

# Measuring and Programming the Urban Square - A Project-based Learning Experiment in Landscape Architecture

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*Abstract:* In this paper, the authors reveal the results of a post-occupancy evaluation process, conducted during the course of a project-based learning as part of a landscape architecture bachelor design studio. It is the result of a collaborative design process, applied to the redevelopment of an urban square in Portugal and implemented in a landscape architecture design studio course and through a project-based learning process, which engaged students, decision-makers and a diversity of other stakeholders. The methodology was designed in order to understand the existing pattern of occupancy and people's level of public satisfaction, needs and preferences, and to educate students on the negotiation practices and on the impact of people's feedback over the design options. This work results on the proposal of a specific methodology for a semester project considering teaching and assessment, from the initial call/problem, through process development, to final product delivery, which in this particular case has ended at the Design Programme level, defining a zoning plan, as well as the general and specific objectives to be considered in the redesign project. In conclusion, one may say that the used methodology is appropriate to achieve the objectives inherent to this type of landscape architecture project, strengthening the quality of the project.

*Key-Words:* project-based learning, post-occupancy evaluation, urban square, teaching, landscape architecture

## 1 Introduction

Learning landscape design is recurrently the exercise of an ideal response to a given problem. It often results in unrealistic products, unlikely to be executed. Nonetheless, approaches such as project-based learning (PBL) (Fig. 1), if motivated by real life challenges, may provide practicable designs and, in addition, be motors of creativity and motivation [13], [4] engaging students in the learning of a professional practice [9].

As well as in professional practice, the PBL process in landscape design teaching, usually starts from (1) a call or a contract from a given client, which sets the designer to follow (2) critical knowledge about the site to be designed, developing research and analysis, collaborating with the client and the stakeholders, and directing his acts towards learning

more about the object and primary objectives of its design – (3) the design programme. Then the designer (4) develops more concrete ideas and concepts, and looks for the resolution of problems and questions throughout a creative and critic process. This is often a trial and error phase, with advances and setbacks.

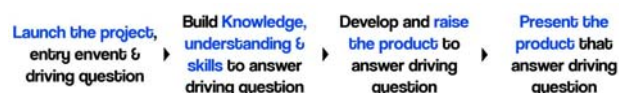


Fig. 1 - Rationale of the PBL process, adapted from Buck Institute for Education (BIE).

Part of the critical knowledge (see 3, above), may be the assessment of the existing situation of the site, whether if considering its physical and ecological factors, or the way people occupy and

behave onsite, i.e., understanding a pattern of occupation.

This paper aims to reveal the general pattern of occupation of the *Adelino Amaro da Costa Square* (AAC Square), by means of a Post-occupancy evaluation (POE) conducted by landscape architecture bachelor students, attending a landscape design course unit of the 3<sup>rd</sup> year. The POE was carried out during the academic year of 2015/2016.

Whether related with the social use of an urban place, or to a broader ecological process, a pattern is the “*visual manifestation of the processes at work in a landscape*” [3] p.204. Its understanding is rather valuable because it “*describes a problem which occurs over and over again in our environment and then describes the core of the solution to that problem*”, as Christopher Alexandre [1] puts it. So, patterns of occupation can be seen as a way through the understanding of user’s needs and preferences over a site.

Very recently the Gehl Institute [6] has published the “*Mayor’s Guide to Public Life*” in which the apology of measuring what people do and want of their open space is seen as the way to start vibrant public life. Yet, already back in 1974 the American Society of Landscape Architects already had raised the need to further develop the evaluation of urban open spaces, which would be of good source to greatly improve both professional practice and teaching in landscape architecture. William H. Whyte [14], back in the 70’s and 80’s, was a pioneer of the systematic outdoor spaces observations and proper measuring of people’s needs and preferences and generating evaluation reports. His POE led to the requalification of many urban squares.

