

USER BEHAVIOUR EXPERIENCES OF DHAKA'S PUBLIC OPEN SPACE
AND DESIGN FEATURES

SUTAPA TASNIM

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DEDICATION

This thesis is wholeheartedly dedicated to my beloved parents; GSM Shamsuzzoha and Nur Mohal Khatun, who have been my source of inspiration and gave me strength when I faced difficulties while continually providing their moral, spiritual, emotional, and financial support.

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ABSTRACT

Public open space is one of the most crucial features for every urban area. It works as a breathing space for the city and use together by urban dwellers for various activity either passive or actively. There is a need to fulfil variety of good criteria and open space design principles in order to ensure such provided space function accordingly and use optimally by dwellers. In Dhaka City, Bangladesh, there are several public open spaces that believed designed with minimum quality, disconnected and not fulfil their function. This research critically investigates influenced of two public open space design in Dhanmondi Lake Park, Dhaka on the pattern of use and user behaviour based on empirical evidence. This research used a qualitative method including direct observation on type of user activities, design inventory, mapping on activity distribution and behaviour matrix of user on site. Relation of user behaviour and detailed design in public open space analysed by using Geographic Information System (GIS) application. The analysis revealed a similar pattern of behaviour that appear to be correlated with particular layouts and details in both parks. Overall, the findings of this research expected beneficial to designers in order to understand the need for proposing better quality and function public open space that can offer various of user experiences.

ABSTRAK

Ruang awam terbuka merupakan salah satu ciri-ciri penting yang perlu disediakan di setiap kawasan bandar. Ruang awam terbuka berfungsi sebagai ruang 'bernafas' dan digunakan secara bersama oleh penghuninya untuk melakukan pelbagai aktiviti sama ada pasif dan aktif. Terdapat keperluan untuk memastikan rekabentuk ruang awam terbuka memenuhi pelbagai kriteria dan prinsip rekabentuk ruang yang baik untuk memastikan ruang yang disediakan berfungsi dan digunapakai secara optimum oleh penghuni bandar. Di Bandar Dhaka, Bangladesh, terdapat beberapa ruang awam yang direka pada tahap minimum, tidak saling berhubungan serta tidak memenuhi fungsi yang sebenar. Kajian ini secara kritis menyiasat kesan rekabentuk ruang awam dua tapak kajian di Dhanmondi Lake Park, Dhaka terhadap corak kegunaan ruang dan tingkahlaku oleh pengguna berdasarkan bukti empirikal. Kajian ini menggunakan kaedah kualitatif iaitu dengan melakukan pemerhatian secara langsung terhadap jenis aktiviti pengguna, inventori rekabentuk, pemetaan taburan aktiviti dan matrik tingkahlaku pengguna di tapak kajian. Hubungkait tingkahlaku pengguna dengan rekabentuk terperinci di ruang awam dianalisis menggunakan aplikasi GIS. Hasil analisis kajian menunjukkan terdapat kecenderungan corak tingkahlaku pengguna yang hampir sama di setiap susunatur ruang awam di kedua-dua taman. Secara keseluruhannya, penemuan kajian ini dijangka akan memberi manfaat kepada para perekabentuk untuk memahami keperluan menyediakan cadangan rekabentuk susunatur ruang awam terbuka yang lebih berkesan, berkualiti serta berfungsi untuk pelbagai jenis kegunaan sekaligus menawarkan kepelbagaian pengalaman kepada pengguna.

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LIST OF ABBREVIATIONS

DCC	-	Dhaka City Corporation
DSCC	-	Dhaka South City Corporation
DNCC	-	Dhaka North City Corporation
DMDP	-	Dhaka Metropolitan Development Plan
RAJUK	-	Rajdhani Unnayan Kartripakkha (Capital Development Authority, Bangladesh)
UDD	-	Urban Development Department, Bangladesh
UTM	-	Universiti Teknologi Malaysia

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CHAPTER 1

INTRODUCTION

1.1 Research Background

Open space is one of the most crucial components of an urban environment. Open spaces can be public or privately owned. These open spaces are essential for the purpose of different public functions, recreational, leisure activities or just to unwind after a long day for the urban dwellers.

