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**HOW WOULD TOURISTS USE GREEN SPACES?  
CASE STUDIES IN LISBON  
PROJECT CYBERPARKS – COST TU 1306  
November 2014**

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CASE STUDY REPORT 1 – This report is part of the Project CyberParks.



*CyberParks – Fostering knowledge about the relationship between Information and Communication Technologies and Public Spaces supported by strategies to improve their use and attractiveness.*

COST Action TU 1306

[http://www.cost.eu/COST\\_Actions/tud/Actions/TU1306](http://www.cost.eu/COST_Actions/tud/Actions/TU1306)

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Executive Summary

This report provides in a relative condensed format the results of small-scale study undertaken in Lisbon during the Meeting of the CyberParks Project ([www.cost.eu/COST\\_Actions/tud/Actions/TU1306](http://www.cost.eu/COST_Actions/tud/Actions/TU1306)). CyberParks is a COST Action coordinated by the Universidade Lusófona at the CeIED - Interdisciplinary Research Centre for Education and Development. The Project aims at creating a research platform on the relationship between Information and Communication Technologies (ICT) and the production of public open spaces, and their relevance to sustainable urban development. The impacts of this relationship are being explored from social, ecological, urban design and technological perspectives.

Based on the supposition that the participants of the Meeting are tourists visiting Lisbon, a survey was carried out on the topic how people actually use and how they would use public spaces. This survey is also the first approach to the case study areas chosen in Lisbon: *Parque Quinta das Conchas* and *Jardim da Estrela*. Both green spaces will be subject of further studies in the forthcoming years.

This study employed (1) a questionnaire for measuring the user's experience and preferences, and (2) two different tracking devices that utilise GNSS (Global Navigation Satellite Systems), in our case the GPS for satellite positioning technologies. It also presents the results of a study on the relevance of wi-fi in Lisbon's public spaces. Even considering that the surveys in Lisbon's green spaces are a first exercise within the work programme of CyberParks they show important outcomes. On the one hand, regarding the technologies used and their potential for research and on the other hand the findings about Lisbon's green spaces. It should be noted that the conducted surveys and the gathered data are statistically not representative, but can be characterised as an empirical case and as a showcase, as how tourists tend to use a green space. The results shows that surveys benefit from multiple research methods and from combining insights.

Keywords: Use of public spaces, GPS, tracking users, green spaces in Lisbon, CyberParks Project.

### Resumo

Este relatório apresenta, em formato condensado, os resultados de um estudo de pequena escala realizado em Lisboa durante o Seminário do Projeto CyberParks. CyberParks é uma Ação COST coordenada pela Universidade Lusófona/CeiED - Centro de Estudos Interdisciplinares em Educação e Desenvolvimento. O projeto visa a criação de uma plataforma de debate sobre a relação entre as Tecnologias de Informação e Comunicação (TIC) e a produção de espaços públicos, e da sua relevância para o desenvolvimento urbano sustentável. Os impactos dessa relação estão a ser explorados a partir de perspetivas sociais, ecológicas, tecnológicas e de desenho urbano.

Na sua etapa exploratória, este estudo assenta na suposição de que os participantes do Seminário são turistas de visita a Lisboa. A partir dos dados recolhidos pelos investigadores envolvidos na ação COST, foi realizada uma análise à forma como diferentes indivíduos usam, e como poderão usar, diferentes espaços públicos verdes. Este estudo apresenta, portanto, a primeira abordagem às áreas de estudos selecionadas em Lisboa. São elas o *Parque Quinta das Conchas* e o *Jardim da Estrela*. Ambos os espaços verdes serão objeto de novos estudos nos próximos anos. Neste primeiro estudo exploratório foram empregues: (1) um questionário, para aferir a experiência de um potencial utilizador e as suas preferências, e (2) dois dispositivos diferentes de rastreamento que utilizam tecnologia GNSS (Sistemas de Navegação Global por Satélite) e, no nosso caso, o GPS para as tecnologias de posicionamento por satélite. Ele também apresenta os resultados de um estudo realizado sobre a relevância do wi-fi em espaços públicos na cidade de Lisboa.

Mesmo considerando que os estudos realizados nos espaços verdes representam um primeiro exercício no âmbito do programa de trabalho do CyberParks em Lisboa, são aqui revelados resultados importantes. Por um lado, o recurso às tecnologias utilizadas e seu potencial para a investigação e, por outro lado, os resultados sobre a vivência dos espaços verdes. Deve-se notar que os dados recolhidos não são estatisticamente representativos, mas evidenciam um caso empírico de como turistas tendem a usar um espaço verde urbano. A combinação do questionário com novos métodos digitais resultou num grande ganho de conhecimento, recobrando as áreas de estudo sob a perspetiva de um turista, para além de maiores informações sobre as potencialidades e limites da tecnologia digital como ferramenta de investigação. Os resultados mostram que a investigação no campo social pode se beneficiar da combinação de vários métodos e técnicas.

Palavras-chave: Uso de espaços públicos, GPS, monitorização de usuários, Projeto CyberParks

### 1. Introduction – The Case Study Areas in Lisbon and the Lisbon Meeting

In Lisbon, the CyberParks Project participants had the first opportunity to meet and work out contents, as it was its first working groups meeting. The meeting took place from June 25<sup>th</sup> to 27<sup>th</sup>, 2014 at the Universidade Lusófona in Lisbon. In Lisbon CyberParks, hold three the three meetings (A) Management committee, (B) Working Groups, (C) Executive Board. Relevant for the Case Study Lisbon was the Working Group Meeting, especially the day 2, when the participants had the opportunity to visit some of the city's green spaces and more specifically the two case areas chosen as study cases: *Parque Quinta das Conchas* and *Jardim da Estrela*. The meeting also provided an opportunity to carry out a small-scale study on the topic enhancing the knowledge how people actually use and how they would use public spaces, using the meeting participants as samples. Than we consider important to understand the local context of green spaces and to understand and develop local evidence for different areas. This study employed two different tracking devices that utilise GNSS (Global Navigation Satellite Systems), in our case the GPS for satellite positioning technologies. It provided also the first approach to the case study areas in Lisbon. Both green spaces will be subject of further studies to be undertaken within the CyberParks' Project in the forthcoming years.

