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JOÃO MANUEL FONTES VIANA BOAVIDA

Lisbon public parks: Development of real-world user scenarios

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I dedicate this work to all users of public gardens and those who, for some reason, problem or barrier, cannot enjoy these public spaces. I also dedicate this work to Gonçalo Ribeiro Telles, who, in Lisbon, played a fundamental role in the development of city green spaces.

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Palavras-chave

Espaços Verdes Urbanos, Design Thinking, Cenários reais de utilizador , Problemas de Parques públicos, Espaços inteligentes ao ar livre, Design Especulaticvo, Design Participativo.

Resumo

A população mundial está a aumentar. Até 2030, a população mundial poderá atingir 8,6 mil milhões de pessoas. Nos dias que correm, cerca de 53,9% da população mundial reside em cidades. Até 2050 a previsão é que este número aumente para 68,4%. Ao mesmo tempo, prevê-se que a percentagem de pessoas com mais de 60 anos aumente de 12% para 22%, e que em países este número atinja 33%. Diversos estudos referem a importância que parques públicos e espaços verdes têm na contribuição para uma maior qualidade de vida e bem-estar.
O principal objetivo desta Tese é compreender que tipo de problemas existem nos parques públicos de Lisboa e perceber como o design pode melhorar a experiência do utilizador nos parques públicos de Lisboa. Esta Tese está dividida em seis capítulos: Introdução, Estado da arte, Metodologia de investigação, Discussão, Cenários reais de utilizador e Conclusão.
Os resultados deste trabalho reforçam a importância da utilização de metodologias de Design Thinking e Design participativo na reflexão e/ou reformulação de parques públicos. Além disso, este trabalho destaca a importância de entender o verdadeiro utilizador, visto que soluções não são universais e precisam ser pensadas de acordo com a localização de cada parque.
Esta Tese pretende inspirar novas ideias de investigação, através da identificação de lacunas no conhecimento. Questões abertas e desafiantes sobre novas soluções para parques públicos são propostas e identificadas para trabalhos futuros, abrindo espaço para pensar em novas soluções que possam contribuir para futuros parques públicos “inteligentes”.

Keywords

Urban Green Spaces, Design Thinking, Real-world user scenarios, Public Park Problems, Smart outdoors, Speculative Design, Participatory Design.

Abstract

The global population is growing. By 2030, the world population will reach 8.6 billion people. Nowadays, about 53.9% of the world's population resides in cities, and by 2050, the percentage is expected to rise to 68.4%. At the same time, the percentage of people over 60 is expected to rise from 12% to 22%, and 33% residing in developed countries. Studies have shown that public parks and green spaces can contribute to a higher quality of life and well-being.

The main purpose of this study is to understand the type of problems exist in Lisbon public parks and to speculate how design and technology could improve the user experience at Lisbon public parks. The thesis is divided into six chapters: Introduction, State of the Art, Research Methodology, Discussion, Real-world user scenarios, and Conclusion.

The findings of this study underscore the significance of incorporating Design Thinking and participatory Design approaches when conceptualizing or revitalizing public parks. Additionally, this research underscores the necessity of comprehending the specific park user demographic, as solutions cannot be one-size-fits-all and must be tailored to the park's unique context. The thesis aims to stimulate fresh avenues of research by pinpointing knowledge gaps. It presents forward-looking and formidable challenges in the realm of innovative public park solutions for future exploration. This paves the way for contemplating novel approaches that can contribute to the evolution of “smart” public parks in the future.

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Acronyms

ICT – Information and communication technologies

INE – Instituto Nacional de Estatística

IoT – Internet of things

IPMA – Instituto Português do mar e da atmosfera

UGCoP – Uncertain Geographic Context Problem

UGS – Urban Green spaces

UN – United Nations

WHO – World Health Organization

Chapter One: Introduction

1.1 Contextualization

The research proposal is titled "Lisbon Public Parks: Crafting Real-World User Scenarios" and constitutes a vital component of the UNIDCOM/IADE research project known as "Smartout – Smart Public Park Solution: Development of Real-World User Scenarios."

The concept of the smart city has garnered increasing attention, prompting a surge in related studies. However, a significant portion of these studies tends to overlook urban green spaces, which hold a paramount role for urban inhabitants. Intelligent Environment and Intelligent Parks are integral to the broader discourse of smart cities, and their realization involves a multitude of influencing factors.

1.2 Problem, Research Questions, and Objectives

The following research questions have emerged in light of these factors:
Q1: What type of problems exist in public parks in Lisbon? “
Q2: Can design act to improve the user experience at Lisbon public parks?”.

The primary aim of this thesis is to categorize the problems within public parks and formulate practical solutions to craft real-world user scenarios.
The secondary objectives encompass:

- Enhancing the comprehension of the public park concept.
- Identifying and categorizing issues encountered in public parks.
- Investigating the dynamics of park management and the relationship between citizens and public parks.
- Crafting real-world user scenarios.
- Speculating on future solutions to enhance public park amenities.

1.3 Motivation

The global population has been steadily growing and is projected to continue this trend in the years ahead. While the pace of growth has slowed down, it is anticipated that by the year 2030, the world's population will reach 8.6 billion (as reported by the United Nations in 2017). According to the UN's 2017 report, approximately 53.9% of the global population currently resides in urban areas, and it is expected that this percentage will rise to 68.4% by the year 2050.

This trend towards urbanization is also evident in Portugal. According to data from the INE (CENSOS, 2021), the population of the Lisbon metropolitan area increased by 1.7% between 2011 and 2021. The migration to large cities has had a significant impact on people's lives, particularly in terms of public health. As noted by Lee et al. (2015), issues such as obesity and mental illness have emerged as prominent public health concerns. These health challenges are linked to contemporary lifestyles that are on the rise due to the ongoing urbanization of the world.

Spending time outdoors, particularly in natural environments, urban green spaces, and public parks, has been demonstrated to enhance the overall quality of life, physical and mental well-being, and personal independence (Lee et al., 2015; World Health Organization, 2017). Furthermore, urban green spaces play a crucial role in mitigating the broader impacts of global changes, extending beyond climate considerations. They are associated with environmental advantages within cities, such as improved air quality and the reduction of urban heat (Grunewald et al., 2017; World Health Organization - Europe, 2017).

The UN (2015) is committed to ensuring that individuals can enjoy prosperous and fulfilling lives, with economic, social, and technological progress occurring in harmony with nature. This perspective underscores the importance of integrating nature into progress. Consequently, the transformation of public parks into "smart parks" becomes imperative for advancing this vision and fostering a stronger connection between urban dwellers and the natural world through technology. Utilizing technology to enhance park quality, facilitate informed decision-making, and involve users in this transformative process is pivotal. This transformation also aligns with the broader Smart City movement, as smart parks, or intelligent outdoor spaces, are integral to the Smart City concept.

Lnenicka et al. (2022) delineate a Smart City as a concept centered on the utilization of Information and Communication Technologies (ICT) and Internet of Things (IoT) solutions in the daily lives

of citizens, aiming to enhance their quality of life while aiding local governments in addressing challenges pertaining to the utilization, allocation, and provision of urban resources and services. When sustainability is introduced into this equation, a complementary definition emerges from UNECE (2015) which characterizes a smart, sustainable city as an innovative urban center that harnesses ICTs and other tools to elevate the quality of life, streamline urban operations and services, and boost competitiveness. Importantly, it ensures that these advancements are in harmony with the needs of both current and future generations across economic, social, environmental, and cultural dimensions.

In the context of this study, it is noteworthy that the research is conducted in Lisbon. According to IMD's 2021 Smart City Index, Lisbon holds the 95th position (IMD, 2021). However, it is worth noting that urban green spaces are not the predominant issues contributing to this ranking, despite the potential for improvement in this area.

After conducting research on Lisbon's Urban Green Spaces (UGS), it became evident that there is limited available literature and information regarding these green areas, particularly concerning their issues. This scarcity of information aligns with the observation made by Vidal et al. (2021), highlighting the necessity for national studies on green spaces. For the research to progress effectively, it is imperative to thoroughly examine Lisbon's UGS before delving into an exploration of their problems.

As pointed out by Byrne & Sipe (2010), parks can encompass a diverse array of categories, such as urban parks, nature parks, pocket parks, district parks, community parks, neighborhood parks, sporting fields, and urban forests. Lisbon follows a similar pattern, where, for instance, gardens situated within squares are referred to as squares rather than gardens. Despite these subtle distinctions, it is crucial to establish clear definitions and categories for the various types of parks and UGS in Lisbon as part of the research process. This preliminary categorization is instrumental in determining which UGS would be selected as case studies.

1.4 Benefits

This study aims to embrace social responsibility for the collective benefit of all. This thesis proposal aligns with the objectives outlined in the 3rd and 11th UN Sustainable Development Goals: “Ensure healthy lives and promote well-being for all ages” and “Make cities and human settlements inclusive, safe, resilient, and sustainable”.

The primary objective of this thesis is to identify the perceived issues associated with urban green spaces and to actively participate in the formulation of better outdoor planning. Its purpose is to offer valuable insights to UGS planners and designers, aiding them in envisioning the future potential of Lisbon's UGS. Furthermore, this research endeavors to position Design as a unifying discipline that transcends traditional boundaries and collaborates with other fields, notably technology, to pave the way toward a sustainable future.

1.5 Thesis structure outline

The structure of the thesis has six chapters: Introduction; Literature Review; Research Methodology; Data, Analysis, and Results; Real-world user scenarios; and Conclusion.

Chapter 1 will be introductory and explanatory and have the background, definitions, and all the introductory parts of the research, such as its design and objectives.

Chapter 2, named “State of the Art”, will describe how Portugal and Lisbon’s Urban green spaces are nowadays.

Chapter 3, “Research Methodology”, will display all the information about the methods used and why they were chosen. This chapter will include sampling, data collection, and statistical analysis.

Chapter 4 will present all the results and discussion for each method. Results will be shown according to different types of analysis.

Chapter 5 will present the user scenarios and the possible solutions for each scenario.

Chapter 6 will gather all the information and present the conclusion. It will also display the limitations and future research steps that need to be taken.

The study diagram can be seen in Figure 1.