A POE may be the means through which a pattern of occupation can be synthesized. It is a multi-method approach to the evaluation of any built environment, traditionally making use of observation, behaviour mapping, surveys and interviews, along with others [11]. It provides valuable data on “*Who is using the site? Where do they tend to gravitate? What are they primarily doing? (...) Who is doing what, where, and with whom?*” [5] p.347, but also on people’s future expectations, needs and preferences, that are useful for “*the ramifications of design decisions and generate insights for use on future projects*” [2] p. 257.

## 2 Case-study: AAC Square

The AAC Square is located in the city of Vila Real, in the Douro Region, Portugal. The square is part of the Francisco Sá Carneiro District of the city (Fig. 2),

known as Araucaria Neighbourhood. This was built during the 1980’s for social housing purposes. The total district area counts 52 housing buildings, summing 451 apartments and 1118 residents organized in 434 families, according to the Census [8]. There are also two commercial buildings and some public equipment and services, such as the Primary School campus.



Fig. 2 – AAC square (red), with the commercial building in the center (yellow) and close to the primary school campus (green).

A technical study [7] promoted by the Municipality of Vila Real considers the neighbourhood in need of priority intervention, so it has been listed as part of the Urban Rehabilitation Programme (URP). The URP follows a strategy of systematic rehabilitation of the buildings, structures, public equipment, green spaces and other urban spaces of public use, with an umbrella goal of requalifying and revitalising the urban fabric.

A 2010 assessment survey [7] points to a generalized satisfaction of the residents towards their neighbourhood, especially indicating appreciation of the own apartment as well as the convenient location of the district. However, the same report calls attention to the need of improving the quality of the open space in an organized way, justified by the fact that many past interventions were “*casuistic and isolated*” p.9. There is also a lack of overall planning of uses along the district, which is proved by the self-allocation habits such as the clothes lines, some sorts of urban gardening, and the invasive parking lots. The lack of children playgrounds was also noted.

In terms of building morphology, the neighbourhood is rather homogeneous, as the housing buildings are four floors and two entrances, summing eight single family apartments in each. These are organized in twenty formal clusters, usually grouped around a square, a piece of public equipment or a main path/road. The open space is relatively occupied, and it provides close and basic needs of access to goods, transports, recreation, stay and other services.

The URP clearly states three specific objectives of its intervention at the *Araucaria* Neighbourhood, addressing three targets: (1) the buildings, (2) the economic activities, and (3) the public open space. The first (1) aims to improve quality and dignity of the existing buildings, envisioning the adaptation to new patterns of comfort living; the second (2) is focused in cheering up and energising the neighbourhood; and the third (3) in making it a place full of life to live well and socialize. The AAC Square is one of the focus of this programme, aiming the site restructuration in order to follow up with that last premise (3). Also under the third auspice, the URP report proposes that a new design should be developed, paying attention to the renewal of the infrastructures and pavements, incorporating new equipment targeting different age groups, the provision of street furniture and a proper tree cover.



Fig. 3 – Existing situation: (top-left) north entrance; (top-right) view to the commercial 1 floor building; (bottom-left) clotheslines; (bottom-right) southwest entrance.

### 3 Methodology

The teaching process starts from a proposition under the terms of the URP Report and supported by the Municipality Executive Office. The first part of the process took the students to learn more about the site but also about methods of research and design to specifically address the AAC square case. It is an approach that mixes teaching, research and field practice.



Fig. 4 – Workshop on public participation case-studies.

Firstly students were familiarized with particularities and concepts such as the public

participation concept applied to landscape design projects: several lectures and a six hour intensive workshop were settled. The teacher’s lectures orchestrated a perspective about the public participation, followed by the workshop on which the students searched, self-selected and developed factsheets about landscape design implemented projects (Fig. 4).

A second intensive six hours workshop was settled in order to select the methods to be integrated in the design procedure. A list of constrains to the selection of methods was analysed. It included the current state of the site, the research and preliminary design objectives, the time and resources available, the target population, the typology of data to collect and the dependent methods of data analysis.

