Revealing people's patterns of occupation – Mondego park case-study

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Abstract: - Is has been widely proved that better and more adapted public outdoor environments have significant role in affecting people's place attachment and well-being. Urban parks grounded culturally and ecologically, opened to the city and devoted to people's engagement, become exceptional places of freedom, recreation and restoration. Mondego park in Coimbra serves as case study to look at people's patterns of occupation, applying the method of behaviour mapping. How does Mondego park is being used and what are the preferred settings? Findings show that although the use of paths is the most frequent setting to promote physical activity and meeting opportunities, in the five case-studies across Portugal, shady meadows and lawns seem to be very important both to active and sedentary use. On the other hand, and contrasting with northern and central European studies, open clearings appear to be under-occupied, yet considered to be important to maintain prospect capacity. Playgrounds are one of the most used features and proved to enhance social interaction between user groups.

Key-Words: - Urban park, Pattern of occupation, Behaviour mapping

1 Introduction

This paper aims to reveal the patterns of user occupation in the Mondego park, Coimbra, Portugal. It is supported by past results of a post occupancy evaluation (POE) carried out on five parks, developed under a large scale governmental programme, called Polis (2000-2011). The research question is: How does Mondego park is being used and what are the preferred settings?

Looking at patterns of park occupation and use can be seen as means to understand the needs and preferences over a site, regarding its various characteristics and settings. Analyzing such patterns has been more and more a focus of research in the field of landscape architecture, which has delivered data about people's perceptions, behaviour settings, affordances, levels of activity, and so forth.

The notion of pattern of occupation is particularly related to the idea of perception and preference. Perception is the way we keep in contact with our context, through our senses, which then generates attitudes. As Simon Bell [2] puts it, visual perception relates to *"the physical aspects of the reception of visual 'stimuli', the intuitive recognition of an aesthetic quality and the ability of the mind to connect sensory information to other knowledge and so to develop opinions about what has been perceived"* (p.206).

Many psycho-evolutionary theories and studies in the field of environmental psychology have been addressing the issue of landscape preferences and how these influence people's behaviour in the open space. Although many seem to point at an innate predisposition to favour certain environments, generalization might turn not be accurate, when addressing peoples use of outdoor spaces, especially because of the great diversity of climate and cultural variables.
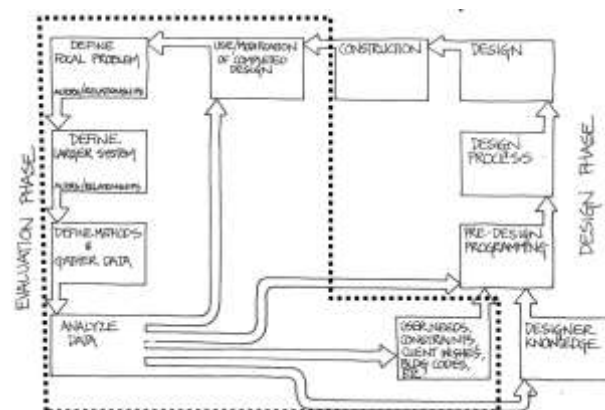

Figure 1 – Design-evaluation cycle adapted from Friedman et al. [8] (p.21). The focus of the POE is the evaluation phase (marked).

The use of a park by people reveals patterns, which result from a complex process at work in a given site. These patterns can be again very useful to find about users preferences and needs and as consequence, to instruct redesign and new design. This process by which research informs design and decision making is the POE.

A post-occupancy evaluation [11][14][17][18] is a multi-method approach to the evaluation of a built environment, consisting in the appreciation of its performance. Clare Cooper Marcus and Carolyn Francis [16] explain it as *"a systematic evaluation of a designed and occupied setting from the perspective of those who use it"* (p. 345). In addition, Augustin and Coleman [1] stressed that *"a well planned POE will collect useful information about the ramifications of design decisions and generate insights for use on future projects"* (p. 257). See for instance Bryant Park, in New York, re-designed in the beginning of the 90's, from a decrepit site, has putted by William H. Whyte [25]:"the territory of dope dealers and smugglers" (p.25). It became, we would assert, a very pleasant park. Whyte, studying people's use of American cities squares [27] and Jan Ghel, in northern Europe [9], where two of the pioneers looking at patterns of occupation with highly practical and design-oriented intentions. Their recommendations were at the time surprisingly comparable. Both used methods of behaviour mapping to instruct their POE.