This report presents findings from this small-scale study on the supposition that the participants of the CyberParks Meeting are tourists visiting Lisbon, and discusses the relevance of the outcomes. In order to get an overview of the city's open and green space structure and specifically the relevance of wi-fi in public spaces a study was undertaken by the PhD Students of Urban Planning at the Universidade Lusófona.

### 2. Mapping Wi-Fi in Lisbon – An overview of wireless internet services in public spaces

*Authors Carlos Pita Rua, Ricardo Malhão, Tiago Duarte, Tiago Queiroz (PhD candidates of ULHT)*

*Coordination Carlos Smaniotto Costa*

#### 2.1 Objectives

This work presents the results of study undertaken in a short-term on providing an overview of the current free wi-fi provision in public spaces in Lisbon. Among the different public open spaces, the following four have been chosen:

- *praça* (square);
- *largo* (small squares or *piazas*, common in the historical centre of the city);
- *jardim* (garden);

- *parque* (urban park).

As this typology corresponds to typical Lisbon's public spaces, and it was considered important to verify the benefits for recreation and leisure the free internet access could bring.

The main objectives of this work were:

- Mapping provision of free wi-fi in Lisbon's public spaces, aiming to deliver an integrated picture;
- Understand the effects of wi-fi in the use and appropriation of public spaces;
- Reflect on public space development through the use of digital technologies.

## 2.2 Methodology

This study follows a set of methodologies: as internet research, interviews with kiosks' tenants in selected locations, and field analysis of these same locations.

The results obtained through different methodologies allow the assessment of data considered important for the overall analysis, which is included in an initial survey to kiosk tenants: broadcaster identification, wi-fi range, whether the access is free or conditioned, the reasons for providing wi-fi, and what benefits can be observed.

The internet research provided an overview of 21 possible samples, eight cases were selected to be further studied due to their location within the city and the different typology.

The following examples, may work as a sample of the overall analysis, which initially comprised eight gardens, parks, squares or "*largos*", from a downtown to uptown overview:

- a) *Príncipe Real Square*: This small romantic garden has almost one third of its area with wi-fi broadcasting, due to the existence of two nearby kiosks/restaurants, which broadcast to their clients. Wi-fi is considered to be a clear advantage for both regular and occasional customers, as well as for tourists;
- b) *Amália Rodrigues Garden*: In this case, the wi-fi broadcasted by the kiosk's tenant, had a range within 30 meters radius, and a password is required to access it. The main reason for providing free wi-fi is related to the acquisition by the kiosk tenant of a triple play package, which includes television, internet, and telephone. Although television was the main reason for acquiring this service, the kiosk owner verified that providing wi-fi was a plus, considering that it resulted in the increase of customers, including students during the day. Providing free wi-fi is being one of its main advertising features;





*Fig. 1: Typical situation in Lisbon's green spaces, with an open-air café and the kiosk in the Príncipe Real Square and Bensaúde Park. Photos: Carlos Pita Rua, 2014*

- c) *Bensaúde Park*: This Park, located in the uptown area, in a typical local residency neighbourhood, is an interesting example of how wi-fi availability may be a central point in inter-generational mixed use. This could be observed on site and was a comment by the kiosk tenant.

### 2.3 Preliminary Results

Since this work is the beginning of a larger research work, it is not possible to speak of conclusions yet, but these main aspects can be observed:

- Nowadays there is no municipal free wi-fi network implemented in public spaces;
- Most kiosks provide wi-fi, which is usually part of a service pack, where TV offer comes first;
- Despite being an investment, most tenants consider this service beneficial for business, by attracting more users;
- The recent kiosk and green space refurbishment by the council did not consider a wi-fi network in its framework.

### 2.4 Follow Ups

- This survey was presented and discussed at the CyberParks' Lisbon Workshop on 25/06/14.
- Presentation and discussion in the frame of the 5° *Encontro de Investigadores do CeIED* – (5th Researchers' Meeting – [www.ceied.ulusofona.pt/](http://www.ceied.ulusofona.pt/)), on 04/07/2014, and will be prepared as a contribution to book of papers being organized by the conference scientific committee.

### 3. Case Study Areas – Parque da Quinta das Conchas & Jardim da Estrela

In Lisbon, two important green spaces in terms of size and popularity have been chosen as case study areas: the *Parque da Quinta das Conchas* and *Jardim da Estrela*. In these green spaces, two different approaches have been chosen to track users: the app WAY CyberParks and GPS. The use of these approaches has been accompanied by a questionnaire provided to each visitor.

In order to obtain a better sense of the city, the site visit stopped at the *Parque Eduardo VII*, which offers an impressive panorama of the central Lisbon. The site visit ended at the Lisbon Expo '98 area, where the participants could have a good overview of the new development with new buildings and open spaces.

These green spaces have been chosen as case studies considering that tourists tend to visit the most popular and well-known spaces, e.g. through description or recommendation in tourist guides. For this reason, historic or remarkable gardens are by far the most visited open spaces. They are visited for pleasure, relaxation, or for its natural beauty or personal interests in plants and landscape (Cianga & Popescu, 2013). Therefore, for the production of green spaces also the tourists' points of view are relevant and could deliver an added value in green spaces development strategies.

#### 3.1 Methodology and Limitations

For the survey in the cases of Lisbon, two different approaches and techniques were used: (1) the use of a questionnaire and (2) applying of the app WAY CyberParks and of GPS devices – both aiming at detecting users and their behaviour, and tracking them and their movement patterns in the case areas. The questionnaire was used in both green spaces, while the app WAY CyberParks was used the Parque da Quinta das Conchas, as wi-fi is available there, the GPS devices was used in the *Jardim da Estrela*.