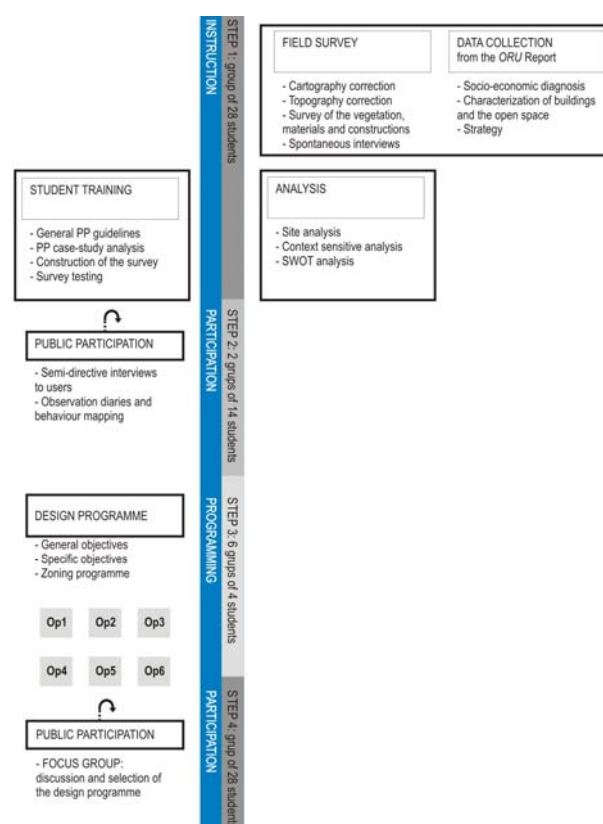


Fig. 5 – Methodology used.

Figure 5 illustrates the comprehensive methodological design to which students and teachers came out after the workshop sessions.

A POE based on several site surveys and analysis, documentary analysis, behaviour observation and mapping, as well as onsite interviews to users was considered to be the best starting point to create a well-supported landscape design programme. Followed by a scrutinizing focus group session, with the local community and ending with the final presentation of a variety of Master Plans.

## 2.1 Observation and Behaviour Mapping

The observation of the site use and behaviour mapping were conducted during September and October 2015. 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 one round of 18 to 25 minutes per session of observation carried out on-site by a group of students.

The data recording system, originally developed by Meireles Rodrigues [10], using a multiouch PC Asus T91MTTM in order to operate the geographic information generated in QuantumGIS 1.7 software, was adapted to an analogic field record of data with the use of a clipboard and a key code for the gender and age variants, spatial day period distribution, levels of activity, observed behaviour and social interaction.

Data was then transcript and analysed making use of the geo-statistical tools of QuantumGIS 2.0 and the IGB SPSS statistics. The collection of data was realized by the students after a workshop on how to perform on-site behavioural observation and mapping.

## 2.2 Onsite Interviews

Following the behavior mapping, the on-site interviews were conducted in October 2015, during four periods of the day (morning, noon, afternoon and evening). Information on climate conditions, period of the day, demographics of the interviewee, frequency of visit and distance to home was collected using a closed questions. Three open ended questions were also asked to comprehend reasons to visit the site, preferred aspects, weaknesses and proposed changes. Interviews were conducted by the students after an intensive course on face-to-face enquiring method.

## 2.3 Focus-group

The focus-group was hosted in the design studio at the University. 10 members of the local community where invited and have participated: three of them were representing their businesses, another three were representing either the Primary School, the cultural, or the sports associations (two of those are also living at this neighbourhood), the other four inhabitants live close by the square.