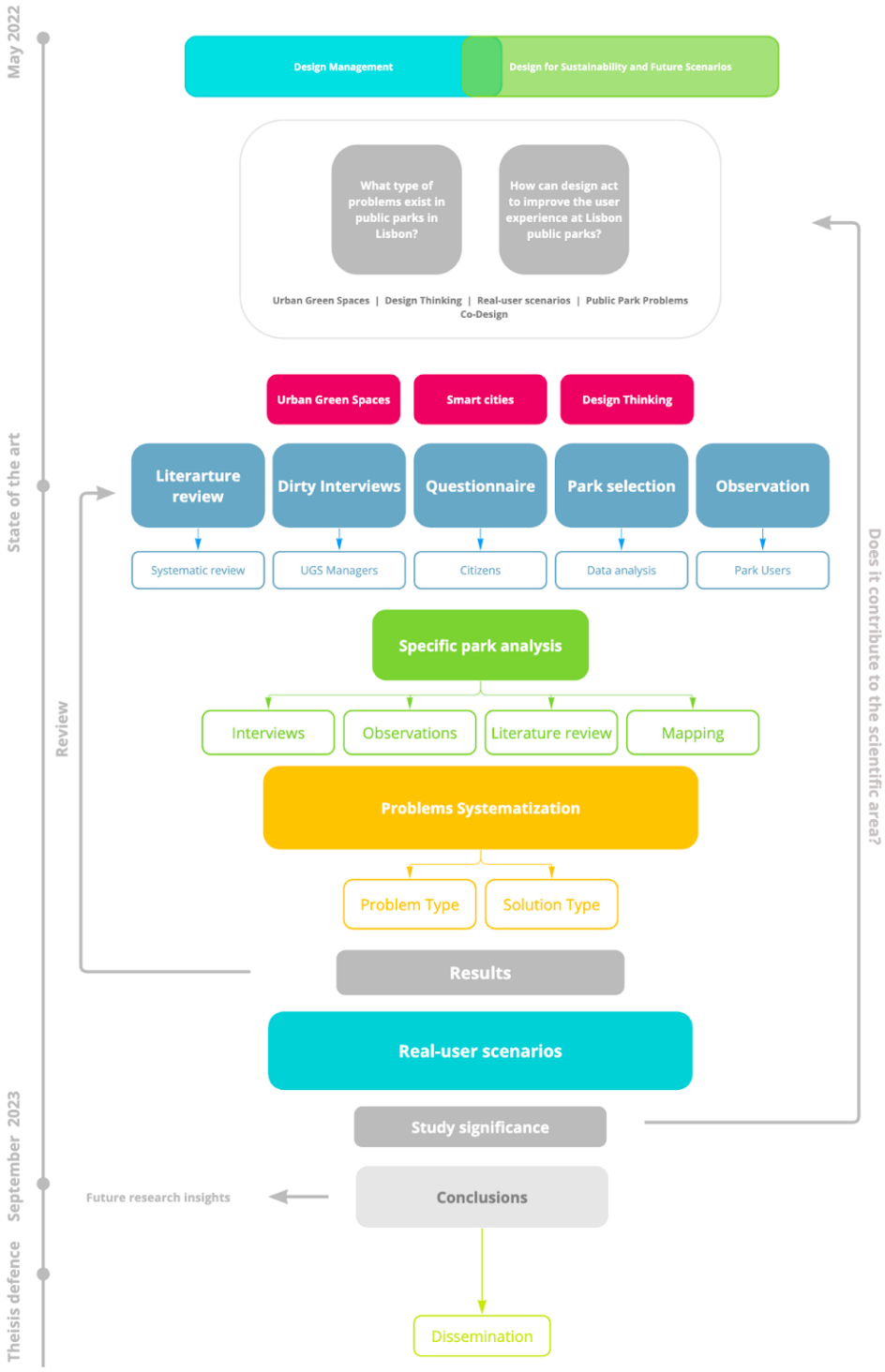


Figure 1- Study diagram

Chapter Two: State of the Art[1]

2.1 Health and well-being

In 1946, The World Health Organization (WHO) explicitly linked health to well-being by defining the former as "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity" (International Health Conference, 2002), whereas Brüssow (2013) defines health as "the capacity to adapt to changing external and internal circumstances," thus making the concept of health broader. In 2015, acknowledged that various social, economic, and environmental factors and individual behaviors and medical interventions impact health, thus implying that any strategy for improving health and wellbeing should include people's physical, mental, and social dimensions (World Health Organization, 2015).

Wellbeing, encompassing individuals and societies, is a positive state influenced by social, economic, and environmental factors, representing a resource for daily life, quality of life, and the capacity to contribute meaningfully to the world (World Health Organization, 2021). According to Crisp (2021), the term "well-being" is most frequently used in philosophy to refer to what is ultimately or non-instrumentally beneficial for an individual, and a person's well-being is what is "beneficial" to them. Therefore, while being healthy could be considered a component of well-being, it is not tenable to assume that it is the only factor. According to Keyes (2002), well-being and illness are measured differently and are not mutually exclusive, highlighting that interventions can be implemented to increase well-being for individuals with diagnosed illnesses and those without but with low levels of well-being. Moreover, the subjectivity of well-being is also an important aspect. According to Diener et al. (2018), subjective well-being (SWB) refers to an individual's own assessment and perception of how well their life is going, with the term "subjective" emphasizing the focus on personal evaluations and perspectives of life quality. According to Diener & Ryan (2009) while self-report measures are widely used in subjective well-being research and often demonstrate strong agreement among different measures, it is crucial to recognize the potential for measurement bias. Hence, although subjective measures exhibit strong

[1] A part of this chapter was published in "Boavida J., Ayanoğlu H., Pereira C. V., & Hernandez-Ramirez R. (2023). Active Aging and Smart Public Parks. *Geriatrics*. 8(5): 94. https://doi.org/10.3390/geriatrics8050094

reliability compared to non-subjective measures, including non-self-report measures is valuable for offering a more comprehensive understanding of well-being and overall life satisfaction.

Physical health encompasses the body's overall well-being, including its organ systems, immunity, and mobility (Svalastog et al., 2017; World Health Organization, 2015). The concept of physical health encompasses a wide range of outcomes, including subjective self-reports of symptoms and objective measures like mortality rates, with self-reported outcomes influenced by factors like memory biases. In contrast, objective disease endpoints provide more concrete and measurable indications of physical health Rasmussen et al. (2009). Mental health, as defined by World Health Organization (2022), is a state of well-being that enables individuals to effectively cope with life's stresses, realize their abilities, learn, work, and contribute to their communities. It goes beyond the absence of mental disorders and is an integral component of overall health and well-being. Mental health encompasses more than the absence of mental illness; it encompasses psychological well-being, which involves optimal psychological functioning and experience (Tang et al., 2019). Social health pertains to an individual's social well-being, including their ability to form and maintain relationships, engage in social activities, and feel connected to their community. Strong social connections provide emotional support, companionship, and a sense of belonging, making social health an essential aspect of overall health and well-being (Doyle & Link, 2022; Soofizad et al., 2022; Vernooij-Dassen & Jeon, 2016). Keyes (1998) defined social well-being as how well a person perceives his or her relationships with others, neighbors, community and put forth five dimensions of social well-being that are theoretically supported: social integration, social contribution, social coherence, social actualization, and social acceptance.

According to Flies et al. (2019), these urban-associated diseases refer to those that either increase in prevalence or severity due to urban living or growth or are expected to rise as urbanization trends continue. The study found evidence linking urban conditions to allergies, autoimmune, inflammatory, and infectious diseases, with air pollution being the most frequently associated health issue. Additionally, other urban risk factors, such as altered microbial exposure, vitamin D deficiency, noise and light pollution, and the challenges of transient, overcrowded, and impoverished populations, have been identified but are not as widely recognized.

Urban environments pose significant health risks and increase the prevalence of diseases among older individuals. Exposure to air pollution, a common feature of urban areas, has been linked to cardiovascular disease, which is a leading cause of mortality in older adults (Arden Pope et al., 2011; Brook et al., 2010). Furthermore, respiratory disorders like Chronic Obstructive Pulmonary Disease (COPD) and asthma are more prevalent among older individuals residing in urban settings, primarily due to the detrimental effects of air pollution (Brunekreef & Holgate, 2002; Cakmak et al., 2014; Havet et al., 2019). The risk of developing type 2 diabetes is also heightened in urban areas due to factors such as chronic stress, unhealthy dietary choices, and sedentary lifestyles (Dendup et al., 2018; Galaviz et al., 2018). Urban living can contribute to higher rates of depression and anxiety in older individuals because of social isolation, limited social support, and exposure to crime and violence (Gruebner et al., 2017; Joshi et al., 2017; World Health Organization & Calouste Gulbenkian Foundation, 2014). Sedentary behavior, which is common in urban lifestyles, can lead to weight gain and obesity, further increasing the risk of various health issues, including heart disease, diabetes, and certain types of cancer (Lynch, 2010; J. H. Park et al., 2020). Moreover, a lack of exercise can exacerbate osteoporosis, a condition characterized by reduced bone density and increased susceptibility to fractures, emphasizing the importance of physical activity in maintaining bone health among older adults (Kelley et al., 2013; Nikander et al., 2010). In the context of active aging, it is crucial to recognize that policies and programs supporting social connections and mental well-being are equally essential alongside initiatives focused on enhancing physical health (World Health Organization, 2002).

2.2 Urban Green Spaces and Benefits

The concept of Urban Green Space (UGS) does not have a single, consensual definition (WHO Regional Office for Europe, 2016). The Industrial Revolution's massive urbanization led to the development of the UGS concept in the 19th century (FADIGAS, 1993; Telles, 1997; Thompson, 2002). The decline of "green" nature landscapes inside cities due to urbanization raised public awareness of the need to incorporate nature assets and components into urban contexts during the 20th century. This decline in "green nature" landscapes led to the development of the urban park movement, which enhanced urban life (Loures et al., 2007; Pregill & Volkman, 1999). Industrialization was more noticeable in Europe and North America, which led to a greater emphasis on UGS. For instance, the idea of a "Green Lung" to purify city air was first implemented

in Central Park, a 19th-century structure in North America. In addition, Fredrick Law Olmsted developed a brand-new idea of continuous green spaces in 1867 and named it a parkway (Fábos, 2004; Walmsley', 1995).

UGS, including forests, public parks, and community gardens, are intended to offer a variety of opportunities for any resident to interact with nature and partake in activities like exercise, relaxation, or socializing (Kabisch et al., 2015; Vierikko et al., 2020). Additionally, they are essential for cities because they offer a variety of recreational opportunities, encourage social interaction and integration, and enhance mental and physical health (Enssle & Kabisch, 2020; Vierikko & Yli-Pelkonen, 2019). Although parks are essential, most UGS planning was seen as closely related to urban and garden design rather than a matter of public health (Loures et al., 2007). The social role of UGS is, therefore, typically highlighted with two main sets of concerns: first, those related to the practice of physical activity and relaxation, and second, those related to enhancing social and intergenerational cohesion (Gómes et al., 2014).

UGS may make cities more pleasant to live in and serve social, cultural, aesthetic, practical, economical, and ecological purposes (Gómes et al., 2014; Madureira et al., 2018). Consequently, the importance of UGS is closely related to a person's level of self-care. Body mass index, subjective health assessments, and longevity can benefit from physical activity, relaxation, and good mental health (Gómes et al., 2014).