For the GPS as there were six devices available the participants were divide into six groups. The collected data were downloaded and then overlayed onto a Google Earth Map for a visual representation of the participant's trail. In a second step, a map showing all six routes together is generated. This allow us to analysis the routes they take within the green spaces and draw conclusion.

### 3.2 The Questionnaire Parks & Tools

As part of the survey, the questionnaire Parks & Tools (see Fig. 2) was designed to capture demographic information of the visitors along with their impression on visiting, and any barriers/problems they may have encountered. With the help of this questionnaire, we seek to collect opinions on the popular parks towards increasing the understanding of the motivations and expectations of tourists visiting green spaces, and on the usefulness (advantages and disadvantages) of the applied technology tools – app WAY CyberParks and GPS.

It should be stressed that this is the first survey; it is only an initial step in approaching the case studies in Lisbon. It is rather understood as a pre-test of techniques, methodologies, and tools that can be applied in the project, and not a deep study on the interactions between information and communication technologies (ICT) and public spaces. In this sense, to the analysis of data collected by the questionnaire it aims mainly to identify the opportunities and limits of technical and methodological issues and to reshape them for a second phase of the field research.

#### a) Main features of the Questionnaire

The questionnaire encompasses both closed-ended questions and open-ended questions. The questionnaire, a basic tool in research, integrated in our case, as Fig. 2 shows, 15 questions organised in four sections: (A) identification of the respondents, (B) experience the park, (C) route in the park, and (D) use of the tool.

The section "(A) identification" encompasses five items: age, gender, educational/professional background, city / country and the question how often the respondent use urban parks in the city where he/she lives.

The section "(B) experiencing the park" consists of four, most open-ended questions. The respondent should mention five keywords about what characterises the park, if he/she likes in the park, as closed-end question: yes, no and no opinion, and a justification for the answer. The respondent should mention three to five elements that positively and negatively, most attracted his/her attention, and three to five elements that could increase the usability of the park.

The section "(C) route in the park" considers three issues: about the consensus in the group on their route in the park, about reason of the route chosen, and an open field for "other" remarks. In this section, the respondents have also been asked, to mark in the distributed map with a circle the

parts of the parks they liked, and with an X, those parts they found not appreciated. The answers provided on this part of the section "C" are not subject of further analysis in this document.

The last section concerns the "(D) use of tools" (app and GPS), and consists of three items: the first as closed-ended question is about the use of the tool, with the possible answers: easy, complicated handle, very complicated. The second closed-ended question is about the usefulness of the tool for research, with the possible answers: yes, no, partially, and finally, one last open-ended question for suggestions to increase the usefulness of the tools.

The questionnaire form is titled "QUESTIONNAIRE ON PARKS & TOOLS" and includes the following sections:

- A Identification:** Includes fields for Age, Sex (male/female), Formation, City/country, and a question about how often the respondent goes to a public space in their home city (times a week).
- B Experiencing the park:** Includes a section for giving up to 3 keywords that characterize the park, a "Do like this park?" section with "yes", "no", and "no opinion" options, and a "Justify" section with "Positively" and "Negatively" sub-sections. It also includes a question about which 3-5 elements can improve the park.
- C Your route in the park:** Includes a question about how the consensus finding in the group was, why the group decided for this route, and an "Others" section.
- D Use of the tool:** Includes a question about how the use of the tool was (easy, complicated but manageable, too complicated) and a question about if it is useful for research (yes, no, partially).

At the bottom of the form, there is a footer with the text: "Fostering knowledge about the relationship between Information & Communication Technologies and Public Space supported by strategies to improve their use and attractiveness" and logos for "cost TU 1306" and "1/1".

Fig. 2: The questionnaire "Parks and Tools" as distributed among the Lisbon Meeting Participants. ULHT & LNEC 2014

b) Application of the Questionnaire

After the site visit in each parks, each participant was asked to respond the questionnaire, returning it to the coordinating team. Respondents are asked to answer the questions individually, i.e. participants should themselves answer the questions.

After the site visits, it was considered appropriate to ask the participants, which park they most appreciated, either the *Jardim da Estrela* or the *Parque da Quinta das Conchas*. The answers were

given informally and oral. This issue is discussed, in the Chapter 6.2 *Results of section (B) Experiencing the Park*, about analysis of the results.

### c) Time frame

Although the meeting's agenda allowed only one hour for visiting each park, this timeframe can however be considered as ideal, as Smaniotto et.al. (2006) in a survey in Dresden (Germany) found out that visitors tend to remain around one to two hours in a green space in their sightseeing tour while visiting a foreign city. In a survey in Denmark, Nielsen et.al. (2010) found out that in average the duration of stay in the park analysed is 33 minutes, and that a very large proportion of short stays characterises the use of the park. Further, they state that the half of the park users did not spend more than 11 minutes in the park, while 2/3 did not spend more than 20 minutes.

### d) Weather conditions

The weather conditions play an important role in connection with the use of public spaces. During the Lisbon Meeting, the temperature was up to 24° Celsius, sunny and not precipitations. Hence, good weather conditions to meet people on recreational activities in Lisbon's green spaces.

## 4. Parque da Quinta da Conchas

### 4.1 Short description of the green space

Area: 24 ha

Location: North of Lisbon, an area known as Alta de Lisboa, within an expanding area, mostly with multi-storey building.

The Parks of *Quinta das Conchas* and its neighbour *Quinta dos Lilás* were open to the public respectively 2005 and 2007. Together they represent the third biggest urban park in Lisbon. They also represent an attempt to safeguard the until the early 20<sup>th</sup> century rich and predominantly agricultural landscape of the surroundings of Lisbon. This was characterized by small towns and villages, and by the *quintas* – a typical rural property with houses and farmed land, with olive groves, orchards, woods, and extensive areas for growing vegetables and cereals. This rural landscape formed once an extensive open space network around the city. Due to an extremely rapid urbanization, primarily based on economic interests and at the expense of environmental quality, the northern districts of Lisbon are seeing disappear these old rural structures. Despite this, this part of the city counts on many new parks. The *Parque da Quinta das Conchas* offers a rich

landscape and layout, with several equipment – playgrounds and cafés (Smaniotto Costa, 2012). This park has become a great asset to the community attracting users from the whole city.