A public open space in a city is a place of mutual involvement beyond the immediate family circle. Generally, public space is an area of public activity and interest, a public space is a social space. The public or private parts of the city that are available, free of charge, to be used or seen by everyone, including streets, squares and parks, are public domain or realm. The public realm at its best is an incomparable teacher of social skills and attitudes ; children and youth learn how to communicate and behave with other people through observation, imitation and participation (Lennard and Lennard, 2004). The importance of public space is unlimited for urban life and liveability. It works as a breathing space for the city and the city dwellers as well.

Dhaka has already evolved as a mega-city with an estimated population of 8.9 million living in the city itself. (Bangladesh Bureau of Statistics, 2016) This huge population living in a densely populated area within 23,234 pop/sqkm (Bangladesh Bureau of Statistics, 2016) needs open spaces within their reach to breath, relax and socialize. In Dhaka city there are some public spaces such as Dhanmondi Lake Park, Ramna Park, Suhrawardy Udyan, Botanical garden, Chandrima Uddan and others. Though they are not enough for a mega-city like Dhaka, these public open spaces still attract a large number of urban residents and also serve as economic zones for informal

traders, meeting places or places of interaction for urban residents, places for social movements and from time to time serve as political arenas.

In Dhaka City, the urban dwellers popularly use both the streets and open spaces for different activities. Thus, the linear open space of streets, other than their main objective of circulation, also generates many different urban events in Dhaka's cultures. In general, public open spaces in Dhaka are mainly used for the purpose of public gathering- like open market, park, plaza, playground, fair-ground etc.

1.2 Problem Statement

Dhaka, being the 11th largest megacity comprises a total population of 16.98 million (United Nations, 2014). According to projection of UN report (2014) Dhaka would become the 6th most crowded city by 2030 with a population of 27.37 million. Rapid and unplanned urbanization, commercial development and population pressure have resulted in the loss of many valuable open spaces to urban filling. But past Dhaka's image is not derived from its concrete parts such as building, roads and others; it is much deeper and more free flowing. Parks and public open spaces are an inherent element of the images that Dhaka has emerged from. (Mowla, 2003). In this context, Halprin's (1979) quote is appropriate: "Our collective perception of cities depends on the landscape of open spaces. They lace a city with their voids.... City is not so much a construction as a landscape of open spaces." British author, James Taylor (1840) has stated in his 'Topography of Dacca', after his visit of 1824, which Dhaka looks like the Venice of the orient. The large open spaces with the lushness of nature surrounding the habitation; the water of the Dulai Khal flowing across the town, and the water boundary by the Shitalakhya and the Buriganga - all these natural features made the city beautiful (Nilufar, 2000).

The problems of urbanization in Cities, like Dhaka, in all developing countries are intensified by high population growth and rural-urban migration. For Dhaka, the problem is further exacerbated by limited land supply, lower land use and lack of adequate land use policies and planning as revealed by previous researches conducted

on Dhaka's public open spaces by Byomkesh et al., (2012) and Shannon and Nilufar, (2008a). Additionally, the ever-increasing urban population is increasingly demanding space. This rapid population flow to the urban areas providing stimulus to construction of built-up areas in huge proportion. Within this junk of concrete, open green spaces act like its lungs, being used as essential part of the city to maintain its environmental and ecological balance. Other than this passive need, they play an evolving role in urban residential life. This role ranged from the city's relief to the human-nature mediator (Sadeghian and Vardanyan, 2013). Thus, one of the primary needs of open spaces in urban life is to meet urban residents ' recreational needs during their leisure time.

In a high-density urban area recreational facility provided by open spaces that are accessible to everyone is an integral part of urban life and a necessity to have a livable environment for the urban residents. The importance of recreation in the physical, intellectual and emotional development of people is unquestionable. (Nilufar, 2000). According to Jepson (2007), Urban public spaces are essential for inhabitants of the town because, if performed correctly, these places not only provide aesthetically pleasing exits, but also improve the mental well-being of inhabitants of the town as well as promote economic promotion, social security and integration concerns.