Studies have shown that green spaces can positively affect older adults' health. For instance, older people who lived close to green spaces in the Netherlands reported better health than those who did not (Gómes et al., 2014). Additionally, it has been discovered that green spaces can strengthen social ties and a sense of community while encouraging physical activity in seniors 60 and older (WHO Regional Office for Europe, 2016). Older people need to interact with others to be healthy and happy, and social isolation has been linked to higher mortality rates (Steptoe et al., 2015).

It is vital to consider the advantages of vigorous and moderate physical activity when discussing the advantages of green spaces for older adults and the general public. Studies from different countries have demonstrated that having access to and using green spaces can increase physical activity, reduce sedentary time, and promote leisure walking (WHO Regional Office for Europe, 2016).

The benefits associated with UGS can only be fully realized when individuals have the necessary resources, time, and a balanced quality of life. This includes factors such as having the opportunity to engage in UGS activities and achieving a satisfactory work-rest balance. One crucial aspect that enables the realization of these benefits is a proper retirement system. With a well-planned retirement, individuals can take advantage of the UGS benefits and enjoy a higher quality of life.

According to B. J. Park et al. (2010), spending time in forested areas while walking or viewing them can decrease cortisol levels, reduce pulse rates, and lower blood pressure than in urban environments. Furthermore, the Conniff & Craig (2016) study also supports the notion that exposure to natural settings can have a restorative effect on our physiological well-being. A recent study by Ribeiro et al. (2021) discovered that individuals with access to natural surroundings during the COVID-19 lockdowns experienced lower stress levels. Moreover, those observing nature from their homes reported decreased psychological distress. This underscores the crucial role of neighborhood green spaces in preserving mental health, extending beyond the benefits induced solely by physical activity. Also, neighborhood green spaces are essential for long, leisurely walks (Sugiyama et al., 2013). Therefore, it is essential to develop green spaces that motivate seniors to engage in moderate physical activity if you want to advance public health. This is crucial because many older people struggle to maintain moderate physical activity levels (WHO Regional Office for Europe, 2016). Physical activity contributes to overall well-being, cardiovascular health, mental health, neurocognitive growth, and the prevention of obesity, cancer, and osteoporosis (Owen et al., 2010). Inactivity is one of the primary risk factors for mortality worldwide (World Health Organization, 2010).

Moreover, inactivity affects the global population's overall health and the prevalence of non-communicable diseases (World Health Organization. & World Health Organization. Regional Office for Europe., 2012). Research by Hartig et al. has shown that green spaces and physical activity levels are related (Hartig et al., 2014). Physical activity in green spaces particularly benefits urban dwellers with mental illness (Roe & Aspinall, 2011). Other demographics or subgroups may also experience similar benefits from green space, which makes outdoor activities enjoyable and convenient and promotes less sedentary lives. An analysis of ten United Kingdom studies demonstrated multiple mental health benefits from physical activity in green environments (Barton & Pretty, 2010). 'Green exercise,' defined as a physical activity undertaken in green or

natural environments, has been suggested to be more beneficial than other types of exercise (Barton & Pretty, 2010; Marselle et al., 2013).

Additionally, physical activity is linked to improvements across mental health indicators (Aurélio et al., 2005; Paluska & Schwenk, 2000). Lack of exercise can exacerbate health issues, especially in older adults (Cunningham et al., 2020; Langhammer et al., 2018). Some diseases get worse with age (Lang et al., 2010). Moreover, physical activity is significant in active aging (Harridge & Lazarus, 2017). Lak et al. (2020) state that active aging can benefit health and well-being. Age-friendly cities can provide a safe environment for older adults to leave their homes and participate in a society that values older adults and becomes more engaged with them.

2.3 Active Aging and Cities

The aging process refers to the biological changes that occur over time, resulting in a gradual loss of physiological integrity, diminished function, and increased mortality risk (López-Otín et al., 2013). Aging involves the deterioration of bodily functions and a decline in physical and mental capacity, primarily driven by cellular damage (López-Otín et al., 2013). While aging is a primary risk factor for various diseases, including cancer, diabetes, cardiovascular disorders, and neurodegenerative diseases, it is crucial to recognize that aging itself is not a disease but a natural phenomenon (López-Otín et al., 2013; Rattan, 2014; World Health Organization, 2002). Rather than focusing solely on disease treatments, adopting health-oriented strategies becomes crucial in addressing the impacts of aging. While there is no cure for aging, promoting active aging can significantly maintain overall well-being.

There is no widely accepted concrete definition of active aging. The concept of ‘Active Aging’ was initially introduced by Kalache (1999) and established a correlation between engagement in activities and health promotion in later life. In Kalache’s perspective, the essentiality of providing older individuals with ample opportunities to maintain an active lifestyle is emphasized, as good health, acting as a catalyst for individual and societal contributions, is dependent on both personal efforts and societal support. Consequently, sustaining activity and embracing an active life significantly enhance the likelihood of attaining optimal health in older age. An active life has the best chance of being healthy. According to World Health Organization (2002), active aging is the process of maximizing opportunities for health, participation, and security to improve the quality

of life as people age. The EU characterizes active aging as assisting people in continuing to live independently as they age and, whenever possible, contributing to the economy and society (European Commission, 2018).

According to World Health Organization (2002) active aging is the process of maximizing opportunities for health, participation, and security to improve the quality of life as people age. It is linked to various life transitions and involves maintaining health through activities that align with individuals' goals, capacities, and community opportunities (Lak et al., 2020). Healthy habits, such as a balanced diet and regular exercise, are essential components of active aging, reducing the risk of diseases and enhancing physical and mental well-being. Determinants of active aging include economic, health, social service, behavioral, individual, physical environment, social, cultural, and gender factors, highlighting the need for localized studies and information gathering to develop effective strategies for older adults. It is worth noting that there is a divergence between European and US approaches to active aging, with Europe prioritizing health and well-being while the US focuses more on productivity (Walker, 2008).

Promoting healthy aging and ensuring a high quality of life in an aging population are significant societal concerns, emphasizing the importance of maintaining well-being and healthy aging. Personal traits and environments play a crucial role in determining healthy aging, with research (WHO, 2007) highlighting their greater influence compared to external factors. Studies indicate that health is influenced by physical and social environments, as well as rewards and obstacles that affect opportunities, decisions, and health behavior (e.g., Brault et al., 2018; Kim, 2016; Sallis et al., 2012; Seeman & Crimmins, 2001). Multiple dimensions, including physical, cognitive, and social factors, are considered in defining healthy aging. Hansen-Kyle (2005) defined healthy aging as a process that involves slowing down physically and cognitively while resiliently adapting and compensating to optimize functioning and participation in all areas of life, including the physical, cognitive, social, and spiritual aspects.

In addition, it is essential to identify and eliminate barriers that hinder older adults from engaging in the community and ensure their voices are heard (United Nations. Department of Economic and Social Affairs. Population Division., 2020). The same study notes that in 2020, the number of adults aged 60 and above exceeded the population of children under the age of five. Therefore, as the population ages, it is crucial to prioritize age-friendly cities that enable older adults to maintain an active lifestyle. By implementing supportive policies, services, and infrastructure, age-friendly

cities can ensure that older adults have access to social participation, healthcare, transportation, and other essential resources that promote an active and inclusive lifestyle. From smart homes and assistive technologies to digital healthcare systems and transportation advancements, integrating technology into age-friendly city planning can create innovative solutions that empower older adults and enable them to thrive in their communities.

2.3.1 Age-friendly Cities

Our cities must prioritize including older residents and giving them full access to urban spaces, structures, and services to fully realize the potential for continued human development among older residents (Plouffe & Kalache, 2010). The comprehensive guide provided by the WHO (2007) offers valuable suggestions and criteria for cities to become "age-friendly," drawing upon the WHO's framework for active aging. This guide focuses on critical areas such as housing, outdoor spaces and buildings, social participation, respect and social inclusion, civic engagement, employment, communication and information, and community support and health services, serving as a valuable resource for cities to enhance their age-friendliness and ensure the wellbeing of older residents. A further suggestion by Dash et al. (2022) is the creation of an age-friendly ecosystem that includes cities, communities, health systems, universities, and employers.

As highlighted by the WHO (2007) document, government policies have been shaped by the analysis and expression of the older adult population's circumstances, leading to their active involvement in decision-making. The endorsement of this approach by the United Nations in 2007 signifies the recognition of older individuals' ability to contribute to society. Key factors such as outdoor spaces and buildings, transportation, and housing, which are closely linked to personal mobility, safety, health behavior, and social participation, are considered to have the most significant impact on an age-friendly city, according to the WHO (2007). According to the World Health Organization (2018), an age-friendly city is characterized by policies, services, settings, and structures that support active aging, acknowledge the diverse capacities and resources among older people, cater to their changing needs and preferences, respect their choices and lifestyles, protect the vulnerable, and promote their inclusion and contributions to all aspects of community life.

According to World Health Organization (2018), the presence of safe and accessible public buildings, transportation systems, and pedestrian-friendly spaces exemplify supportive

environments that can enhance the preparedness of cities. Age-friendly cities are designed to cater to people of all age groups, with a particular focus on the older population. These cities encompass policies, services, and infrastructure that foster healthy and active aging, empowering older individuals to contribute to society and ensuring they can live with dignity, security, and enjoyment. Key features of age-friendly cities often include the accessibility of facilities for senior citizens and their active participation as valued members of the community (e.g., Buffel et al., 2012; Fitzgerald & Caro, 2014).

In their study, Rashid et al. (2021) examined various reports from Age-Friendly initiatives worldwide, including those from New York City, Taiwan, Washington DC, London, Liverpool, South Australia, the UK, and New Zealand. By applying the eight dimensions outlined in the WHO guide, the authors identified 60 age-friendly features and categorized them according to the most relevant dimension. These findings underscore the importance of considering the specific needs of older adults when developing city policies, services, and infrastructure to foster inclusivity and wellbeing for all residents.

The study narrowed Rashid's original eight dimensions to seven, leaving out dimension three, which addressed housing features. Each dimension also excluded specific characteristics that were not directly or indirectly relevant to Smart Parks. The seven revised dimensions, resulting in 33 features, are shown in Table 1.