The session was divided in four parts. The first part consisted in a (1) short ten minutes presentation, led by the professors, of the objectives, area of study and methodology of the landscape architecture studio. The urban context of the square

as well as the urban regeneration strategy were explained. The results of the observation and interviewing processes were also presented to the participants. The second part was conducted by the students and comprised the (2) presentation of the design programmes developed by each of the six groups, taking five minutes per group. Every spokesman of the group was asked to present their general objectives, specific objectives and zoning program. The third part, moderated by the professors, was the (3) discussion round, opened to the focus-group participants, who were able to reply to each of the groups. The fourth part was the (4) exhibition and assessment of the design programmes. Exhibition of six posters was made available to the participants who were asked to pin six post-it to the most preferred programme, as well as to place comments and suggestions by the poster.

## 3 Results and Discussion

The behaviour mapping has returned 438 individuals mapped, 55,0% of which are male (n=241). Concerning the age group distribution, the most observed group was the Adults (55,7%, n=244) followed by the Elders (17,4%, n=76) and the Children (16,0%, n=70). The Teenagers was the least frequent observed individuals (4,3%, n=19).

In what relates to the social status, most of the mapped individuals were with another person (38,4%, n=168), or in a group of three or more people (26,5, n=116). Nevertheless, 148 users (33,8%) were alone, and six were mapped using the mobile phone. Being engaged in some sort of social interaction represents a total of 72,2% of the total observed.

Regarding the level of activity, Walking was by far the most recorded situation. More than half of the users were walking along the square (55,7%, n=244), followed by the Standing (15,5%, n=68) and the Sitting (15,5%, n=68). The individuals mapped do not seem to engage in very intensive activities at square (table 1).

Table 1 - Frequencies of the level of activity mapped at the Square

	Freq.	Percent.
<i>Laydown</i>	1	0,2%
<i>Sitting</i>	68	15,5%
<i>Standing</i>	68	15,5%
<i>Walking</i>	244	55,7%
<i>Running</i>	8	1,8%
<i>Biking</i>	7	1,6%
<i>Playing</i>	8	1,8%
<i>Playing with ball</i>	15	3,4%
<i>None of the above</i>	19	4,3%

<i>Total</i>	438	100,0%
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Considering the total number of cases for the Type of Behaviour mapped (table 2), the most observed was Talking (41,3%, n=180), apart from None of the above (42,8%, n=194). This are individuals who are engaged in some sort of activity shown in Table 1, with no other secondary behavior observed. Playing (8,2%, n=37) and Watching (4,4%, n=20) are also quite relevant, above twenty users mapped.

Table 2 – Frequencies of the type of behaviour mapped at the Square

	Freq.	Percent.	Percent. of cases
<i>Watching</i>	20	4,4%	4,6%
<i>Talking</i>	180	39,7%	41,3%
<i>Playing</i>	37	8,2%	8,5%
<i>Listening/Playing to music</i>	2	0,4%	0,5%
<i>Eating</i>	11	2,4%	2,5%
<i>Kissing/Dating</i>	2	0,4%	0,5%
<i>Reading/Studying</i>	1	0,2%	0,2%
<i>Walking the dog</i>	6	1,3%	1,4%
<i>None of the above</i>	194	42,8%	44,5%
<i>Total</i>	453	100,0%	103,9%

The overall pattern of occupation shows a higher frequency of use: (1) close to the entrance of the coffee shop, (2) on the way to the school and (3) by the building’s entrances. The most used routes are the southwest-northeast crossings, although there is also a very significant use of the northwest-southeast way through the commercial esplanade.



Fig. 5 – General Map of Behaviour, revealing the overall distribution of people and the tracking of passersby.

The on-site survey has delivered 60 interviewees, who are either residents in the neighbourhood, or frequent users. In fact, 83,3% of the respondents (n=50) are daily users of the square and only one has claimed to rarely use it. When asked how far, on foot, is their resident to the AAC square, 68,3% (n=41) of

the users have responded that they live by the site, and only 6 live more than ten minutes away on foot.

The interviewing process was implemented after the observations and behaviour mapping, in order that the gender and the age-group balances could be used to determine the quota samplings of the interviews. 60% of the respondents are Male (n=36) and regarding the age group balance, 53,3% are Adult (n=32) and the following most interviewed group is the Elders (16,7%, n=10) and the Children (16,7%, n=10).