### 4.2 The application WAY CyberParks

Within CyberParks Project, an application (app) called WAY CyberParks – Public Open Spaces Monitoring Tool is being developed to track users and their movement's patterns in public spaces; it is composed by a mobile application and a monitoring web service. This app is a result of a wider research programme developed by Deusto Tech-Mobility in Bilbao, Spain, partner of CyberParks Project. WAY (Where Are You) is a mobility application for supporting on seamless positioning and guidance of people in outdoor and indoor environments. The innovative idea behind the application responds the following questions: Where are you? Where is what you are looking for? How can you get there? How can you be connected to what you seek? The potential of WAY technology for CyberParks results by achieving a continuous estimation of the user's position in open spaces, enabling the delivery of various services based solely on location. Making use of the in the smartphone integrated GPS the app WAY CyberParks captures more parameters than just the most common as position, time, speed, distance, and altitude, what facilitates its use when visiting the park, and based on the position, it can provide multiple services. The app shows a map, in an easy and intuitive way, the position and orientation of the user, allows to create alert zones and augmented reality, and by associating videos and audio with the position and display contextual information can enrich a visit with additional information about the space and its context. When reporting the position in real time to a server (or monitoring platform), the app is also an interactive tool in the sense that, from the server, "orders" can be sent in real time and immediately received by the smartphone. The Lisbon Meeting offered as first attempt to use and test this tool. The app WAY CyberParks can be downloaded at [www.costcyberparks.eu](http://www.costcyberparks.eu)

The data collection procedure uses GPS receivers to automatically collect time, local coordinates, and speed at regular sampling periods (for the test in Lisbon every 3 minutes) and through this signals an itinerary of the user can be created in the web services. The app is prepared to send signals only when a user is inside the *Parque da Quinta das Conchas* (outside of the fixed area it will not send any data). The periodicity of signals needs to be tested, in order to find out an appropriate sampling periods. Prior using the app, the users are asked to answer a series of questions. This allows us to produce a user profile.

Unfortunately, the data collected with the app WAY CyberParks in Lisbon got lost as the monitoring web service was moved to another hosting. As the data were not saved before, there is no results to be analysed or presented on the case study *Parque da Quinta das Conchas*. This technical mishap can notwithstanding, be taken as a lesson to be learnt. It reveals that ICT, for all their benefits, can also be a reason of problems for those who rely heavily on IC technology, e.g. data quality or as in our case their loss, no matter what causes it. We are smitten with technology, and this can be a trap. However, ICT are most necessary and useful, but so are traditional techniques and methodologies.

In this context, the reflection should go on the benefits of the traditional and the computer driven tools and the results and knowledge both can advance. Each of them follows the own logic. With ICT, via the app, the collected data provides important information, but it goes in line with the computer logic and the way it arranges the data. It transforms persons into numbers, and might ignore other facts, that a researcher can capture in the field work, not only in terms of spatial-physical presence, but also spatial-temporal. The symbolic meaning of the human being, in this case of being urban, is difficult to be materialised through the data collected by an app or other digital method. On the other hand, using traditional methods can be led by the view or approach of who analysis it (i.e. in a too personal manner). In the process of data gathering and analysis the observer / researcher / analyst should strive his/her best to be a translator and an interpreter then those data.

What is needed in CyberParks is to find out a bridge between the two possibilities. This can be achieved with the forthcoming tests of the app and the gained experiences. Therefore, sharing our lessons learned will be relevant to your current and future work.

### 5. Jardim da Estrela

#### 5.1 Short description of the green space

Area: 4,6 ha

Location: Lapa Borough, an old borough of Lisbon with many building of the 19<sup>th</sup> Century. In this borough are also located the Portuguese National Assembly as well as many embassies.

The *Jardim Guerra Junqueiro*, named after a Portuguese poet, is mostly known as the *Jardim da Estrela* is situated opposite the Estrela Basilica, which is one of the is one of the most brilliant achievements of the Portuguese late Baroque (1790). The garden was open for public use on April de 1852 and since then has grown as an iconic green space of Lisbon. It is the "coolest park in

entire city. Perfect place to chill, read a book or just hang out with friends, especially in really hot summer days" (Tripadvisor). It is a "delightful neighbourhood park, one of the loveliest in the city" (Lonely Planet) and a favourite for families with children (Go Lisbon). To its attractions, include many trees, several exotics among them, an animal-themed playground, ponds, and several open-air cafes. The garden is perfect for a stroll, with various sculptures and an ancient and attractive wrought-iron gazebo.

The garden offers nice shady spot under leafy trees, where one can relax or rest. The combination basilica, a pleasant public garden, small-scale neighbourhood, easily reachable by the old trams attract many tourists.

## 5.2 GPS devices and modelling the trails

The GPS device used in this survey enabled recording time, speed, distance, position, altitude, and direction. This data enabled us the generation of itinerary routes in the park.

As there were only six GPS devices available, the participants have been divided in six groups, each one having a device. The groups were asked to turn on the GPS device, as they were ready to start the trip around the garden. They were advised to visit the garden, as they normally would do, and to *forget* they were carrying the device. The Fig. 3 shows the itinerary of a group, in red the starting point for all groups. The colour coded maps document besides the route also the trip time along these route segments. The Fig. 4 shows the different routes of each of group. The trails represent the consent within the group to follow a certain itinerary in a kind of a random exploration of the garden opportunities. The trips lasted around 1h15 min; the time expended in each point is for this survey not so relevant, as the "visitor" had to follow a tight time schedule of the meeting.