Table 1- Age-friendly features related to public parks (Adapted from Rashid et al., 2021)

Area	Dimension	Age-friendly features
Public parks	Buildings and Outdoor Spaces	Age-Friendly Pedestrian System Community Space Availability Inclusive Public Spaces Outdoor Spaces Seating Sign and Way-finding Sufficient and Accessible Public Toilet
	Transportation	Bicycle Strategy Facilities and Amenities at Stop and Station Priority Parking Public Transport to key destinations Transportation Option Well-maintained Roads
	Social Participation	Access to Facilities Accessibility of events and activities Range of Events and Activities Social Participation and Partnership Social Participation Guide Volunteerism Option
	Respect and Inclusion	Community Inclusion Intergenerational and Family Interaction Recognition and Acknowledgement Respectful and Training
	Civic Participation and Employment	Civic Participation Volunteering Options
	Communication and Information	Access to Communication System Age-Friendly Website Communication Option Information Offer and Deliver
	Community Support and Health Services	Crime Free Emergency Planning Falls Prevention Initiative Health and Support Social Services Training for Aged People

In their study, Rashid et al. (2021) conducted analyses on multiple reports at different levels of governance, including district, city, state, and federal governments. This variability highlights that the WHO guidelines provide principles that can be adapted and applied across various levels and regions (WHO, 2007). It is essential to categorize the key features of different elements within a

city. For instance, buildings and outdoor spaces are crucial in public parks. By understanding the specific features that are important for different city elements, urban planners and policymakers can take more effective actions to create age-friendly environments.

In 2018, the WHO introduced a report on "The Global Network for Age-Friendly Cities and Communities," which proposed a continuous improvement cycle for creating age-friendly environments (World Health Organization, 2018). This cycle consists of four dimensions: Engage and Understand, Plan, Act, and Measure, as depicted in Figure 2. Starting with the "Engage and Understand" dimension, the process progresses through the other dimensions until reaching the "Measure" dimension. This cycle is not a closed loop and can be initiated again from the "Engage and Understand" dimension. The age-friendly environment continuous cycle shares similarities with the Design Thinking method, which typically follows a 5-step model: Empathize, Define, Ideate, Prototype, and Test (Kernbach et al., 2022). Both strategies prioritize user-centered approaches, emphasizing the value of co-design and participatory design in creating effective and user-friendly solutions.

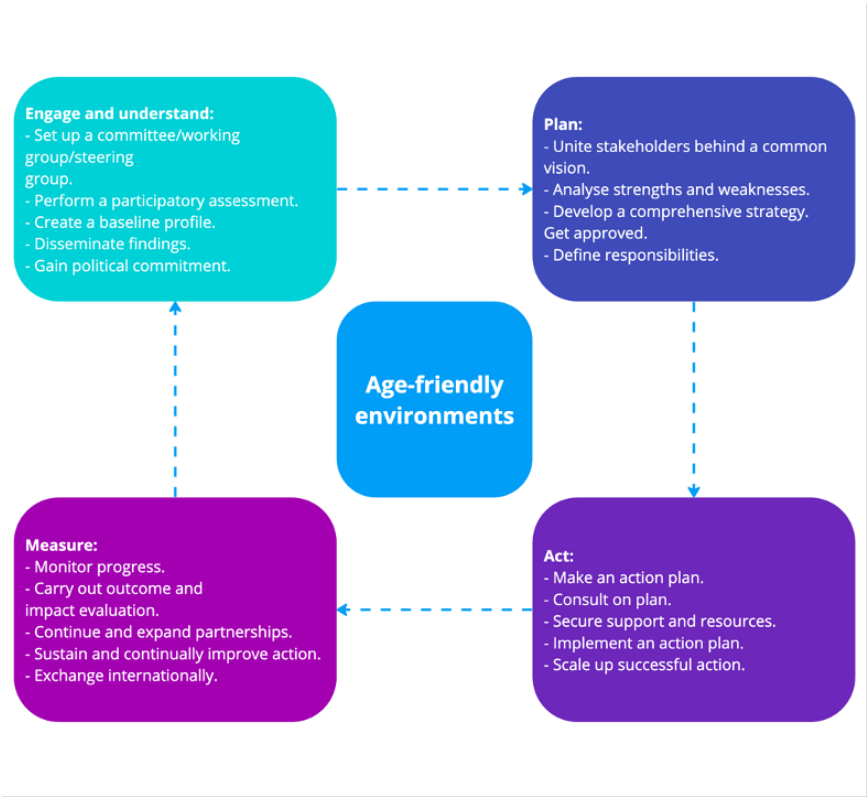


Figure 2 – Age-friendly environment cycle of continuous improvement (Adapted from WHO, 2018).

Buffel et al. (2012) claimed that creating age-friendly communities has become a significant social policy concern, encompassing issues relating to urban and rural settings. As cities globally embrace the smart city concept, which harnesses information and communication technologies (ICT) and Internet of Things (IoT) solutions to enhance the well-being of citizens and address urban resource management challenges (Lnenicka et al., 2022), it becomes increasingly crucial for urban development to prioritize the formulation of new policies and strategies aimed at integrating older adults into the social and economic fabric of cities (Buffel et al., 2012). Age-friendly cities focus on creating environments that cater to the needs of older adults, ensuring accessibility, safety, and social engagement. In contrast, smart cities leverage technology to enhance various aspects of urban life, such as transportation, energy efficiency, and infrastructure management. By integrating age-friendly principles with smart city solutions, cities can create innovative and inclusive environments that prioritize the well-being of all residents, regardless of age.

2.4 Recent Research on Older Adults and Public parks

This section presents an analysis and discussion of existing research on public parks, exploring their impact on promoting healthier aging among older adults. It also highlights solutions and recommendations for designing or redesigning parks with a focus on senior citizens. Extensive studies have been conducted on the relationship between public parks and the wellbeing of older individuals. To provide insights into the current state of research, a comprehensive analysis of 28 recent articles was undertaken, categorizing them based on their objectives, environmental aspects, proposed solutions, research methodologies, and geographical locations (see Appendix A).

A search was performed on the Elicit database, with a focus on the most widely cited papers released between 2020 and 2023. The search requested the original research's abstract summaries, main findings, study types, regions, and population summaries. Elicit identified a total of 31 articles. These articles encompass a diverse range of approaches. However, three articles were excluded: one was an earlier version of the research by the same author, the second needed more results as it focused on research methodology, and the third article was unavailable. The approaches found in the remaining 28 articles varied from technological solutions to a more social perspective on the problem. It is worth mentioning that Elicit includes its limitation to publications

in Semantic Scholar, excluding licensed journals and articles behind paywalls, which may result in a gap in the literature being retrieved (Kung, 2023).

Most of the papers analyzed in this study originate from Europe (N=15) and China (N=5), indicating the geographic distribution of research in this field. Notably, diverse solutions encompassing policy-related, design-related, technological-related, and mixed approaches were identified. Figure 2 illustrates these four types of solutions. Among the different types of research conducted, reviews (N=10), qualitative studies (N=7), and applied studies (N=7) are the most prominent categories, while data analysis studies or quantitative research (N=4) represent a smaller portion. Data analysis studies primarily rely on open-access data and often utilize Geographic Information System (GIS) research methodologies, such as visitation pattern analysis described in (Enssle & Kabisch, 2020). Qualitative studies employ questionnaires, observations, and interviews to gain insights into specific challenges park users face in particular regions. For instance, Onose et al. (2020) focused on understanding older individuals' interactions, needs, and motivations of older individuals in Romanian public parks. Literature reviews aim to establish parameters and guidelines for future research. For example, Alves et al. (2020) defined parameters for constructing a walkability index map based on non-GIS information. Lastly, applied studies concentrate on solutions predominantly relying on wearables. An example is Lachtar et al. (2020), which developed a cane utilizing LoRa and MQTT technologies to track older adults.

Furthermore, the analysis revealed that the articles examined in this study encompassed indoor and outdoor research and solutions. Indoor studies are predominantly centered around enhancing elder autonomy and providing healthcare assistance. On the other hand, outdoor research focused on evaluating the suitability of cities for older adults, such as by assessing walkability indices and visitation patterns and addressing issues related to public parks. Notably, a greater number of studies have emphasized the use of smart devices in outdoor environments. This prevalence of outdoor solutions in the applied research findings may be attributed to the specific keywords used to retrieve the articles, highlighting the importance of keyword selection in shaping the research outcomes.

The review highlighted several factors and barriers that influence older adult individuals' motivation when considering a public park visit. These motivations were categorized into three

main activities within the park: engaging in physical activity, participating in visitation and relaxing activities, and seeking social interactions. Understanding these factors and barriers makes it possible to comprehend better the drivers behind older individuals' decision-making processes and their preferences for different park activities.

In terms of physical activity, Bonaccorsi et al. (2020) identified positive factors such as walkability, urbanization, street connectivity, access to facilities, pedestrian-friendly infrastructure, green spaces, safety measures, and aesthetic qualities that motivate individuals to engage in physical activity. Conversely, negative factors such as barriers to walking, poor infrastructure, safety concerns, pollution, and noise discourage physical activity. Veitch et al. (2020) also highlighted the importance of walking paths, organized activities, and fitness equipment in promoting physical activity among seniors. The presence of outdoor fitness equipment has been found to positively impact older adults' total steps and energy expenditure, offering alternative exercise options beyond walking (Zhai et al., 2020). Living in areas with abundant amenities and resources is associated with leading more active lifestyles and increasing walking time (Gauvin et al., 2012). Furthermore, proximity to greenways with higher levels of neighborhood social capital and well-maintained paths, natural elements, and seating is linked to increased outdoor activities and subsequent physical activity among residents (Chang et al., 2020).

According to Stanley et al. (2022), older users prefer more benches in public parks as they are inclined towards relaxation and enjoying the scenery. Therefore, benches can serve as motivators for their park visits. Enssle & Kabisch (2020) found that older adults with stronger social networks receive more visits to parks than those who are socially isolated. The study also identified trees, nature and greenery, walking paths, and seating as crucial park features desired by visitors, particularly older adults. Furthermore, attractive, peaceful, and relaxing park environments are highly favored by senior citizens. Veitch et al. (2020) confirmed that well-maintained parks with established trees, gardens, birdlife, seating, pleasant paths, toilets, cafés, water features, shade, facilities for grandchildren, and the presence of other people encourage older adults visitation. The authors also highlighted that picnic/barbecue areas, scheduled events, cafés, and aesthetically pleasing surroundings act as motivators for social interaction among senior park visitors.

The review categorizes three different types of solutions (design, management, and technological), as illustrated in Figure 3. The analysis indicates a strong emphasis on technological solutions (N=13) for enhancing the well-being of older adults, reflecting the prevalence of technology-based approaches. Additionally, improved planning, policy, and management solutions were identified as crucial (N=7), underscoring the significance of advancements in these areas. On the other hand, design solutions (N=3) and hybrid solutions (N=3) have received less attention, indicating opportunities for further exploration and integration. These findings shed light on the existing research gap in terms of integrated solutions and highlight the potential for hybrid approaches to address the complex needs of optimizing the quality of life for older adults in public park settings.