In the historical city of Dhaka (Old Dhaka), large scale public gathering space was used for open markets/ chawks, the whole city had small scale and intimate public open spaces in the neighbourhoods. Traditionally such informal public open spaces, like street corners, court yards etc., helped to generate local social activities and ensured social interactions (Nilufar, 2000). Despite its organic morphological character and spontaneous development, in new Dhaka it is rare difficult to locate similar informal and intimate open spaces. The scarcity of required open spaces, both in public and private, has restricted and changed urban lifestyles to a great extent. Different studies on public open spaces of Dhaka revealed that the number of urban populations using these public open spaces for their daily recreational needs is relatively low.

Additionally, the amount of open spaces Dhaka has is insufficient and the amount is slowly decreasing. Moreover, most of the existing open spaces are not serving their desired roles and some of them lost their appeal to people and become abandoned with time (Khan, 2014). A lot of these public open spaces are not designed properly either and there is a lack of proper guidelines or standards that can be used to design public open spaces in the context of a developing country (Shannon and Nilufar, 2008a). So, it is necessary to examine how the urban design and design features of Dhaka's existing public open space is impacting user's activity and behaviour in that space. This can create an understanding of the correlation between users and these design features which in turn can be implemented to prepare a guideline and standardize the design of public open spaces of Dhaka.

For that an imperial study can be of great use to understand and predict relation between usage and the design of a public open space, which in term can assist in design-decision making for a more effective open space. For this, GIS database provides transparent place examination through various combinations of behavioural pattern attributes for example type of activity, time, features, gender, age etc. (Golicnik and Marusic, 2012). It allows to combine and compare any combination of attributes for a place and enables designer to look at the scenario from different perspective. Additionally, GIS based behaviour map can present the outcome which have been found through deeper examination of the different features or elements. For example, frequency of occurrence for different activities, how intensively a certain activity has occurred, how the patterns of each particular activity were distinguished with respect to the immediate environment and so on.

Therefore, this study would attempt to analyse the user behaviour experience and the design features of the public open spaces of Dhaka in order to create an understanding of the influence of design features on the user's behaviour.

1.3 Research Aim

This study aims to investigate the user behaviour experience in public open spaces and how their design influence user behaviour at that space in the context of Dhaka. It intends to understand the how the design features influence the user behaviours taking place in Dhaka's public open space.

1.4 Research Objectives

The objectives of this research are:

- 1) To explore different design features of the public open spaces of Dhaka.
- 2) To identify types of activities taking place in the public open spaces of Dhaka.
- 3) To understand the connections between user behaviour and the design features of the open spaces of Dhaka.

1.5 Research Questions

The research question for this research are listed as followed:

- 1) Where are the different design features located in the public open spaces of Dhaka?
- 2) Which activities are taking place in the public open spaces of Dhaka?
- 3) What are the connections between user behaviour and the design features of the public open spaces of Dhaka?

1.6 Scope of study

The scope for this research is listed as follow:

- 1) This study limits the research inquiry within the extent of physical observation of public open spaces and the behaviour of their users.
- 2) This study mainly focuses on the intermediate-scale urban spaces in the city context.
- 3) In doing Dhanmondi Lake Park waterfront development have been selected to investigate their use by the urban dwellers. Two sites investigated for this study are- Dhanmondi 8 Lake Park and Dhanmondi 32 Lake Park.
- 4) From the findings, it will attempt to outline the connections between user behaviour and design features in the public open spaces of Dhaka.

1.7 Significant of Study

This study has significant contribution towards the urban planners and designer and also the local authorities. The discussion is as follows:

- Practical Contribution

The contribution of this research is to provide a body of knowledge about the user behaviour taking place and the design features present at the public open spaces of Dhaka. This study is therefore helpful in creating an understanding how the design features are influencing the user behaviour of these open spaces. Therefore, creating an effective design-decision making process for the urban planner and designers.

- Theoretical contribution

Theoretically, the study will help researchers to expand their research towards the investigation of open spaces that exist in the urban areas of Dhaka. Thus, the framework constructed for this research also include the assessment of design features and user behaviour found in the public open spaces. This study might be relevant and might need further enhancement to be used in future studies as references.