Although the time frame and starting point were the same for all six groups, the itineraries differ in the directions and paths of flows, walking speed, as well as the overall number and duration of stops, this all resulting in different magnitudes in the use of the green space. The Fig. 5 shows at an aggregate level the six trails together. It can be taken as a record of user's frequency and itineraries considering the size of the groups and the time intervals within the period surveyed (14:40 - 15:45). Although the display of the routes does not show accuracy as the segments does not overlap well, even the patches in *Jardim da Estrela* are broad. A possible solution for this problem would consists to display with help of GIS the GPS trackpoints that overlap. However, even with few trails venturing further the main routes, some common segments can be detected, as well as areas of intensified use.





Fig. 3: A typical representation of an itinerary with path and points, for each point the coordinates and the time it was reached are recorded. ULHT 2014

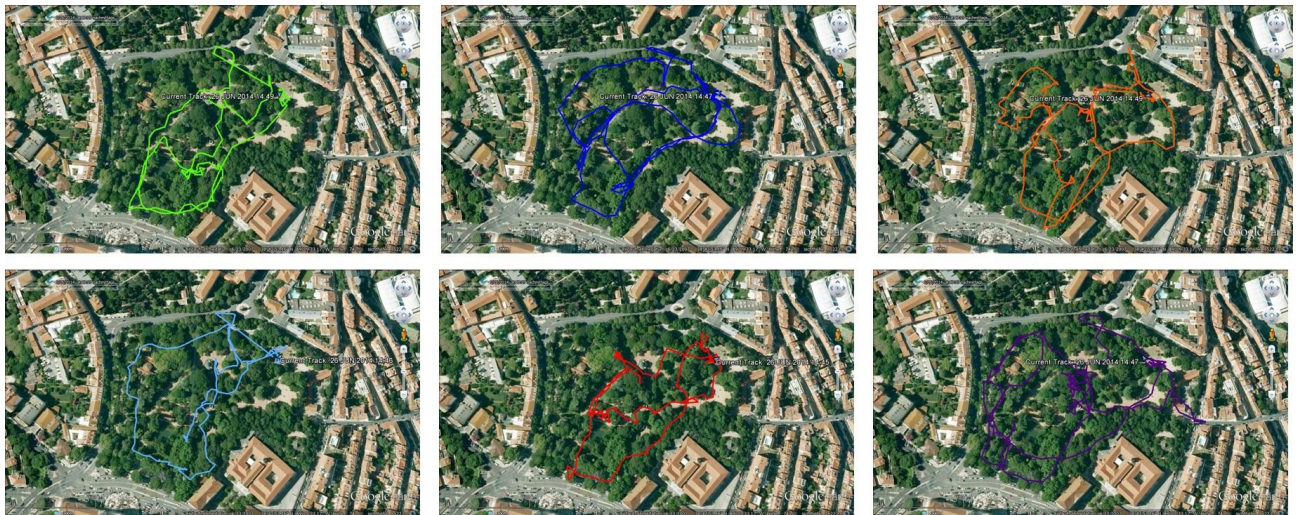


Fig. 4: The recorded tracks of the six groups within the Jardim da Estrela. ULHT 2014

Checking the common route segments and the areas of intensified use against the reality in the garden also reveals the reason for these attractions. Almost all segments with more flow or longer stay have a magnetism that attracts people – despite the general captivating atmosphere in the garden offering a variety of exotic flowers and trees. The attractions, be it one of the big or exotic shaped tree, or one of the several cafés or ponds, reveals areas of interest and have the potential to attract tourists. The most common attractions are displayed in the Fig. 6.



*Fig. 5: This map displays the spatial distribution of visitors of the six routes together. It reveals some common patterns in the use of the space. ULHT 2014*

### 5.3 Discussion on preliminary analysis

Aside from the limitations in terms of time and number of samples, the trails in *Jardim da Estrela* confirms a supposition that visitors seek to a scenic or pretty location to relax and enjoy their recreational time, and these can be offered by the *Jardim da Estrela*. Detecting and visualizing the different user patterns and trails, and the "seek" for attractions could be confirmed by the analysis of the questionnaires, as Fig. 6 shows.

Therefore, GPS data can be also used for analyses and investigation on the distribution of visitor flows. This added with the practical knowledge on the demographic patters, needs of users and potentials of the spaces opens up for deeper insight within the context of production of inclusive green space.



Fig. 6: The main attractions in the Jardim da Estrela, from left to right, top to bottom: the wrought-iron gazebo, a coffee house, a pond with a fountain, the main entrance opposite the basilica, the tree-lined street, and an open-air café at a major pond. Images: Google earth.

## 6. Results from the questionnaire based survey

The questionnaire on "Parks & Tools" was answered by a total number of 58 persons, 55.17% (n = 32) regarding the *Jardim da Estrela*; and 44.82% (n = 26) regarding the *Parque da Quinta das Conchas*.

### 6.1 Results of section (A) Identification

With regard to the age of respondents, they are distributed among the following age groups:

- 3.44% (n = 2) is less than or equal to 25 years of age;
- 22.41% (n = 13) has between 26-35;
- 37.93% (n = 22) has between 36-45;
- 20.68% (n = 12) has between 46-55;
- 15.51% (n = 9) is 56 years of age or older.

The most representative age groups are between the 26-35 and 36-45 years of age.

With regard to gender from the total respondents, 35 are men (60.34%) and 22 women (37.93%). Even if a respondent did not provide an answer to this question, it was also noted that the majority of respondents are male. Considering this item by the responses obtained as a function of the parks

under study, it is observed that in the *Jardim da Estrela* 19 of the respondents were male (59.37%), and 12 female (37.5%); while in the *Parque da Quinta das Conchas* 16 of them are male (61.53%) and 10 females (38.46%). As expected, most respondents in both parks are male.

With regard to professional background, most represented areas are architecture and planning, with their respective variants (landscape architecture, urban economy, transport, etc.). Thirty-two respondents (55.17%) identified themselves within these disciplines / professional areas, whereby 12 responses (37.5%) are related to the *Jardim da Estrela*, and 10 to the *Parque da Quinta das Conchas* (31.25%). Disciplines/professional areas related to the social sciences (anthropology, sociology, geography, communication sciences) had five respondents (15.62%) in the *Jardim da Estrela* and 4 (38%) in the *Parque da Quinta das Conchas*.