Figure 3 – Identified type solutions

Exploring public park issues involves various techniques and offers diverse solutions, including technological, policy-related, design-related, or hybrid approaches. Appendix A presents two distinct paths taken in different studies. The first path focuses on identifying issues and understanding the population's needs. These studies (e.g., Onose et al., 2020) delve into user motivations, perceived problems, and user studies conducted in specific geographic areas like cities, nations, or groups of nations/cities. They employ techniques such as observations, interviews, questionnaires, or literature reviews to grasp why people visit public parks comprehensively. This method aims to provide practical and realistic solutions by building upon the existing knowledge of the issues and population (e.g., Lachtar et al., 2020). While all the studies in Table 2 offer expert recommendations or solutions, none of them follow a systematic approach. Appendix A also highlights several recommendations from the articles. Active participation of older users in the planning process is crucial to designing age-friendly parks (Enssle & Kabisch,

2020). Citizen participation ensures better outcomes and addresses the specific needs of the older population.

When applying research findings from one country to another, caution should be exercised, as these findings may be influenced by cultural or geographical factors (Bonaccorsi et al., 2020). It is recommended to combine qualitative techniques, such as focus groups, interviews, and observations, with objective measurements like comfort and usability to obtain more precise data on the quality of bench designs. The concept of Uncertain Geographic Context Problem (UGCoP), highlighted by Kwan (2012), refers to situations where contextual variables and research findings are sensitive to different delineations of contextual units.

Policy and decision-makers, urban planners, landscape architects, and government organizations at various levels must comprehend the reasons older people visit public parks in order to ensure that parks effectively support older adults' health and active lifestyles (Veitch et al., 2020). This highlights the importance of developing policies that specifically cater to the needs of senior park users. Furthermore, promoting user participation in park management and creating socially multifunctional spaces can help create inclusive parks that cater to diverse age groups (Sundevall & Jansson, 2020). It is essential for planning policies and practices to be more nuanced and tailored to the specific requirements of older adults (Benton et al., 2021). Landscape architects can contribute by incorporating outdoor exercise equipment in urban parks, encouraging seniors to engage in physical activity (Zhai et al., 2020). Understanding the reasons, approaches, and optimal timing for senior citizens to use outdoor exercise equipment is essential for designing effective interventions.

As stressed by Podgórniak-Krzykacz et al. (2020), it is crucial to incorporate a citizen-centered approach in order to create smart and age-friendly environments. Similarly, Tian et al. (2020) highlight the importance of human-centered design that promotes fairness, flexibility, diversity, and positive user experiences while considering older adults' specific space usage needs. Furthermore, Marques et al. (2020) emphasize the importance of accuracy, security, and reliability in addition to user-friendliness, ubiquity, and user-centricity when developing technologies for older adults.

Onose et al. (2020) point out the significance of connecting public parks to the nearby neighborhood to maximize their use. Regarding park facilities, Zhai et al. (2021) suggest that seniors prefer amenities such as flat pavements and benches. Creating engaging environments with features like artwork, sculptures, and cafes is crucial, as emphasized by Enssle & Kabisch (2020) and Veitch et al. (2020), as these elements can attract older adults. Additionally, providing appropriate fitness equipment can encourage more active use of the parks.

Chang et al. (2020) suggest that urban greenways, linear public spaces next to roads, should prioritize environmental quality to create outdoor spaces that promote the wellbeing of older adults and are simple to maintain. Additionally, Marques et al. (2020) suggest recommendations for smart therapeutic landscapes, including the use of on-site and remote monitoring tools, activation mechanisms for assistive technologies during emergencies, and the localization of affected senior citizens. These measures aim to ensure that older adults can enjoy the outdoors while addressing their specific needs and concerns. The following section will focus on the Lisbon public parks case.

2.5 Lisbon case

In Portugal, Urban Green Spaces have different definitions depending on the region and management team responsible for the UGS.

For the Lisbon region, there is no general definition for UGS. Instead, several micro definitions were made for management purposes.

Lisbon Council organizes City Urban Green Spaces into three big groups, Green Corridors (Corredores Verdes), Leisure and Green Spaces (Espaços Verdes e Lazer) and horticultural parks (Parques hortícolas) (CML, n.d.-a).

According to CML (2017) there are 17 different types of UGS: Main Garden (Jardim Principal), Framing a monument or noble equipment (Enquadramento de monumento ou equipamento nobre), Recreational park (Parque recreativo), Neighborhood garden (Jardim de bairro), School (Escola), Cemetery (Cemitério), Residential Framework (Enquadramento residencial), Continuous residential framing (Enquadramento residencial contínuo), Equipment framing (Enquadramento de equipamento), Urban park (Parque urbano), 1st level road framing (Enquadramento de via de 1.º nível), Central separator track framing (Enquadramento de via-separador central),

Discontinuous track framing (Enquadramento de via descontínuo), Green spaces for recreation and production (Espaços verdes de recreio e produção), Green spaces for protection and conservation (Espaços verdes de proteção e conservação), Expectant areas (Áreas expectantes) and Noble garden (Jardim nobre).

These variations happen because Lisbon city was not all planned simultaneously. The majority of the neighborhoods were planned and built at different times. We can use the example of Olivais Neighbourhood, which was built based on the Athens Letter (Portas et al., 2003). The Athens Letter has a vision of cities, mixing nature and buildings. For that reason, there are very few places near buildings that seem like UGS, but they don't match all qualities that a UGS must have.

Through World Health Organization (2017) definition of Urban Green Spaces, just Main Garden (Jardim Principal), Recreational park (Parque recreativo), Neighborhood garden (Jardim de bairro), Urban park (Parque urbano), and Noble garden (Jardim nobre) have touch points with that definition. This means that these parks have some carachteristics that resemble the definition. Those carachteristics can be related to size, features or other public park elements.

Main Garden (Jardim Principal) can be defined as a garden for use at the city and neighborhood levels. Reference space in the city (architectural, artistic or plant heritage, viewpoint), with the permanent need to carry out a large number of maintenance operations simultaneously.

Recreational park (Parque recreativo) can be defined as a fenced space designed for intensive recreation at a metropolitan level. With a wide range of children's and/or youth equipment and support infrastructure, it is foreseeable the permanent need to carry out a large number of maintenance operations simultaneously.

Neighborhood garden (Jardim de bairro) can be defined as a Garden with use at the neighborhood level, with the daily need to carry out a large number of maintenance operations simultaneously.

Urban park (Parque urbano) can be defined as a large space in general, designed for recreation and leisure for metropolitan use. Dimensioned to support "heavy" equipment, constituted by diversified areas and with different levels of demand, foreseeable the permanent need to carry out a large number of maintenance operations simultaneously in some places.

The other types of UGS define framework places near streets, roads and monuments, school areas, cemetery places, places for plantation and conservation purposes, and finally, expectant zones, which are important green areas with potential that can be transformed into Urban Green Spaces.

In Lisbon, places like Largos, Praças, Terreiros, Pracetas, and other public spaces (similar to squares) are abundant, in opposition to many other cities. These places are often compared to public parks and gardens because they are situated near users and sometimes offer the same features like fitness machines or cafés.

Lisbon Council defined some objectives for Lisbon Urban Green Spaces. Firstly, they want that all citizens can access to Urban Green Spaces within a maximum 10 minutes walk from their homes. Secondly, the Lisbon council is planning and constructing Green corridors that connect different Lisbon regions, and monuments, using green structures and other places.

Lisbon has nine Green corridors Alto do Lumiar, Central, Ocidental Rio Seco, Oriental, Periférico de Lisboa, Ribeirinho, Vale de Alcântara, Monsanto, and Olivais.

Besides this definition, green spaces in Lisbon are inside two other big groups, leisure and green spaces and Horticole Parks.

The two groups essential for this research are Green corridors and green leisure spaces.

2.5.1 Lisbon case in numbers

A research using Lisbon as case study, concluded that "nature motivated park use more often, and the park visitors enjoyed relaxation and well-being much more often than in the other three cities."Also, according to Vierikko et al. (2020, "in Lisbon visitors went to parks near their homes to enjoy nature, walk around and relax."

From this study it is worth to mention that "the close to home location was a commonly mentioned motivation for park use in Helsinki and Lisbon (25% and 21%)" even though "in Lisbon only 19% of land surface is recreational UGS compared to Helsinki with 47% of recreational UGS" (Vierikko et al., 2020; Vierikko & Yli-Pelkonen, 2019).

Has mentioned in the above study, when compared to other 24European cities, "both Lisbon and Porto show below-average green space availability values" (Kabisch et al., 2015). But according to European Environment Agency (2021), the share of green urban areas inside the core cities is higher in Lisbon (24.1%), mostly because of the non-used green infrastructure.

2.5.2 Crime and park usage, a study in the second biggest city of Portugal

Ribeiro et al. (2015) study focused on the crime related areas and public park usage in Porto city. Results didn't find a correlation between neighborhood crime rate and the practice or the frequency

of leisure-time physical activity (LTPA), but neighborhood characteristics like distance to the nearest park and to the nearest non-residential destination, are associated with the time spent on LTPA, but only among older women that were active in some way. The only positive association found was between participation in LTPA and non-violent crimes among women.

According to Ribeiro et al. (2015), say that are three possible explanations for the unrelated associations between Physical activity (PA) and neighborhood crime: low risk of crime; walkable neighborhoods are attractive to crime; and social/cultural factors alleviate feeling unsafe. Ribeiro et al. (2015), says that most Portuguese cities are relatively safe urban areas and the few existing threats might not suffice to dissuade older adults from engaging PA.

In the next section of the thesis the draw of the research and the methodologies are explained in more detail. Also, the map of the tasks is presented.

Chapter Three: Research Methodology

This dissertation approaches the two scientific areas of Design, Design Management and Design for sustainability and future scenarios. This dissertation presents exploratory research with an ethnographic approach using qualitative and quantitative information to build Real-world User Scenarios.

The methods used were literature review, questionnaire, dirty interviews, data analysis, and Observation. Also, for some of the methods used, different tools were used(e.g., Clustering, AEIOU Framework, and Storytelling).

The first method used was a literature review. This review aimed to understand the state of the art of Urban Green Spaces generally, the impact that Urban Green Spaces have on citizens' health and wellbeing, how UGS can contribute to active aging, and the state of the art of Lisbon public parks. Also, the collected information gave insights into the suitable methods to use while exploring public park problems(e.g., Questionnaires, Interviews, and Observation). Additionally, this review gave important information on everyday activities and problems park users face while visiting parks. This information was crucial to build the questionnaire.

The second method used was the questionnaire. The questionnaire aimed to overview Lisbon public parks, define the type of users, understand how users interact with public parks, understand the activities they usually do in parks, and understand which problems users face while visiting parks. Furthermore, the questionnaire confirmed information gathered from the literature review, verifying the state of the art for the Lisbon case. Additionally, the information from the questionnaire was essential in choosing the parks to observe in the following phases.