1.8 Background of Study Area

In 1998, Dhaka City Corporation (DCC) initiated the Dhanmondi Lake Park development project, restoring the lake side waterfront, enhancing the social, economic, cultural and environmental sustainability of the neighbourhood as well as providing the urban community of Dhaka City with recreational facilities as part of the urban residents ' acute demand. In order to recover the invaded land areas, the project initially had to carry on some eviction of the invasions by local landowners (Hossain et al., 2009).



Figure 1.1 Dhanmondi Residential Area Master Plan, 1964. (Department of Architecture, Ministry of Works, Bangladesh)

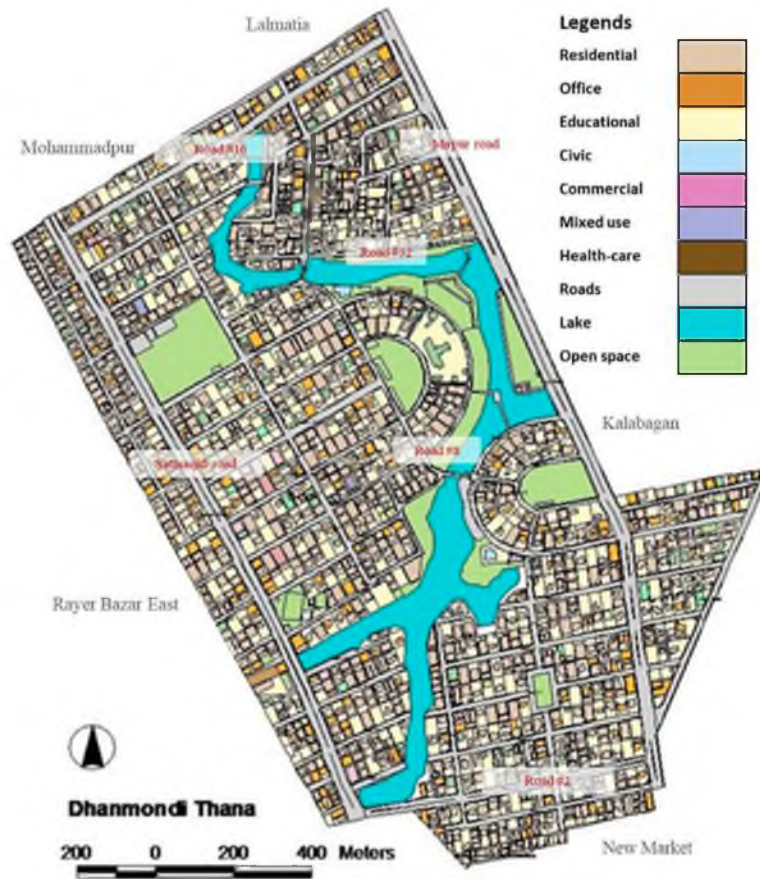


Figure 1.2 Land-Use Map of Dhanmondi Residential Area. (Dhaka City Corporation, 2013)

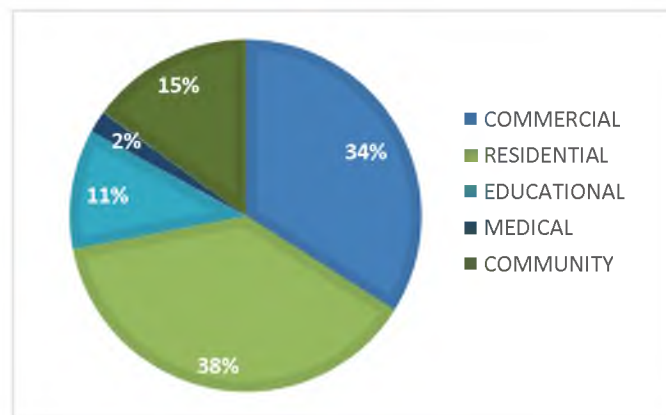


Figure 1.3 Land-Use Pattern of Dhanmondi Residential Area

Land use map of the area shows a mixed-use pattern at present, where majority is used for residential after that commercial usage is highest. Educational and other usage makeup rest of the land-use. Mixed-use is also seen in the vertical layers, in the

same building blocks as, commercial use often seen in the road-front especially on the ground floors and residential use in upper floors on the peripheral roads.