Another aspect to consider regarding the professional background is that the answers to open-ended questions were richer in content when expressed by respondents from the areas of architecture, urbanism, and planning. This might be explained by an awareness of these professionals toward spatial realities, including public spaces. These deductions are not considered further in the analysis of open-ended questions, because they are not very representative, but should be kept in mind in a deeper reflection for future studies of observation and surveys.

In this section, the answer to the question about the frequency of use of an urban park in the city where the respondent lives did not provide the expected information. Maybe this question was not well posed, as is a part of the request to name the home city. As this question is important for the topic on the use of public spaces, it would be necessary to rework it in order to better address this issue, i.e. define some parameters and the kind of information to be gathered. Even so, from the replies it seems that the majority of respondents usually go / use a public space at least once a week, followed by few those who use a public space more than 3 times a week. For the analysis of the cases in Lisbon, however this question is not so relevant. In this sense, the answers obtained do not enable us to go much further at the moment.

## 6.2 Results of section (B) Experiencing the Park

To the open-ended question "provide 5 keywords that characterise the park", we proceeded a content analysis, in order to systematise and organise the answers into specific themes. Especially because often one response addresses different subjects, whereby they were grouped around a main subject. Thus, responses were grouped into categories provided for both parks, and then rearranged

to group all the answers provided for discussion in both parks. In a next step a hierarchy of categories-was created around the themes, with subcategories.

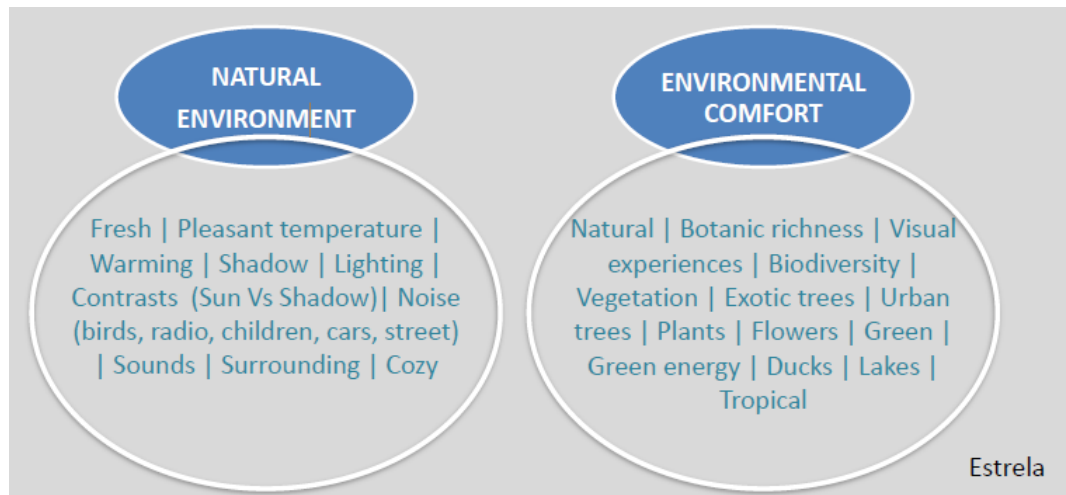


Fig. 7: shows the two main categories and subcategories identified for the Jardim da Estrela.

Considering the responses for the *Jardim da Estrela* it can be observed that the content analysis enabled us to organize the responses into 16 thematic categories, as the Fig. 7 shows. These categories and subcategories are listed in order of importance, i.e. from the most often mentioned to the less. These categories are: natural environment, environmental comfort, place of tranquillity, quality of environmental and social environment (with equal number of mentions), equipment, park dynamics, historicity and tradition, activities, style / design, maintenance and urban context (with equal number of mentions), multifunctionality, diversity of environment, safety.

Regarding the question, if the respondents like the park the responses are:

- *Jardim da Estrela* 100% of respondents (n = 32) indicated that they like it;
- *Parque da Quinta das Conchas*: 80% (n = 21) indicated that they like it, while 7.6% (n = 2) reported that they do not like it, and 15% (n = 4) indicated to not have an opinion about.

It has been also requested to justify the response. For the *Jardim da Estrela* five of the respondents (15%) did not follow this request. The content analysis of the provided answers allow us to arrange them into the following thematic groups:

- The most mentioned responses occur to the group "quality of environment", for example referencing to "nice atmosphere", "nice environment", "and "interesting site".

- The next, with similar incidence, include the following thematic groups: "natural environment", "style", "social environment," urban sense", and "design".
- The third group of high incidences is the category "mixed environment".
- With less weight, but with similar incidence include the categories: "maintenance", "environmental comfort", "equipment / infrastructure", "place of peace".
- Finally, there is only one answer framed in the category "multifunctionality".

All the categories identified above refer to positive aspects, certainly, because almost all users stated to like the park. Concerning the justification about the reason for negative responses for the *Parque Quinta das Conchas* the following can be highlighted:

- Among those that replied with "like it", four did not justify their answer, and 22 mentions include (by the number of occurrences): design and natural environment, a place of tranquillity, urban context and activities offered (all with the same frequency), and heterogeneity, dynamic and maintenance (with the same frequency too).
- Two justifications with the answer "don't like it" refer respectively to the "social environment" ("I prefer more lively parks") and issues related to the attractiveness ("I do not find any attraction here").
- From four responses that indicated "no opinion" only 2 justified the responses, and relate them respectively to the design / style of the park ("I prefer many other parks"), to the social environment, maintenance and equipment, infrastructure of the park ("I like the children but I dislike some other part for the excess of concrete and the poor maintenance").

Regarding the request to mention the elements that called the attention (positive and negative) in the park, as it is an open-end question it was subject to a content analysis and categorisation. The same categories identified before were used to frame the answers given to this question.