The third method, Dirty interviews, happened parallel to the questionnaire preparation, delivery, and analysis. This method's main objective was to collect information about Lisbon's Public Park Management by understanding the main challenges each parish perceives and prioritizes. Also, these interviews enable an understanding of the possible ways of managing Lisbon Public Parks.

Before the fourth method, Observation, a park selection was performed to understand the three parks to be observed. Since the study has Lisbon as its case study, all information about Lisbon

public parks from a literature review, dirty interviews, and questionnaires was analyzed to select the best parks to observe. This step involved the clusterization all the parks that fulfilled the requisites to be considered public parks. After this clusterization, the parks were chosen by crossing this information with the questionnaire information, leading to the three parks: Jardim Guerra Junqueiro, Jardim da Alameda Dom Afonso Henriques, and Parque Bensaúde (The justification for this choice is more detailed in the park selection section).

The fourth method, Observation, aimed to collect specific on-site information about the type of users, activities, interactions, objects, and the environment. Also, specific information related to possible problems that users can perceive was retrieved from these observations.

After an analysis and comparison, an overview of the most relevant Lisbon public park problems was achieved. Finally, these results were used to write real-world user scenarios. This step transformed problems without context into context ones, making them easier to approach.

The methodology diagram and flow chart (Methods are shown as time-based; the upper part of the flow chart illustrates the early stages, and the lower portion shows the final stages) of this research can be visualized in the flow chart in Appendix B.

Chapter Four: Data Description, Analysis, and Results

4.1 Insights from Management

Since 2012 and according to the regulation Lei n.º 56/2012 Reorganização Administrativa de Lisboa, the council parishes of Lisbon have been responsible for managing, maintaining, and cleaning green spaces and equipment in the city, while the city council is only responsible for structural elements in the city, such as the main traffic lanes or large green spaces: Fountains (conservation and repair), Green spaces (management and maintenance), Street furniture in the public area (maintenance, repair and replacement); Pedestrian floors (maintenance and conservation); Toponymic plates (acquisition, placement and maintenance); Horizontal and vertical signage (conservation and repair); Roads, public spaces, gutters and sinkholes (cleaning); Bathhouses, washrooms, and public toilets (creation, construction, management, preservation, and cleaning); Cultural equipment (management, conservation, and repair); Sports equipment (management, conservation, and repair); Schools, first cycle and pre-school education establishments, daycare centres, kindergartens, and support centres for older adults (management, conservation, and repair); Fairs and markets (day-to-day management and maintenance); and Public playgrounds (creation, construction, management, and maintenance).

To guarantee funds for parishes to do all these activities, CML provides different amounts of money depending on the area and type of green spaces in each parish. This way, all the parishes receive different quantities of money.

The main objective of this section was to have an overview of public parks management problems and trace a possible path to conduct the research. Since each parish has the power to manage its green spaces, the approaches can vary. Therefore, the Quick and dirty interviews method was chosen to detail the different approaches and try to understand possible problems each parish faces.

4.1.1 Methods

Quick and dirty interviews were done due to being not intrusive and let the interviewees feel free to discuss the topics they felt were more important. Email interviewing and face-to-face interviews were conducted because of the participants' availabilities.

4.1.2 Participants

Five different parishes (Penha de França, Benfica, Beato, Olivais, and Alvalade) participated in 3 different forms of this study. The coordinator of green spaces from Benfica Parish and the head of the public space and equipment division from Alvalade Parish were accepted to be interviewed face-to-face. The Head of the territorial management and administrative modernization division of Penha de França and the responsible for public space at Beato parishes responded to the questions through email, and Olivais just sent the information that was asked.

4.1.3 Procedure and Materials

A first email was sent to all 24 parishes of Lisbon in which the study's objective was indicated. Some information was asked: “I am particularly interested in information such as area, features of the park, garden furniture, whether it has drinking fountains, whether it has a bike path, what access it provides, whether it is accessible to people with reduced mobility, whether it has a playground, whether it has a bathroom, whether they have café’s and what activities are possible to do in the park.”

Besides, the researcher asked for a meeting to interview the responsible person in each parish. Most of the parishes (19) did not reply. Two parishes accepted to be interviewed face-to-face, two were email interviewed, and one parish only sent the information that was asked in the email. Another email was sent to 2 parishes with the interview questions. Furthermore, a third email was sent to Lisbon City Council for more information.

However, they directed the researcher to get the information from their platforms, namely Lisboa Interativa, the City Council website, and the app Na Minha RUA LX.

Lisboa Interativa is a platform developed by the Lisbon city council that allows citizens and managers to view and get information about Lisbon maps. The platform could be more friendly but displays much information.

The City Council website has information about different areas from Lisbon council. This information connects citizens to Lisbon news(i.e., new law approvals, cultural events, or interventions in the city).

The researcher went to each parish for the face-to-face interviews to meet the responsible person. The procedure changed for each parish that was interviewed face-to-face, though the questions

(Table 3) remained the same. More detail is given in the results section. During the face-to-face interview, some extra doubts/questions were raised.

Table 2 - Interview Questions

	Questions	**Objective**
Q1	How do you manage green spaces?	Understand and confirm how parishes manage their green spaces, trying to understand if they have their teams or if they subcontract.
Q2	What are the biggest problems in your green spaces?	This question was made to understand if the problems that citizens feel are the same as those of managers.
Q3	How do you interact with citizens about green spaces?	This question aims to understand which channels are used to communicate with citizens. This way, we can understand how these interactions work.

4.1.4 Results:

Table 4 highlights the most relevant results from quick and dirt interviews. We can compare the type of maintenance, the most common problems, and how parishes interact with citizens.

Table 3 - Compilation of the information gather during interviews

Parish	**Benfica**	**Alvalade**	**Penha de França**	**Beato**	**Olivais**
Maintenance of Green Spaces	Internal Teams	External Teams	-	External Teams	-
Problems in the green spaces	Irrigation - Water Stress; Garbage – Dirt; Trees; Pine processionary; Vandalism.	- Irrigation - Water Stress; -Garbage – Dirt; -Dog waste; -Vandalism; -Inappropriate use of equipment.	-Lack of civility and vandalism	-Vandalism	-
Interaction with citizens	- Email; - In the Parish; - Telephone; - App na minha Rua Lx	- Email; - In the Parish; - Telephone; - App na minha Rua Lx	-	-	-

From the table, it is noticeable that there are two ways of maintaining green spaces: through internal teams or external teams.

The following results were grouped by parish.

<u>Benfica Parish:</u>

Benfica's face-to-face interview had two phases. Firstly, the space was explored, and the responsible explained the maintenance and management processes. Secondly, the researcher was invited to the office, and the interview was executed.

Benfica Parish Public Parks Management's primary goals are:

- Switch all fossil fuel-dependent equipment to electric equipment;
- Reduce the use of plastic garbage bags through the use of burlap sacks;
- Reduce water costs;
- Compost green waste to reuse as a natural fertilizer;
- Make Gardens more attractive through events, equipment (Creating dog parks), and "outdoor art galleries" – Bringing people back to the parks and taking care of animals.

The coordinator mentioned that the most significant problems are irrigation, garbage, trees, pine processionary, and vandalism.

Irrigation is mentioned because they do not have automatic sprinklers and other technological instruments that help manage water use and low water waste.

Garbage and dirt in the street occur most of the time because citizens abuse and throw garbage everywhere.

Lack of trees, tree management (i.e., old trees that are protected by law and cannot be cut), and complaints from citizens about branches near their houses.

Pine processionary is a problem that Benfica parish deals with every year. Now, they are using natural products to deal with this problem. The first places where they intervene are schools and places near houses.

Vandalism is explained as a problem that happens all over the parish but is not considered a huge problem. Vandalism problems are not related to broken urban furniture but to wrong usage or drawings in the furniture.

This parish is very concerned about nature and animals. They use different approaches to make species control in their area of affection.

For example, they use street catteries to prevent the growth of the rat population and use "*Pombeiro*" to control the pigeon population.

Benfica Parish receives feedback from park users via different means. Young adults prefer the app "Na Minha Rua Lx" or email, and older adults tend to use telephone and direct contact in the parish. Feedback from parish workers is also a way to get information about changes and problems related to green spaces.

Alvalade Parish:

The Head of the Public Space and Equipment Division at the Parish Council of Alvalade replied to the original email sent to the Alvalade Parish proposing an interview in the parish facilities.

Subcontracted teams are responsible for Alvalade parish green space cleaning and maintenance because Alvalade parish does not have a maintenance team.

The interviewee mentioned that one of the most significant problems is the nonexistence of public parks for youth. Sports parks, such as skateparks or basketball fields, are the only parks available for that kind of user. This lack of options leads these youths to use inappropriate equipment, like playgrounds, that are planned for children between three and twelve years old.

Also, the interviewee stated that the pandemic had brought more use and appreciation of urban green spaces. Nowadays, citizens value having a green space close to home. The number of requests for community gardens increased. Citizens want to be active in caring for gardens and patios and create new green spaces near their residences.

Communication and feedback between citizens and the parish are similar to those in Benfica parish. The interviewee only pointed out that their parish users would point less to the problems and look more for possible solutions, meaning they are more participative than other parishes.

The interviewee gave some examples of how the parish intervenes.

Alvalade Parish offers plastic bags to collect dog poop and announces it by using visible signals throughout the parish so the citizens do not need to buy plastic bags.

Another example was the transformation of public parks. Managers increased the size of bins at a park near a school frequented by young adults because the older bins were always full of pizza boxes, and sometimes the boxes would not fit inside and would fall to the floor.

The most common problems in Alvalade green spaces are irrigation, garbage, dog waste, vandalism, and inappropriate use of equipment.

Irrigation and garbage problems are similar to Benfica parish, with no good water management and much dirt in the places where it is not supposed to be.

Dog waste is mentioned as a problem because the parish gives bags, and people continue to act as if they do not exist. This problem can be related to a lack of civility or lousy communication.

Vandalism was said to happen constantly in the same places, most related to tags in urban furniture and broken instruments.

Inappropriate use of equipment is mentioned as a big problem because, as told above, there are no parks prepared for young people, only Sportif parks, and sometimes they tend to use playgrounds. In the end, the head of the Public Space and Equipment Division stated that they would like to get more information about the places of stay (most used areas) and the most and least frequent hours of usage.

Penha de França parish:

The Head of the territorial management and administrative modernization division at Penha de França parish replied to an email interview sent to Penha de França parish.

Penha de França parish's main problems are transversal to all their green spaces: lack of civility and vandalism. Examples include Damaged or stolen street furniture, Destroyed and graffitied playground equipment, Theft of irrigation systems, Dog droppings on lawns, and Theft of plants. Besides these answers, the responsible added a map of public parks of their responsibility to the email. The public parks map shows that most of them are small.