The underlying design concept of the professional team involved envisaged as to revitalizing the lake and lake side area. It includes primarily decontaminating the water of the lake, shaping the water shade area, opening it up and making it easily accessible to the public. All of this was done through a public private partnership (Hossain et al., 2009)



Figure 1.4 Satellite Image of Dhanmondi Lake and Its Surrounding Residential Area. (Google Earth, 2019)

Visual and physical connectivity between the lakefront and surrounding neighbourhood was taken into account for ensuring accessibility to the public. High fences were replaced with low green hedges to make the Lake Park visible from adjacent roads. Physical connectivity was ensured by articulating the park areas with walkways and connecting them to the adjacent roads at strategic locations. Some passive activities were introduced along the walkways such as areas to sit and relax to make these links sustainable. The curvilinear path around the lake side was the main attraction and the facilities generating moderate traffic were places in the Lake Park's central areas. (Nilufar, 2000).

The scheme introduced functions that are related to generating less traffic in a residential area. Throughout the development, functions such as restaurants, food stalls, drink corners, health club, boat club, open-air theatre and playground for children have been distributed in various visually and spatially strategic locations. The concept thus, aimed to make these functions as focal points, to encourage people to visit the Lake Park. The functions were placed in more localized areas in order to avoid direct traffic flow from the busy neighbourhood peripheral roads that can lead to congestion. Incorporating all these functions was envisioned as commercial gain for the maintaining authority, DCC (Hossain et.al., 2009).

Hossain et.al., (2009) refers that Dhanmondi Lake Redevelopment Project opens up urban design opportunities in Dhaka. The area was made attractive to the public by inclusion of the recreational space on the urban scale. Overall, it is an overwhelmingly effective initiative that accommodates all classes of individuals of the urban context with a minimum of monetary and physical interference through the residential neighbourhood (Hossain et.al., 2009).

In a critique review Shannon and Nilufa (2008a) refers to the redevelopment of Dhanmondi Lake in flood-prone Dhaka as a strategic urban concept in an emerging city. The framework effectively restores and maintains an important urban water resource, offers place for public leisure and includes innovative development approaches to prevent urban encroachment. Modernity in the design approach

combined with local knowledge is indeed timeless and can guide Dhaka into the future (Shannon and Nilufar, 2008a).

From the inception of the lakefront by different researchers it has been observed that several multi-functional public facilities have been incorporated around the lake which attracts more non-neighbourhood city dwellers in and around the area. This project is cited for general improvement of the circulation of traffic in the area, the prevention and elimination of interference with public land and water resources, the restoration and improvement of environmental qualities, the creation of open physical facilities for recreation and recreation, it also creates open physical amenities for recreation and leisure, creates a vast architectural setting with the integration of open spaces and walks along the waterfront and as a road map for other developments (Swapan, 2013).

1.9 Thesis Outline

This thesis is organized into five chapters. First chapter depicts the general research background of this study, explains the justification of research, defines the research aim, goal and objectives of the research. At this stage, the researcher also determines the public open space that is suitable with the study's topic. The two open spaces chosen for this study are- Dhanmondi 8 Lake Park and Dhanmondi 32 Lake Park.

Second chapter critically reviews related literature on public open spaces; and discusses public open space in urban context, design features and the influence of design on human behaviour, ending with several current literatures that supported the phenomena explored in this study. Furthermore, it also provided a framework based on previous studies that are related with the research topic.

Third chapter describes the research methodology, elaborates the research design and introduces the methods used to identify the design features and different behaviour pattern and discusses methods used for data analysis.

Fourth chapter analysed the findings of the study by investigating environment-behaviour relationship. It analysed the influence on behaviour pattern based on- design features, time, accessibility, number of users. The analysis will be done using Microsoft Excel, ArcGIS and AutoCAD.

Fifth chapter presents summary and discussion on the findings, the implication of the study and make recommendation for future study. In this stage, the researcher will ensure to achieve the objectives of the study. In this, the researcher will also enlighten on the limitation of study and proposed several suggestions for improvement in the future.