This approach has been used to evaluate urban open space from different perspectives and focusing a variety of case-studies and issues, such as the use of squares and small urban spaces [10][15][23][27], children's use of green spaces [5][13][14][20], residential proximity parks [3][4][6][20], patterns of use in urban parks [7][11][12][18][19][21], and so forth. The methodology frequently includes methods of observation and behaviour mapping, surveys and interviews.

2 Case-study: Mondego park

Mondego green park, in Coimbra, was design by PROAP and since the final works completion (in 2008) it has developed and going through several adaptations. Nevertheless, the park is still preserving the original design intention of making it very visually and conceptually connected with the river (Figure 3) and with the historical and hilly city (Figure 4).

With over 100 000 residents, Coimbra is known has the historical University city, holding one of the oldest universities in Europe, founded in 1290. Student's life is still today one of the most important social impellers. The city was settled by the Romans, over a hill by the riverbanks. Its centre is quite dense now, and most of its milestones date back to the Middle Age.

Figure 2 - Representation of the present situation of Mondego park, developed by Meireles Rodrigues [19].

Figure 3 – Suspended wooden decks on the right bank margin of the river Mondego. Image credits: Frederico Meireles Rodrigues 2013

With about 20 hectares, he park seats on both sides of the river (which is here quite large). The right bank is more connected with the city center and thus more dynamic. It has a large esplanade with bars and restaurants, a wide open promenade (away from the river) and a very much leveled connection with the waterline (Figure 3). It is though mostly a meadow, covered, now and then, with grids of trees resembling fruit orchards. Close

to the esplanade there is also a children's playground.

Figure 4 – Mondego Park and the city hill scenery, seen from the "Pedro e Inês" walking bridge [22]. Image credits: PROAP.

Figure 5- Picnic site by the River Club buildings, on the left bank of the park. Image credits: Frederico Meireles Rodrigues 2013.

The left bank is a bit more built up. There are some wooden sheds where the sailing club is located and a very large outdoor concert yard, where the academic festivities take place. There are also some specific recreation facilities, such as the outdoor gym, the skate park and the volleyball fields. Closer to the river there's the meadows, still with some inherited trees, and the poplar woods on the pontoon. The pedestrian bridge "Pedro e Inês" links both of the margins.

3 Method

The observations and behaviour mapping were conducted during spring and summer 2011, which is when most of the activity and variety of behaviours are expected. The fieldwork was organized by sets of three observation sessions per four periods of the day (morning, noon, afternoon and evening). This has resulted in 12 sessions and, at least, one round per session, depending on user's frequency and recording speed. In total 27 rounds of 18 to 25 minutes were carried out. The car parking, the pedestrian bridge deck and bars' esplanades were excluded from the observation area. This however is one of the most densely and consistently used areas, although there's less variety of behaviours observed.

The data recording system was originally developed by Meireles Rodrigues [19] and makes use of a multiouch PC Asus T91MT^{TM} in order to operate the geographic information generated in Quantum GIS^{TM} software. The input of data is facilitated by a user interface form, developed in Qt designer^{TM} programming application. The computer allows operating in tablet mode, using a digital writing pen, and has proved to be very expedite and more reliable than the conventional analogical system. Data was analysed making use of the geo-statistical tools of Quantum GIS and the IBM SPSS statistics.

Results focus on gender and age group variants (children, teenagers, young adults, adults and elders), spatial day period distribution, social interaction, levels of physical activity and type of behaviour.

3 Results and discussion

The results reveal a total number o 1779 users mapped (55,3% male). Young adults (n=515) and children (n=415) are the most frequent age groups, and the elders the least (n=104), but teenagers and adults are the most gender unbalanced favouring male users. Male tend to explore more areas of the park and female tend to focus activity around certain settings, such the children's' playgrounds. The teenagers reveal a special distribution, in favour of the river side areas and the eccentric use of the water to swim or playing sports on canoes.

is mostly related to contemplation, looking after children, and socializing. Whether active or sedentary, about one third of the users were talking (n=632) and the most common activity amongst these is walking (n=191).

Table 2 - Frequencies of the type of behaviour observed in the park [19]. The users under the variable 'none of the above' did not reveal any specific behaviour, apart from the type of level of activity already listed on table 1.