For the *positive aspects* in the *Jardim da Estrela* the analysis shows following results: first all participants (n = 32) identified at least a positive aspect in the park:

- The most mentioned are "natural environment"<sup>1</sup> (with the most incidences), followed by "equipment"<sup>2</sup> and "social environment"<sup>3</sup>
- Followed by: "multifunctionality" and "maintenance";
- The third group with more mentions are "place of tranquillity" and "design".
- The fourth group and with the same incidences includes "urban sense" and "environmental comfort";
- In the fifth group also with similar incidences are "safety", "design", "activities", and "heterogeneous environment";
- Finally, and with only an indication is mentioned "history and tradition".

Still regarding the *Jardim da Estrela*, seven out of the 32 respondents did not answer this question (21%). For the *negative aspects* following groups can be formed:

- The first group encompasses "Equipment / infrastructure"<sup>4</sup>, "social, environmental"<sup>5</sup>, "environmental comfort";
- In the next group, all with the same incidences, are mentioned "design", "safety", "natural environment";
- The third group include "activities" (i.e. "not much to offer".) and "maintenance".

For the *positive aspects* in *the Parque da Quinta da Conchas* the analysis shows following results, considering that only one participant did not answer the question about positive aspects identified in the park.

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<sup>1</sup> Examples of references: *about the fauna*: animals, many animals, birds, birds singing, ducks; *about the flora*: dense vegetation, interesting vegetation, variety of the species of plants, vegetation (different kind of trees), exotic plants, many trees, different trees mature trees, size of trees, old trees, tall trees,, tropical trees, profusion of plants, nice plants, flowers, flower colour, lake plants; *about equipment and features*: green energy, lakes, nature, biodiversity, water, variation of textures, variety.

<sup>2</sup> Examples of references: benches, many places for sitting, bookshop, library, café, music pavilion, playground, kiosks, lots of different sitting opportunities, playground, pathways, podium, small shops, the good condition of the infrastructure.

<sup>3</sup> Examples of references: people, elderly, a lot of kids, diverse groups, girls sunbathing on the grass, not to crowded, social life, the way that kids were enjoying it, very interesting age differentiate presence.

<sup>4</sup> Examples of references: better maintenance, information (none about plants, lack of signs, only in Portuguese), trash boxes, more suggestions to visitors, poor furniture, sometimes there is a market but I do not like it, sports equipment.

<sup>5</sup> Example of references: bourgeoisie, children accompanied, male behaviour, overcrowded, smokers.

- "Natural environment" (with contents related to birds, forest, nature, green areas, plants, trees, water, wild) was the most mentioned aspect.
- To the second group, but far less significant than the first topic, are mentioned "social environment".
- The third group encompasses "equipment / infrastructure".
- The fourth group, with similar incidences, includes "design", "maintenance," and "environmental comfort".
- In a fifth group highlights mentions as "place of peace".
- Finally, three mentions with the same number of incidences "historicity and tradition", "mixed environment" and "activities".

Concerning the negative aspects the results can be grouped as follow, considering that four questionnaires had no answers:

- "Equipment / structure" is in the foreground, followed by "maintenance".
- "Natural Environment" and "social environment", in the second and third groups.
- "Environmental Comfort" in the fourth and "urban effect" and "design", a fifth plane.
- Finally, and with equal incidences, re the "activities" and "security".

As regards the last question of this section, about "to mention 3 to 5 elements to Improve the park" for the *Jardim da Estrela* 31% (n = 10) of 32 respondents did not answer this question; for the *Parque da Quinta das Conchas* was 15% (n = 4) out of 26. The shows the suggestions provided.

Table 1: Elements that can improve the parks

<i>Jardim da Estrela</i>	<i>Parque da Quinta das Conchas</i>
Equipment/Infrastructure	Equipment/Infrastructure
A map showing the park structure	Areas for old people
Artworks	Cafes
Bicycles parking	Children facilities in the wild explore
Digital signage and virtual guides, annotation	Explanation of plant
Fountain to drink	History guide
Fountains	info maps and signs
Have more accessible toilets	Interactive information
Identify the name of the park	More benches
Identify the trees	More fountain
Information about plants' species (small "carrots") to enhance the educational value	More information about areas of elements (natural and made).
maps	Opening library in abandoned building
Meeting points furniture	Playground
More info/didactic panels (or with hotspots, not everywhere)	Sports trail
Panels, social events	Swimming possibility
	The app can give some: ex. to enjoy the visit



Redesign of the coffee places Renew the furniture Signs in trees Suggestions for visitors, navigating maps Unifying elements within park Wi-fi  Design Cultural programme Participation in terms of urban Temporal activities The park at the entrance  Maintenance Cleaning Gardening Ponds surroundings  Social Environment People  Natural Environment More green areas  Safety Remove police	Towers on top Use of wood instead of concrete  Maintenance Better maintenance and citizen reporting Clean the water Clean tree area Cleaner water ponds Maintaining Repair the map sitting  Natural Environment Animals Expand the forest Flowers in gardens More flowers in the garden More wilderness Provide evocative ecological  Design Open it for public Improve paths  Environmental comfort More shade places  Attractions More activities
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### 6.3 Results of section (C) Your Route in the Park

In this section, the first question is about the group consensus for choosing a route to visit the park.

For the *Jardim da Estrela* it was obtained the following results:

- 21% did not answer this question (n = 7).
- The response with the highest incidences was an *easy* and *high level* of consensus.
- Followed by different responses such as "collaborative decision", "group decided while walking", "not really a consensus", "we Followed the leader", "everybody was free to walk around but at the same we were chatting"; the remaining answers were are poorly conclusive.

For the *Parque da Quinta das Conchas* the results are as follow:

- 34% did not answer this question (n = 9).
- Responses with higher incidences considered an *easy and high level of consensus*.
- Other responses refer to "the input allowed", "random", "I have gone alone", "attracted by the nice vegetation everybody in the group shared the same feeling", "we decided to go to the wild side of the park", "up the hill - if there is a hill you can climb it".