REFERENCES

- Ali, T. (2007) 'Community care brings Gulshan's Tank Park to life again', *The Daily Star*. Available at: http://www.thedailystar.net/pf_story.php?nid=2645.
- Barua, U. and Stoican, I. (2014) 'The changing nature of urban public places in Dhaka City', *Urbanism. Arhitectură. Construcții*, 4(May).
- Begum, H. and Sharna, F. K. (2018) 'Factors Influencing Public Accessibility to Community Open Spaces in Dhaka City : A Case Study of Mirpur Budhhijibi Complex in Dhaka', *International Journal of Social Sciences and Humanities Invention*, 5(05), pp. 4759–4764. doi: 10.18535/ijsshi/v5i5.17.
- Bell, P. A., Fisher, J. D. and Loomis, R. J. (1996) *Environmental Psychology*. 4th edn. California: Thomson & Wadsworth, Belmont.
- Brebner, J. (1982) *Environmental Psychology in Building Design*. Applied Science Publishers: London.
- Byomkesh, T., Nakagoshi, N. and Dewan, A. M. (2012) 'Urbanization and green space dynamics in Greater Dhaka, Bangladesh', *Landscape and Ecological Engineering*, 8(1), pp. 45–58. doi: 10.1007/s11355-010-0147-7.
- Canter, D. and Stringer, P. (1975) *Environmental Interaction: Psychological Approaches to our Physical Surroundings*. Surrey University Press: London.
- Canter, D. V. (1977) *The Psychology of Place*. The Architectural Press Ltd : London.
- Carmona, M. *et al.* (2003) *Public Places - Urban Spaces*.
- Carr, S. *et al.* (1992) *Public space*. Cambridge University Press.
- Chua, B. H. and Edwards, N. (1992) *Public Space- Design, Use and Management*. Singapore: Singapore: Singapore University Press.
- Cooper Marcus, C. and Francis, C. (1998) *People Places: Design Guidelines for Urban Open Space*. 2nd edn. Toronto: John Wiley & Sons, Inc.,
- Creswell, J. W. (2008) *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. USA: Sage Publications.
- Davison, K. K. and Lawson, C. T. (2006) 'Do attributes in the physical environment influence children's physical activity? A review of the literature', *International Journal of Behavioral Nutrition and Physical Activity*, (3(19)), pp. 1–17.

- Dijkstra, L. W. (2000) 'Public Spaces: A Comparative discussion of the Criteria for Public Space', *Journal of Research in Urban Sociology*, (5(1)), pp. 1–23.
- DNCC (2018) *List of parks and playground under Dhaka north city corporation*. Dhaka. Available at: <http://www.dhakanorthcity.gov.bd/park/index.html>.
- DSCC (2018) *List of parks and playground under Dhaka south city corporation*. Dhaka. Available at: <http://www.dhakasouthcity.gov.bd/park/index.html>.
- Ehrenfeucht, R. and Loukaitou-Sideris, A. (2007) 'Constructing the sidewalks: municipal government and the production of public space in Los Angeles, California 1880-1920', *Journal of Historical Geography*, (33(1)), pp. 104–124.
- Francis, M. (2003) *Urban Open Spaces designing for User Needs*.
- French, J. S. (1978) *Urban Space: A Brief History of the City Square*. Kendall Hunt: Iowa.
- Gallacher, P. (2005) *Everyday Spaces: The potential of neighborhood space*. London, United Kingdom: Thomas Telford.
- Gehl, J. (2011) *Life Between Buildings: Using public space*. Washington, DC: Island Press.
- Gifford, R. (2002) *Environmental psychology: principles and practice*. Optimal Books.
- Golicnik, B. and Marusic, D. (2012) 'Behavioural Maps and GIS in Place Evaluation and Design', *Application of Geographic Information Systems*. doi: 10.5772/47940.
- Goličnik, B. and Ward Thompson, C. (2010) 'Emerging relationships between design and use of urban park spaces', *Landscape and Urban Planning*, 94(1), pp. 38–53. doi: 10.1016/j.landurbplan.2009.07.016.
- Halprin, L. (1979) 'The Collective Perception of Cities', *In Urban Open Spaces*. New York: Cooper- Hewitt Museum and the Smithsonian Institution.
- Hossain, N., Zahir, I. and Apurba, P. (2009) 'Making an Urban Oasis. The Use of Space Syntax in Assessing Dhanmondi Lake Revitalization Project in Dhaka, Bangladesh', *Proceedings of the 7th International Space Syntax Symposium*, 44, pp. 1–7.
- Islam, M., Mahmud, A. and Islam, S. M. D. (2015) 'Open Space Management of Dhaka City , Bangladesh: A Case Study on Parks and Playgrounds', *International Research Journal of Environment Sciences*, 4(12), pp. 118–126.