Looking at the number of cases, the most preeminent reasons to visit the site is the fact the respondent live by the place (31,7%, n=19) and the use of the place as passer-by, usually heading to the school (30,0%, n=18). Also significant is the look for social interaction (25%, n=15) and the use of the commercial zone (23,3%, n=14). This results also reveal that recreation is not a very frequent answer to the reason to get outdoors (n=7).

In what concerns what people like the most about the AAC square (table 3), 36,7% of the cases has mentioned the fact that it is a green space (n=22). Also rather frequent are the answers regarding the commercial zone (2,0%, n=12) and the opportunities for social interaction (13,3%, n=8). In 15,0% (n=9) of the cases the interviewees have denoted that they dislike the place.

Table 3 – Results of the question “What is that you like the most about the Square?”

	Freq.	Percent.	Percent. of cases
<i>The green space</i>	22	30,6%	36,7%
<i>The commercial zone</i>	12	16,7%	20,0%
<i>I don't like this place</i>	9	12,5%	15,0%
<i>Social interaction</i>	8	11,1%	13,3%
<i>It's quiet</i>	3	4,2%	5,0%
<i>It has a clothes-line</i>	3	4,2%	5,0%
<i>The ease of access</i>	2	2,8%	3,3%
<i>The recreation opportunities</i>	2	2,8%	3,3%
<i>Other</i>	5	6,9%	8,3%
<i>I don't know</i>	6	8,3%	10,0%
<i>Total</i>	72	100,0%	120,0%

When asked about what would they change about the place (Table 4), respondents were quite specific pointing the need to do playground for children (46,6%, n=27) and to create new places for staying and for leisure (20,7%, n=12). One of the top answers reveals the concert with the design of the space, suggesting the overall improvement of the quality of the site (46,6%, n=27).

Table 4 – Results of the question “What would you suggest to be changed at the Square?”

	Freq.	Percent.	Percent. of cases
<i>Make a playground</i>	27	30,7%	46,6%
<i>Improving the quality of the space</i>	27	30,7%	46,6%
<i>Create stay and leisure opportunities</i>	12	13,6%	20,7%
<i>Diversify the commerce</i>	5	5,7%	8,6%
<i>More tree shade</i>	2	2,3%	3,4%
<i>More recreation places</i>	2	2,3%	3,4%
<i>More car-parking lots</i>	2	2,3%	3,4%
<i>Other</i>	7	8,0%	12,1%
<i>I don't know</i>	4	4,5%	6,9%
<b>Total</b>	<b>88</b>	<b>100,0%</b>	<b>151,7%</b>

Regarding the focus-group results, as mentioned in sub-chapter 2.3, six design programmes were orally presented by the students to the focus-group, providing the general objectives and the specific objectives considered by the group. A zoning drawing, placing all the amenities and facilities, along with the specification of the objectives, was also shown to the participants, who were then able to analyze each group work by looking at the poster exhibition. The groups design proposals is synthesized in table 5, below.

The design programme belonging to group 1 was elected by the focus-group participants and 11 comment/suggestion papers were collected to add to the previous session of discussion. A similar exercise, to the one that led to the assessment of the design programmes by the focus-group, was conducted with the six groups of students. Each of the groups had to agree on assessing their colleagues’

design programme by attributing 1 to 5 points and providing a short explanation for their higher score. The division of scores was quite balanced, yet group 2 was elected as the best for its aesthetic quality and overall organization of spaces.

The results of the POE and of the focus-group, as well as the group-works’ cross-evaluation were then used to develop the final design programme: The general objectives considered were the overall qualification of buildings; the improvement of outdoor space and the enhancement of green presence; the creation of a new energy centre in the neighbourhood; the improvement of accessibility. Specific objectives are described in Figure 6.