	Responses		Percent of Cases
	N	Percent	
A5 Watching	397	21,0%	23,2%
A5 Talking	632	33,5%	36,9%
A5 Singing/playing music	10	0,5%	0,6%
A5 Eating	99	5,2%	5,8%
A5 None of the above	542	28,7%	31,6%
A5 Sleeping	2	0,1%	0,1%
A5 Fishing	65	3,4%	3,8%
A5 Reading/studying	26	1,4%	1,5%
A5 Kissing/dating	113	6,0%	6,6%
	1886	100,0%	110,1%

Figure 6 – Map of the general pattern of occupation (n=1779) revealing that the areas that show higher concentration of use are the playgrounds (a, b), the outdoor gym (c), the shady meadow (d), the river side on the right bank (f) and the pontoon on the left bank (e) [19].

Table 1 - Table of frequencies of the levels of physical activity observed in the park [19].

	Responses		Percent of Cases
	N	Percent	
A6 Laying down	42	2,4%	2,4%
A6 Sitting	387	21,8%	21,8%
A6 Standing	359	20,2%	20,2%
A6 Walking	516	29,0%	29,0%
A6 Working	31	1,7%	1,7%
A6 Running	54	3,0%	3,0%
A6 Cycling	139	7,8%	7,8%
A6 Playing sports with ball	68	3,8%	3,8%
A6 Playing other sports	173	9,7%	9,7%
A6 Other			
A6 Gymnastics/TaiChi/Yoga	9	0,5%	0,5%
	1778	100,0%	100,1%

Figure 7 – Map of the active use of the park (n=958), signing the 'players' with a star (n=241).

Findings also show that although the use of paths is one of the most frequent setting which promotes physical activity and meeting opportunities, shady meadows seem to be very important, both to active and sedentary use (Figure 6). Nevertheless, the total frequency of users involved in any type of physical activity is 53,8% (Table 1), while the sedentary use

Playgrounds are one of the most used features and proved to enhance social interaction between user groups. The variable 'playing other sports' (see

Table 1), includes children's recreation in the playgrounds. Playing (Figure 7) also take in sports with a ball and in the water. Overall, the revealed patterns of active an sedentary have in common the clusters of the playground areas and shady meadows; wile diverging on the use of paths (active) and river margins (sedentary).

The most contrasting pattern with other behavior mapping results carried out in northern and central European countries [11][12] and in the US [21] is the use of open clearings. In this case it appears to be under-occupied, yet considered to be important to maintain prospect aptitude. These was also proved to be accurate in other urban park case studies in Portugal [18][19].

Figure 8 - Map of the users in a group (blue, n=844) and the users alone (red, n=307).

Figure 8 reveals a disperse pattern of occupation differentiating the alone users. These users do not form clustes but it is possible to relate their occupation with paths (to walk, run and ride a bicycle) and river margins (to contemplate). The group uses (families, groups of friends and children's camps) follow the general pattern o occupation clusters.

Table 3 - Table of frequencies of the type of social interaction mapped in the park.

	Responses		Percent of Cases
	N	Percent	
A3 Alone	307	16,9%	17,3%
A4 With pet	19	1,0%	1,1%
A4 With baby	38	2,1%	2,1%
A4 On mobile	14	0,8%	0,8%
A4 With another person	593	32,7%	33,5%
A4 In a small group	612	33,7%	34,5%
A4 In a big group	232	12,8%	13,1%
A4 None of the above	1	0,1%	0,1%
	1816	100,0%	102,5%

Findings reveal that the majority of park use is also motivated by some sort of social interaction. Related research, based in interviews, that was carried out in Portuguese parks [19] supports this fact.

4 Conclusion

Sparse woods, partially covering the clearing meadows, seem to be the best layout in order to maximize multifunctionality and recreation in the hot summer southern European parks. This model contrasts with the sharper edged open meadows, which seem to benefit users' needs in northern and central European parks.

Whether aligned with the city form or going after nature as inspiration, functionally homogeneous or individually inclusive, the park should perhaps be multinational, and grounded in local realities. It is supposed to be a place of freedom, recreation and restoration, cultural and ecological oriented, open to the city and to everyone.