- Jafrin, M. and Beza, B. (2018) 'Developing an Open Space Standard in a Densely Populated City: A Case Study of Chittagong City', *Infrastructures*, 3(3), p. 40. doi: 10.3390/infrastructures3030040.
- Jakle, J. A., Brunn, S. and Roseman, C. C. (1976) *Human Spatial Behaviour: A Social Geography*. Duxbury Press: Massachusetts.
- Jepson Jr, E. J. (2007) 'Reviews - Land Use, Zoning, Growth Management, and Planning Law-Urban Place: Reconnecting with the Natural World', *Journal of the American Planning Association*, 73(1), p. 121.
- Khan, M. (2014) 'Study of Open Spaces in the Context of Dhaka City for Sustainable Use: A Syntactic Approach', *International Journal of Engineering and Technology*, 6(3), pp. 238–243. doi: 10.7763/ijet.2014.v6.704.
- Kohn, M. (2004) *Brave New Neighborhoods, The Privatization of Public Space*. New York: Routledge.
- Lennard, S. H. C. and Lennard, H. L. (2004) *Principles of True Urbanism*. Available at: <http://www.livablecities.org/articles/principles-true-urbanism?cv=1>.
- Lewin, K. (1951) *Field Theory in Social Science*. Harper & Row: New York.
- Lieshout, M. V. and Aarts, N. (2008) 'Youth and Immigrants' Perspectives on Public Spaces', *Journal of space and culture*, (11(4)), pp. 497–513.
- Lofland, L. H. (1998) *The Public Realm: Exploring the City's Quintessential Social Territory*. Transaction Publishers.
- Lynch, K. (1960) *The Image of the City*.
- Madanipour, A. (2003) *Public and Private Spaces of the City*. London: Routledge.
- McAndrew, F. T. (1993) *Environmental Psychology*. Brooks/Cole: California.
- Mowla, Q. A. (2002) 'Streetscape Design in the densely Populated Urban context - the Case of Dhaka', *The Journal of Asian Studies*, 21, pp. 1–11.
- Mowla, Q. A. (2003) 'Towards a Paradigm of Livable City – the Case of Dhaka', *The Jahangirnagar Review*, XXVII, pp. 43–54.
- Mowla, Q. A. (2006) *Memory Association in Place Making: Understanding an Urban Space, Protibesh*.
- Mowla, Q. A. (2011) 'Urban Aesthetics: A Study on Dhaka', *Asiatic Society Bangladesh Publication*, III, pp. 169–186.
- Nabi, A. S. M. M. (1978) *Study of Open Space in Dhaka City*. University College, London.
- Nasar, J. L. (1998) *The Evaluative Image of the City*. Sage Publications: California.