Fig. 6 – Final Design Programme specific objectives: (1) requalification of the clotheslines area, creating a green open meadows for multifunctional recreation, along with the clotheslines; (2) improving the green presence in the paved area and improve microclimate comfort; (3) requalification of the esplanade, adjusting the design to people’s stay and business

Table 5 - Synthesis of the design programmes

Group	General objective	Specific objectives/Zoning
<i>Group 1</i>	Recreation and leisure and enhancement of green presence.	Large multifunctional recreation open space; Playgrounds; Stray area and esplanade; Small allotment garden; Greening of the walking routes; improvement of accessibility by increasing the quality of paving.
<i>Group 2</i>	Qualification of buildings, living together in better green spaces and energizing the neighbourhood.	Eliminating the architectural barriers, improving accessibility; Playgrounds; Greening the sloppy edges to lower maintenance costs; Esplanade; Enhance green presence to increase stay comfort; Standardize the flower beds along the entrances.
<i>Group 3</i>	Energizing the square and better integrate it the whole neighbourhood. Care for people’s needs and preferences.	Playground with seating spots and vegetation hedges; Paved multifunctional open space for recreation; Esplanade; Large passive recreation and leisure wood with seating opportunities; Reduction of the clothes-line zone; Establishing an clear hierarchy of pathways.
<i>Group 4</i>	Requalification of the collective space and improvement of the ecologic, social and aesthetic values.	Standardize the flower beds along the entrances; Appealing stay area, close to the entrance of the square; Paved multifunctional open space for recreation and pedagogical actions; Esplanade; Playground with seating spots and vegetation; Urban allotment garden.
<i>Group 5</i>	Energizing the square and make it accessible to all.	Overall greening; Requalification of the walkways and the stay areas; Redesign of the square to increase its use; Improving accessibility to all; New recreation sites, such as the playground and the multifunctional plaza; Urban allotment garden.
<i>Group 6</i>	Overall requalification of the public and green spaces; Improving the ecologic and the aesthetic values; Energizing and improving quality of life; Better environmental quality and energy efficiency.	Making the place comfortable along all seasons, by better maintaining it; Targeting different age groups’ active and passive recreation needs; Adequate the equipment and street furniture; Improving paving and making the space accessible to all; Leisure places to get together; Considering the clothes-line zone, an allotment garden, a pic-nic area and proper reception plazas.

needs; (4) Design of a playground, improving access for all; and (5) Improving access and accommodate informal sports use.

## 4 Conclusion

This study is an example on how interests from teaching, learning, executive decision-making, and local people can be brought together to a landscape design studio and be performed by students as a professional practice contract. This process brings students in contact with the open space and its users, connecting with the actual occupation of the site. The awareness of the design solutions and implications is thus integrated in the teaching process and results on an important value in teaching.

The actual results of the POE are seen as a secondary target of these conclusions, given the greater outcomes for learning methods and teaching methodology applied to landscape design. Nevertheless, the results from behavior mapping, the interviews and the focus-group session, as well as the other methods used to search, analyze, and synthesize information were considered to be robust and allowed a very comprehensive and feasible Design Programme Proposal.

Also from the student's perspective, the POE becomes a research product, which appears to be fundamental to the design product itself. Research was seen to be very valuable as means to collect and analyze empiric data on how a place works and is foreseen by its users. The involvement of students in this process results on a comprehensive post-occupancy evaluation (POE) which delivers a significant body of knowledge able, whether to validate the need to the intervention, or to inform the design programming.

In landscape architecture, the design process is a persistent circular effort, which relies on availability of data and intelligence about a given site and on the designer's decisions, in the sense that, as [12] puts it, designing uses creativity to respond to conditions, in order to concentrate meaning. Understanding the relationship process-product is therefore an important attainment.

Moreover, from a teaching point of view, the fact that students and tutors are involved in the design of the research, is able to return new project-based teaching methodology, which overcomes standard academic studio approaches. The innovative character of the teaching studio is also regarded on the fact that the academy joins with public and decision-makers' needs, which reminds the landscape architectural professional practice approach.

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