Beato parish:

The Responsible for public space in Beato Parish replied to the email interview.

External services ensure the maintenance of green spaces. Vandalism is the main problem in Beato Parish. The last question was not answered.

Olivais parish:

Olivais is a unique Lisbon parish inspired by the Athens Letter (1933), the city-garden model. It has a significant area of green spaces, around 101ha.

The green spaces are divided into four main groups: urban parks, Public gardens, framing and road areas, and buildings and Expectant areas. The first three represent places that already have a purpose, and the last one represents areas that have the potential to turn into something usable. The size of this area is around 1.4 ha.

4.1.5 Conclusions:

Each parish has its way of managing the public parks, ideas, and goals. The values vary from parish to parish. All the parishes have problems, but most have common problems (i.e., water stress) but

with different degrees. How parishes manage their parks can be related to various aspects: green area size, type of population, budget, terrain, and others. The vision of each parish is different. For example, even though Benfica managers focus on nature, they refer to the Olivais parish area as a good idea only on paper. Even though it is a big green area, most of them could be more valuable, and a lot of water and resources are needed to maintain the city garden.

In Lisbon, Urban Green Spaces management can be done by (Figure 4): the council, the parish, or both in cooperation. Inside parish management, two ways exist: by using their own teams or contracting external services. The main focus of managers is efficiency, doing more with less. They focus more on solving problems they perceive than on listening to users. The focus on perceived problems might happen because of the need for more workers and technology resources. There is a big transition in Lisbon's urban green spaces, but many parks keep having a few essential technological devices like remote-controlled water sprinklers.

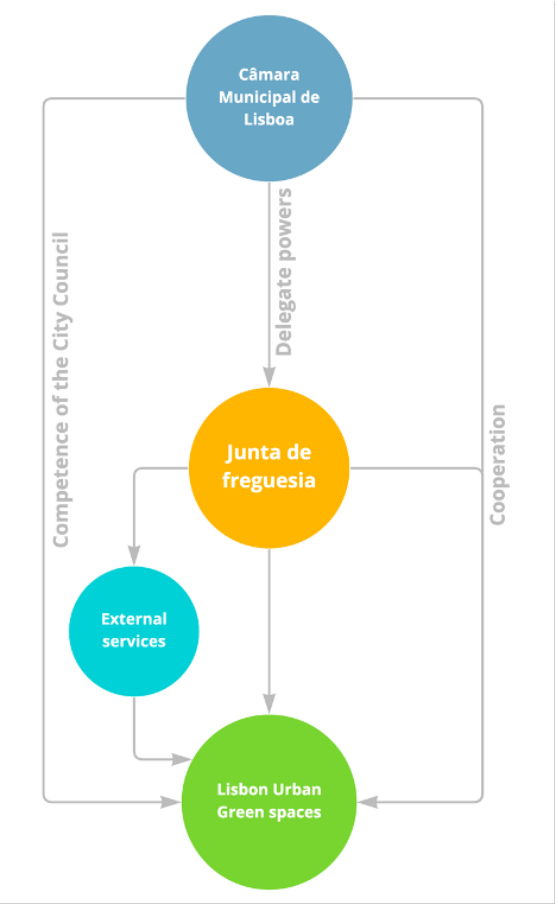


Figure 4 - Lisbon Urban Green Spaces management

This chapter highlights the deficiency of technological solutions to help managers build more responsive and intelligent parks. As mentioned above, the only technological solutions are not intelligent or responsive. They are only technological, like sprinklers, tools, or lights. For example, new devices that perceive problems like non-accessible areas can contribute to more effective interventions, resulting in more usage by citizens. Also, technology can be used to bring more users by understanding what citizens need and how citizens would like those parks to be. Since today's citizens rely on technology, even in fundamental life aspects, intelligent devices that can be used to adapt the ambient to users can help managers turn cities into more livable places.
Insights from management displayed how Lisbon's urban green spaces are managed. It gave insights into managers' perspectives and freedom of work per parish and highlighted each parish's different approaches. Most of the problems of parishes are similar. The following section displays the citizens' perspective on public parks.

4.2. Insights from Citizens

The previous section gave insights into managers' perceptions, ways of action, and priorities.
Lisbon council displays information about city public parks and how they are managed, but this information is dispersed in different platforms. That information can be checked in Na minha Rua LX, and people can indicate problems online. There is also another initiative from CML named Lisboa Participativa, which has been done since 2008 (Cameira, 2019). This initiative allows citizens to apply for new projects, and the ones more voted to receive a budget to be implemented.
As mentioned in the literature review, citizens use green spaces for different reasons, including proximity, physical activities, and other activities.

4.2.1 Method

An online questionnaire was created aiming to get information about users' perceptions of problems regarding green spaces. The secondary objectives are to understand, at a deeper level, the public park users prefer and their needs while visiting a specific public park.

4.2.2 Participants

One hundred five people replied to the questionnaire, and the participants' age ranged between 20 and 71 (M= 41.36, SD=15.619), with gender distributed as 75 females, 28 males, and 2 others.

The questionnaire respondents were all residents of Portugal, from Lisbon, Setúbal, Coimbra, Porto, Braga, Leiria, and Aveiro districts.

4.2.3 Material

An online questionnaire was created in Portuguese and English (See Appendix C). The expected filling time was 20 minutes. The online survey had an introduction in which the study's objective was highlighted, as well as the filling time and email of the researcher in case of necessity.
The questionnaire (See tables 5 to 8) consists of 4 sections. The first section (Q1-Q6) was related to demographic information, why users visit the park, how often it visits, and the park that visits the most. The second section (Q1-Q6) relates to questions about the park he visits the most. The third section (Q1-Q6) is related to why users do not visit a park. The fourth section (Q1-Q6) is where respondents can give others insights and contributions about public parks.

Table 4 - Questions section 1

Section 1 - Demographic Information	
Q1. Age	Continuous
Q2. Gender	Nominal
Q3.Parish, do you live	Nominal
Q.4 Type of house Where do you live?	Binomial
Q.5 Highest education level	Ordinal
Q.6 Marital Status	Nominal

Table 5 - Questions section 2

Section 2	**Most Visited Park**
Q.7 Park most visited	Open question
Q.8 Reasons to visit that park	Nominal
Q.9 How do you get there	Nominal
Q.10 Time to arrive at the park	Ordinal
Q.11 Who do you go to the park	Nominal
Q.12 Time stay in the park	Ordinal
Q.13 When do you visit the park	Nominal
Q.14 Time of the day	Ordinal

Q.15 Days per month	Ordinal
Q.16 Please indicate if you have any disability	Nominal
Q.17 Barriers in the park	Nominal
Q.18 Are there any events occurring in the park?	Binomial
Q.19 What kind of events occur in the park?	Nominal
Q.20 Which information did you receive about the park?	Checkbox
Q.21 Areas of preference	Checkbox
Q.22 What do you like about the park?	Open
Q.23 What don't you like about the park?	Open
Q.24 Activities you do?	Likert scale

Table 6 - Questions section 3

Section 3	**Park, you do not visit**
Q.25 Park less visited	Open question
Q.26 Animal Problems	Ordinal
Q.27 Weather conditions problems	Ordinal
Q.28 Noise problems	Ordinal
Q.29 Park information problems	Ordinal
Q.30 Maintenance problems	Ordinal
Q.31Facilities, Areas, and Equipment Problems	Ordinal
Q.32 Accessibility problems	Ordinal
Q.33 Security Problems	Ordinal
Q.34 Park cleanness problems	Ordinal
Q.35 Vandalism problems	Ordinal
Q.36 Events/Activities problems	Ordinal
Q.37 Other problems	Ordinal
Q.38 Other problems that you want to highlight	Open question

Table 7 - Questions section 4

Section 4	**Your relationship with the park**
Q.39 What is missing in the park?	Open question
Q.40 What information would you like to get from parks	Open question

Q.41 Do you have any idea of possible ideas for the problems you mentioned	Open question

4.2.4 Procedure:

A Snowball sampling technique was used to distribute the questionnaire, letting each participant be the distributor. The touchpoints used in this distribution were e-mail, Parish communication, and Social networks (Facebook, Instagram, and WhatsApp). Due to the sampling technique, the respondents were not limited to Lisbon. The questionnaire was active for 40 days to collect data until it reached sufficient participants.

4.2.5 Results and Discussion

The data from the questionnaire were analyzed using SPSS 28.0.

Different statistical methods were used to analyze the data. Descriptive analysis was performed to understand data from the population. The Fisher test was used to test the correlations, and Spearman's test was used to evaluate a correlation.

Section 1: Demographics

One hundred five people replied to the questionnaire, participants' ages ranged between 20 and 71 years (M= 41.36, SD=15.619), and the mode was 22 years. Of the 105 respondents, 71.4% were Female, 26.7% were male, and 1.9% replied other. Most respondents live in apartments(78.1%) than in Houses (21.9%).

The academic qualifications of the respondents show that 84.7% are very educated (Graduates: 44.8%, Masters: 33.3%, and Doctorates: 6.7%), 14.3% have high school, and 1% did not finish high school.

Fisher test is a non-parametric test used to evaluate if there is a correlation between the type of house where users live (House or Apartment) and the number of times they visit a park in a month. This test was chosen because some assumptions about the sample were not verified to apply the Chi-Square test.

Hypothesis:

H0: The number of times they visit the park is independent of the type of house they live;

H1: The number of times they visit the park is not independent of the type of house they live;

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	3.200[a]	4	.525	.550		
Likelihood Ratio	3.902	4	.419	.482		
Fisher-Freeman-Halton Exact Test	2.447			.641		
Linear-by-Linear Association	3.117[b]	1	.077	.083	.046	.021
N of Valid Cases	105					

a. 5 cells (50.0%) have expected count less than 5. The minimum expected count is .66.

b. The standardized statistic is -1.765.

Figure 5 - Chi-Square Result

It was expected that the people living in apartments tend to go to parks since they have more limited space and a lack of outside space. Since P= 0.641 > 0,05= $\boldsymbol{\alpha}$, do not reject H0 (Figure 5). The variables are independent. No correlation exists between the number of times they visit the park and their house type.

Spearman's test:

Spearman's test evaluates the correlation of two variables.

Hypothesis:

H0: Respondents visit parks in their council.

H1: Respondents do not visit parks in their council.

Correlations

			Council	Park_Council
Spearman's rho	Council	Correlation Coefficient	1.000	.658**
		Sig. (2-tailed)	.	<.001
		N	105	103
	Park_Council	Correlation Coefficient	.658**	1.000
		Sig. (2-tailed)	<.001	.
		N	103	103

**. Correlation is significant at the 0.01 level (2-tailed).

Figure 6 - Spearman's result

The results showed a positive correlation between the council where citizens live and the council where the park they visit is located (Figure 6). It is possible to assume that park users live near the park they visit.