- Németh, J. and Schmidt, S. (2011) 'The Privatization of Publicness: Modelling and Measuring Publicness', *Environment and Planning B: Planning and Design*, 38(1), pp. 5–23.
- Nilufar, F. (2000) 'Urban life and use of Public Space Study of responsive public open spaces for supporting urban life in Dhaka City', 1999(July), pp. 1–41.
- Pasaogullari, N. and Doratli, N. (2004) 'Measuring accessibility and utilization of public spaces in Famagusta.', *Journal of Cities*, 21(3), pp. 225–232.
- Pomeranz, D. (1980) *Design and Human Behaviour: A Psychology of the Individual in Society*. Pergamon Press: Sydney.
- Punter, J. (1991) 'Participation in the Design of Urban Space', *Landscape Design*, (200), pp. 24–27.
- RAJUK (2016) *Preserving open space for recreation, livability and identity, Dhaka Structure Plan 2016-2035*.
- Rapoport, A. (1977) *Human Aspects of Urban Form*.
- Rapoport, A. (1982) *The meaning of the built environment: a nonverbal communication approach*. Sage Publications.
- Sadeghian, M. M. and Vardanyan, Z. (2013) 'The Benefits of Urban Parks, a Review of Urban Research', *Journal of Novel Applied Sciences*, 08, pp. 231–237.
- Saniya, T. and Sarah, B. S. (2011) *Contextual Inquisition of Green Space in Dense Urban Environment: DCC Parks as Exempla, Jahngirnagar planning review, department of urban and regional planning.*
- Sepe, M. (2013) *Planning and Place in the City: Mapping Place Identity*. USA and Canada: Routledge.
- Sepe, M. and Pitt, M. (2013) 'Improving liveability and attractiveness by preserving place identity in emblematic thoroughfares: A method and a case study', *URBAN DESIGN International*. Macmillan Publishers Ltd., 18(3), pp. 229–249.
- Sepe, M. and Pitt, M. (2014) 'The characters of place in urban design', *Urban Design International*, 9(3), pp. 215–227.
- Shaftoe, H. (2008) *Convivial Urban Spaces*. London: Earthscan.
- Shannon, K. and Nilufar, F. (2008) 'Transforming Urban Landscape; Growing Cities', *Topos: Review of Landscape Architecture and Urban Design*, pp. 77–81.

- Sharmeen, N. and Houston, D. (2019) 'Spatial Characteristics and Activity Space Pattern Analysis of Dhaka City, Bangladesh', *Urban Science*, 3(1), p. 36. doi: 10.3390/urbansci3010036.
- Speller, G. (2006) 'A Place of my Own', *Green Places.*, march(26,), pp. 18-20.
- Staeheli, L. A. and Mitchell, D. (2007) 'Locating the public in research and practice', *Journal of Progress in Human Geography*, 31(6), pp. 792–811.
- Swapan, A. Y. (2013) ' ' Third Place ' -an Urban Regeneration Strategy " Third Place " - an Urban Regeneration Strategy', in. Proceedings of the International Conference on Engineering Research, Innovation and Education 2013.
- Tabassum, S. and Sharmin, F. (2013) 'Accessibility Analysis of Parks at Urban Neighborhood: The Case of Dhaka', *asian journal of applied science and engineering*, 2(2), pp. 48–61.
- Tabassum, S. and Suchana, S. B. (2011) *Contextual Inquisition of Green Space in Dense Urban Environment : DCC Parks as Exemplar*. Dhaka.
- Taylor, J. (1840) *A Sketch of the Topography and Statistics of Dacca*. Calcutta: G.H. Huttman, Military Orphan Press.
- Truong, V. C. (2008) *Sydney City's Public Open Spaces*. University of New South Wales, Australia.
- Varna, G. and Tiesdell, S. (2010) 'Assessing the Publicness of Public Space: The Star Model of Publicness', *Journal of Urban Design*, 15(4), pp. 575–598.
- Veitch, R. and Arkkelin, D. (1995) *Environmental Psychology: An Interdisciplinary Perspective*. Prentice Hall: New Jersey.
- Whyte, W. (1980) 'The Social Life of Small Urban Spaces City : Rediscovering the Center', *Washington Dc. the Conservation Foundation*, VIII(1).
- Whyte, W. H. (2001) *The Social Life of Small Urban Spaces*.
- Winett, R. A. (1987) *Empiricist-Positivist Theories of Environment and Behaviour: New Directions for Multilevel Frameworks*. Plenum Press: New York.
- Wood, P. K. and Gilbert, L. (2005) 'Multiculturalism in Canada: accidental discourse, alternative vision, urban practice', *International journal of urban and regional research*, (29(3)), pp. 679–91.
- Worpole, K. (2007) *The health of the people is the highest law: Public health, public policy and green space*.