References:
[1] Augustin, S. & Coleman, C., *The Designer's Guide to Doing Research: Applying Knowledge to Inform Design,* John Wiley & Sons, 2012.
[2] Bell, S, Landscape pattern, perception and visualisation in the visual management of forests. *Landscape and Urban Planning,* 54(1–4), 2001, pp.201–211.
[3] Cooper, C. C., *Easter Hill Village: Some social implications of design*, Free Press, 1975
[4] Cooper Marcus, C., Miller Watsky, C., Insley, E., & Francis, C., Neighborhood parks. In *People Places: Design Guidlines for Urban Open Space* (ed. Clare Cooper Marcus e Carolyn Francis.*), Wiley, 1998.*
[5] *Cosco, N. G., Motivation to Move: Physical Activity Affordances in Preschool Play Areas,* PhD Thesis, Edinburgh College of Art, 2006.

[6] Francis, M., Cashdan, L., & Paxson, L., *Community Open Spaces: Greening Neighborhoods Through Community Action and Land Conservation*, Island Press, 1984.

[7] Francis, M., *Some Different Meanings Attached to a City Park and Community Gardens,* Landscape Journal, 6(2), 101–112, 1987.

[8] Friedmann, A., Zimring, C., & Zube, E. H., *Environmental design evaluation,* Plenum Press, 1978.

[9] Gehl, J., *Life between buildings: Using Public Space*, Nova Iorque: Van Nostrand Reinhold, 1987.

[10] Gehl, J., *Life Between Buildings: Using Public Space,* Island Press, 2008.

[11] Goličnik, B., *People in place: a configuration of physical form and the dynamic patterns of spatial occupancy in urban open public space,* PhD Thesis, Edinburgh College of Art, 2005.

[12] Goličnik, B. & Ward Thompson, C., Emerging relationships between design and use of urban park spaces, *Landscape and Urban Planning*, 94(1), 2010, pp.38–53.

[13] Hussein, H., The Influence of Sensory Gardens on the Behaviour of Children with Special Educational Needs. *Procedia - Social and Behavioral Science*s, 38, 343–354, 2012.

[14] Hussein, H., Affordances of Sensory Garden towards Learning and Self Development of Special Schooled Children. *International Journal of Psychological Studies*, 4(1), 135–149, 2012.

[15] Joardar, S. D., & Neill, J. W., The subtle differences in configuration of small public spaces. *Landscape architecture*, 68(11), 487–491, 1978.

[16] Marcus, C. C., & Francis, C. (Eds), *People Places: Design Guidlines for Urban Open Space*, 2nd Edition (2nd ed). Wiley, 1997.

[17] Marcus, C. C., & Francis, C., *Post-Occupancy Evaluation*, In People Places: Design Guidlines for Urban Open Space (2nd Edition.). Wiley, 1997.

[18] Meireles Rodrigues, F., Farinha Marques, P., Bell, S. & Silveirinha de Oliveira, E., Perceived use of gren urban parks: users' assessment of five case studies, *Specifics – Discussing Landscape Architecture*, ECLAS Congress 2014 Proceedings, pp. 446-451.

[19] Meireles Rodrigues, F., *Da especificidade do parque português contemporâneo*, PhD thesis University of Porto, 2015.

[20] Moore, R. C., & Cosco, N. G., *Using behaviour mapping to investigate healthy outdoor environments for children and families: conceptual framework, procedures and applications*. In Innovetive approaches to Researching Landscape and Health (ed. Catharine Ward Thompson, Peter Aspinall & Simon Bell.), Routledge, 2010.

[21] Nager, A. R., & Wentworth, W. R., *Urban park evaluation*. In Environmental design evaluation (ed. Friedman, A., Zimring, C. and Zube, E., pp pp.155–165), Plenum Press, 1978.

[22] PROAP, Green Park of Mondego – south bank, *PROAP landscape architecture*, website available at http://www.proap.pt/project/green-park-of-mondego-south-bank-1/

[23] Rutledge, A. J., *A pilot study in post construction evaluation : First National Bank Plaza, Chicago, Illinois*, University of Illinois at Urbana-Champaign. Dept. of Landscape Architecture, 1975.

[24] Sommer, R., *Social Design: Creating Building with People in Mind,* Prentice-Hall, 1983.

[25] Tate, A., *Great City Parks*, Taylor & Francis, 2001

[26] Ward Thompson, C., Experience of landscape: understanding responses to landscape design and exploring demands for the future. PhD Thesis, Edinburgh College of Art, 2010.

[27] Whyte, W.H., *The Social Life of Small Urban Spaces*, Conservation Foundation, 1980.