About the decision on the route in the park, the answers are too different in both parks, presenting a lack of meaningful content for analysis. The request on "other comments" also delivered very different answers but few significant for this study, so these were not considered further in the analysis. One reason for this could be that the questions were not well clear posed, although the intention was to create a relationship between the route and the use of digital tools (GPS and app WAY CyberParks).

#### 6.4 Results of section (D) Use of the Tool

The last section to be evaluated refers to the use of tools - digital technologies as the GPS and the app WAY CyberParks. As this issue is of interest to increase further the use of tools, the full responses are listed in the Table 2, only repetitions have been eliminated.

Regarding the question about the how the participants judge the use of the tools the results are:

- For *Jardim da Estrela* from a total of responses (n = 32) 62% (n = 20) reported as being of easy use; 9.3% (n = 3) reported as being "complicated but manageable"; 21% (n = 7) did not answer this question, and 3.1% stated "they will decide later" (n = 1).
- For *Parque da Quinta das Conchas* from a total of responses (n = 26), 50% reported as being of easy use (n = 13); 7.6% (n = 2) reported of being "complicated but manageable"; 21% (n = 10) did not answer this question, and 3.8% reported being "partially complicated but manageable".

It has to be mentioned that for the *Jardim da Estrela* 31% of respondents (n = 10) did not answer this open-end question, and 38% of respondents (n = 10) did so for *Parque da Quinta das Conchas*, and a very often response was that user's need more experiences with the tools to forward better suggestions. Therefore, this question have to be addressed in further surveys.

Table 2: List of suggestions to improve tools GPS and the app WAY CyberParks

<i>Jardim da Estrela</i>	<i>Parque da Quinta das Conchas</i>
Implement photos taken at the park connect them to their exact position	Improve app to be one interesting thing in order to obtain data from people
More precise mapping, mapping of objects/activities / performances	What use? Only had a map with navigator arrow that positions are on it
Link to photos	We need to add more functionalities/services to be more attractive to visitors
Connecting to photo-register with the path	Set more parameters
Feedback on wi-fi. Tool for questionnaire	Was not working
Use it for e.g. organizing educational paths of plants (no need of the real cards with plant's names)	App didn't work offline
Train the users in advance	I have many ideas, but my opinion is clearly biased
More specific detail gathered, i.e., demographics,	In many ways. It is wonderful for research
Quite passive, be more engaging. Does it record duration of stops?	Can't work without access to network
Does it work offline? It is too expensive to be connected to network	more mapping opportunities
Explain the objectives of the tool	Did not work on iPad
The use of the app must provide few information. It could be more useful also by providing the possibility to forward feelings besides data.	
Use of GPS combined with other device (e.g. smartphone)	
GPS lost the connection many times. The park is too small and intense to be observed in that way - how people are moving around in so limited time we had	
Phone has no offline option so was unstable	

As mentioned in b) Application of the Questionnaire, during the survey the participants were requested to mention (orally and informally) which park they liked most – *Jardim da Estrela* or *Parque da Quinta das Conchas*. From the total number of participants (n = 58) 41% (n = 24) responded to this question: 17 (70%) preferred the *Jardim da Estrela* and seven (29%) preferred the *Parque da Quinta das Conchas*.

## 7. Final considerations and outlook

Even considering that the surveys in Lisbon's green spaces are a first exercise within the work programme of CyberParks – as they were prepared and held as part of the CyberParks' Lisbon Meeting, they show important outcomes. On the one hand, regarding the technologies used and their potential for research and on the other hand the findings about Lisbon's green spaces. It should be noted that the conducted surveys and the gathered data are statistically not representative, but can be characterised as an empirical case and as a showcase, as how tourists tend to use a green space.

Despite the need of more data about users' needs and the meanings they seek in public spaces, at this point and based on the few data available makes more sense in centring the outlook on the use of the technology as research tool. The technology used provided clear evidence of the path taken and speed in gathering data. People's behaviour and movement patterns can be easily recorded is a simple and effective survey method. Especially considering the increasing use of handy GPS (global positioning system). GPS has several advantages over traditional methods for mapping spatial behaviour, as it is a cost-effective method for gathering data, and it allows the precise and continuous tracking of individuals. It also provides spatially rich data, including velocity and timing information. Using GPS and geographic information system (GIS) technologies together is gaining in importance in the fields of transportation, and urban planning. It also has potential as a tool used for monitoring recreational use in outdoor environments. The combination GPS & GIS allows new types of analysis, and this can result in measures for the improvement of surveys on and planning of public spaces. Comparing the gained data with other data collection methodologies such as interviews seems to be easily makeable. There is, however, another aspect to which thought must be given. The quality of data could make such survey vulnerable, as the witnessed data loss, or considering open and green spaces dense canopy cover can cause signal disturbance or is dependent upon weather conditions, does remain an issue.

In our survey, the combination of questionnaire for measuring the user's experience and new digital methods resulted in a great gain of knowledge, about the areas, the acceptance of their features, but also about the potentials and limits of the digital technology as research tool. This shows that surveys benefit from multiple research methods and from combining insights. This calls for applying two or more methods, especially new ones and just not those that are familiar.

The all above-mentioned reasons reinforces the need to collect further supporting information and feedback via other methods to help interpret user's behaviour patterns. It is relevant to understand the green spaces and their context, and to capture the users' interests and needs. People want different things from different spaces and different benefits accrue from these; and in this context to respond with appropriate policies and design that meet the needs of the urban dwellers, and to encourage them to a more active life style. Only when people are aware about the benefits they can cherish the spaces. Therefore, one of the main objective of research is to ensure that people discover and value access to local green space.

We consider GPS-tracking, and the use of the app WAY CyberParks as a promising technology and research field for data collection and spatial analysis of people's behaviour in urban spaces. This survey demonstrates that digital technologies have much to offer in the management and planning of urban spaces. The challenge is how to address technology to integrate public space and public life.

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