W.R., Moore, R.C., Floyd, M.F., Bocarro, J.N., Cosco, N.G. and Danninger, T.M. (2014).** Park use among youth and adults: Examination of individual, social, and urban form factors. *Environment and Behavior.* 46: 768-10.1177/0013916512470134.
- Bedimo-Rung, A.L., Mowen, A.J. and Cohen, D.A. (2005).** The significance of parks to physical activity and public health: A conceptual model. *American Journal of Preventive Medicine.* 28, 159–168.
- Corti, B., Donovan, R.J. and Holman, C.DJ. (1996).** Factors influencing the use of physical activity facilities: Results from qualitative research. *Health Promotion Journal.* 6:16 –21.
- Costigan, S.A, Veitch, J., Crawford, D., Carver, A. & Timperio, A. (2017).** A cross-sectional investigation of the importance of park features for promoting regular physical activity in parks. *International Journal of Environmental Research and Public Health.* 14(11).
- Francis, M. (2003).** *Urban Open Space: Designing for user needs.* Landscape Architecture Foundation, Washington, DC: Island Press.

Jacobs, J. (1993/1961). The uses of neighborhood parks. In *The death and life of great American cities*. New York: Modern Library, 1993[1961]:116 – 45.

Kaczynski, A.T., Potwarka, L.R. and Saelens, B.E. (2008). Association of Park Size, Distance, and Features with Physical Activity in Neighbourhood Parks. *American Journal of Public Health*. 98 (8), 1451-1456.

Kaczynski, A.T. and Havitz, M.E. (2009). Examining the relationship between proximal park features and residents' physical activity in neighborhood parks. *J. Park Recreation*. 27:42–58.

Kaczynski, A.T., Besenyi, G.M., Stanis, S.A.W., Koohsari, M.J., Oestman, K.B., Bergstrom, R., Potwarka, L.R. and Reis, R.S. (2014). Are park proximity and park features related to park use and park-based physical activity among adults? Variations by multiple socio-demographic characteristics. *Int. J. Behav. Nutr. Phys. Act.* 11, 146.

Lloyd, K., Burden, J. and Kieva, J. (2008). Young girls and urban parks: Planning for transition through adolescence. *Journal of Park and Recreation Administration*. 26, 21–38.

Low, S., Taplin, D. and Scheld, S. (2005). *Rethinking Urban Parks: Public Space and Cultural Diversity*. Austin, TX: University of Texas Press.

Mehraneh, A.B., Mehrdad, A.M. & Amirreza, K. (2016). Investigating the role of space factors in promoting vitality for designing sports couple. *Civil Engineering Journal*. 4, 10.28991/cej-03091109.

McCormack, G., Rock, M., Toohey, A.M. & Hignell, D. (2010). Characteristics of urban parks associated with park use and physical activity: A review of qualitative research. *Health and Place*. 16(4), 712-726.

Mugenda, O. & Mugenda, A. (2003). *Research Methods: Quantitative and Qualitative Approaches*. Nairobi: Acts Press.

Olmstead, F. (1999). Public parks and the enlargement of towns. In R.T. LeGates, F. Stout (Eds), *The City Reader* (2nd ed.). London: Routledge, pp. 314-320.

Sakip, S.R., Akhir, N.M. & Omar, S.S. (2015). Determinant factors of successful public parks in Malaysia. *Social & Behavioural Sciences*. 422-432.

Tabassum, S. & Sharmin, F. (2013). Accessibility Analysis of Parks at Urban Neighborhood: The Case of Dhaka. *Asian Journal of Applied Science and Engineering*. 2(2), 48-61.

Veitch, J., Bagley, S., Ball, K. & Salmon, J. (2006). Where do children usually play? A qualitative study of parents' perceptions of influences on children's active free-play. *Health and Place*. 12, 383–393.

Veitch, J., Ball, K., Crawford, D., Abbott G.R. & Salmon, J. (2012). Park improvements and park activity: A natural experiment. *Am J Prev Med*. 42: 616-619. 10.1016/j.amepre.2012.02.015.