Section 2: The most visited park

Most public parks are located in Lisbon (15) and their surroundings (Loures, Oeiras, Cascais, Sintra, and Odivelas). Appendix D shows the most visited parks and the number of times each park was mentioned.

Question 8 was asked to understand why people go to the parks. From a list of 26 activities, the main reasons chosen by the respondents to visit the park were: to walk (66.7%), to be in nature (58.1%), to be with friends (52.4%), to go for a coffee (35.2%), to do picnics (25.7%), listen to birds (23.8%) and to exercise (20%). From these answers, it is noticeable that users have different motivations to visit a park, making parks with more variability more attractive to citizens.

Question 9 reveals the way people get to the parks. People tend to arrive at the park by car (45.9%) or walking (43.8%); only 7.8% use public transportation, and 2.9% use bicycles or electric scooters. The reasons why people use cars or go on walking can be related to the distance from the park. Besides, people may go further distances due to the park's better facilities or the need for transportation to green spaces. The low results from public transportation use might be related too. The main reason for the low use of public transportation is that people prefer to visit green spaces near their residences. Another reason could be the need for more transport to green spaces.

When asked about the time they spend to arrive at the park (question 10), 53.7% arrive at the park in less than 10 minutes, 32.4% need between 10 and 20 minutes, 8.6% need between 20 and 30 minutes, and 5.7% need more than 30 minutes to arrive the park. These results show the tendency for users to use parks near their homes or go to a park by car, which is within a short distance.

People prefer to visit the park (Question 11) with others (80%). 15.2% of people go to the park alone, and 4.8% go with their pets. It is perceivable that parks work as reunion places and community gathering areas.

Question 12, “How much time do you stay in the park?” shows that most users visit the park for a 1 to 2 hours period (57.1%), 23.8% stay there for less than 1 hour, and 19% visit the park for more than 2 hours. The usual time spent in the park is around 1h30 min.

When asked about the preferred week periods to visit the park (Question 13), 45.7% of the respondents replied that they only visit the park on weekends, and 12.4% only do it during the week. 41.9% of the respondents did it on both periods. Since most people are working during the weekdays, this could be a reflection of that. It is crucial to evaluate park usage in both periods due to the high use values.

Question 14 about the period of the day people tend to visit the park showed a user preference during the afternoon (67.6%) compared with the morning (24.8%). Most people do sports in the morning. Therefore, these people could be the ones who use the park in the morning. It is also proven that older adults wake up early and start doing activities in the morning (Li et al., 2018). The low percentage could be related to the sample not containing a few older adults.

When asked how many days per month they visit the park (Question 15), respondents strongly(88.6%) visit the park for less than eight days per month(51% 1 to 3 times per month; 19% 4 to 7 times per month; 18.1% less than one time per month). An opportunity exists to make parks more attractive and essential in people's lives.

Questions 16 and 17 aimed to understand if respondents have any disabilities and the barriers they may encounter when using the park. Only one respondent indicated having a disability, and he specified that he uses a wheelchair. This person indicated that the barriers in the park access are mostly related to the height of the sidewalk. Other respondents answered the question saying that, for example, the lack of parking lots is a barrier for them to visit the park. These questions highlight the difficulty of getting answers from park users with disabilities. It is essential to find more users with disabilities and understand what makes them not visit the park.

Questions 18 and 19 were related to the events in the parks that users visit. 66.7% of the respondents said that the park they visit has events. Then, it asked them to highlight the events, and the main answers were related to fairs, music concerts, cultural events, and sports events.

Question 20 was related to the information users receive from the park. 32% of the respondents did not receive any information about the park. The others receive information about the schedule, closed facilities, temporary interventions, and events. This answer shows no pattern in park information, and each park gives different types of information.

When asked where users prefer to stay in the park (Question 21),

the most mentioned areas were grass, shadow, and café areas. Comparing the mentioned areas, they can be in the same or different park areas. Once again, it displays the importance of making a park with variety.

Question 22 was mentioned to understand what users like more in the park they visit. The most mentioned characteristics can be divided into groups: nature, facilities, urban furniture, park areas, and others.

Nature characteristics mentioned were: being a natural ambiance, having a big green area, existence of trees, existence of animals (specifically birds), being outside, being near the river, having a lake, and existence of a grass area. The facilities mentioned were coffee shops and the diversity of facilities in the park. The reason related to urban furniture is that the park has benches. The areas mentioned were sports and leisure areas, walking zones, dog parks, coffee shops, and playgrounds in the same place.

Other reasons mentioned by the users were the park being well treated and beautiful, being a quiet place, being near home, having a nice view, having shadowing and sunny places, being fresh, the inexistence of walls, not having vehicles, and being flat.

Question 23 aimed to understand what users do not like about the park. The respondents answered based on the park they chose at the beginning of this section and for hypothetical parks when they considered that the park they visited the most had no flaws. The answers were grouped into 11 groups: Coffee shops and restaurants, security, schedule, characteristics, vegetation, areas and activities, garbage and maintenance, users, animals, noise, and others.

Coffee shops and restaurants are things that respondents do not like when they are expensive or when there is a lack or nonexistence. Security is referred to when there is a lack of surveillance and security in the park. The schedule reason is related to parks that close very early for the users. Caracheteristics is related to park characteristics, and the most mentioned ones are lack of shadows, big slopes, narrow paths, lack of signage, lack of comfortable urban furniture, lack of toilets, and lack of water points. Vegetation reasons are related to the lack of vegetation (i.e., trees, grass, and plants). Areas and activities are related to the necessity of more diversification of places and activities. Garbage and maintenance are more related to bad maintenance and lack of civility from users, for example, garbage in the park, lack of general maintenance, and lack of bins for garbage separation. Users group referred to the type and amount of users, being that bad people with a lack of civility and parks very crowded during weekends are problematic. Animals group refers to

reasons unrelated to the animals but with things they are connected with, like dog poop, many pigeons, and the lack of specific places for dogs. Noise problems are related to general people's noise and noise from cars and airplanes.

Another problem is a new problem related to fast cyclists and electric scooter riders speeding inside public parks.

Question 24 was made to understand which activities respondents do in the park. This question is different from motivation because motivation is the main reason, and this question displays all the activities that users do in the park. Most of the answers are similar to Question 8. The activities mentioned were walking, being in a coffee shop or kiosk, listening to birds, being in nature, being with friends, and watching others.

Section 3: The Least Visited Park

This section aims to understand which parks users prefer to avoid visiting and the main problems users encounter when visiting a public park.

At the beginning of this section, the name of the park respondents avoided visiting was asked (Question 25). A group of respondents named the park, and another mentioned the characteristics they did not like in parks. The group that named the parks mentioned 11 parks in Lisbon (Monsanto, Quinta das conchas e lilases, Jardim da Alameda Dom Afonso Henriques, and Parque José Gomes Ferreira were the most mentioned) and eight parks outside of the region of Lisbon.

For research purposes, the listed parks were grouped into Table 9 with two sections (parks from Lisbon council and parks from other regions of Portugal).

Table 8 - List of parks respondents avoid to visit

Lisbon parks	Campo Grande, Monsanto, Quinta das Conchas, Vale da ameixoeira, Parque Jose Gomes Ferreira, Parque Oeste, Parques da zona ribeirinha da expo, Jardim da Alameda, Bela Vista, Parque Urbano do Vale Marvila and Jardim da Parada.
Outside Lisbon parks	Parque dos poetas, Parque Bela Vista(Setúbal), Parque de Miraflores, Parque da Portela de Sintra, Parque Felício Loureiro (Queluz), Parque infantil da Vila, Choupal (Coimbra) and Jardim Vanicelos (Setúbal).

In questions 26 to 37, respondents were asked to rate according to a Likert scale From 0 to 5 (where 0 = No opinion, 1 = Not at all a problem, 2 = Minor problem, 3 = Moderate problem, 4 = Serious problem, and 5 = Extremely serious problem), the listed problems. There were 12 groups with sub-problems in each group. The grouping problems were Animal problems, Weather-related problems, Noise problems, Park information problems, Maintenance problems, Facilities

problems, Accessibility problems, Security problems, Park cleanness problems, Vandalism problems, Events problems, and others.

Figure 7 displays the comparisons by group through mean values. It is noticeable that security and park cleanliness are the group problems that users find more problematic. On another level, but still very important, we have maintenance, facilities, vandalism, and other problems.

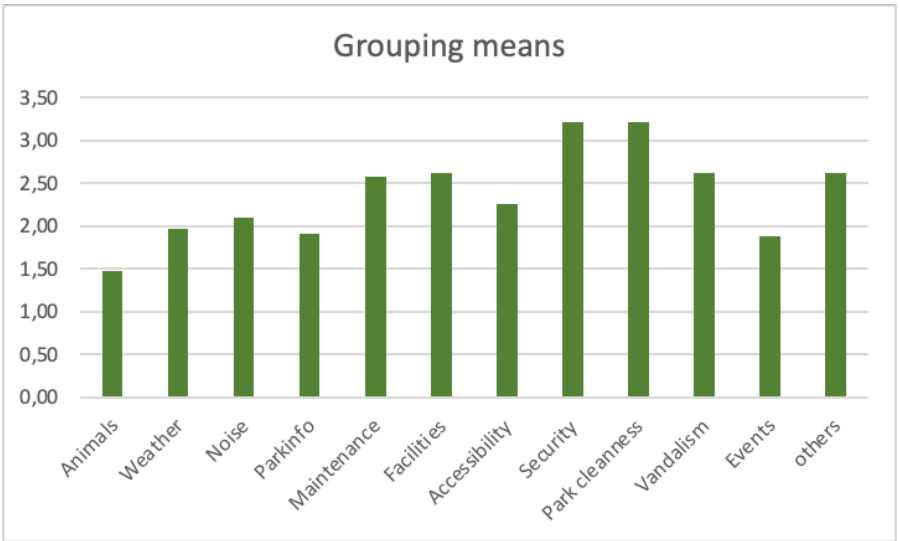


Figure 7 - Means of problems by group

The group problem's values are very different. Group means over 3 and 2.5 were deppen analyzed in the subsequent paragraphs. For each group, sub-problems that rate higher than 3.01 were specifically analyzed.

The maintenance problems group (See Figure 8) shows disparities in what respondents consider the major problems. General maintenance (M: 3.01 and SD: 1.644) and Janitor (M: 3.00 and SD: 1.797) sub-problems present high mean values. They are both connected and present users' perceptions about park maintenance. On a similar level, Landscape maintenance is influenced by the two other sub-problems but is displayed as a lower problem than the other two.

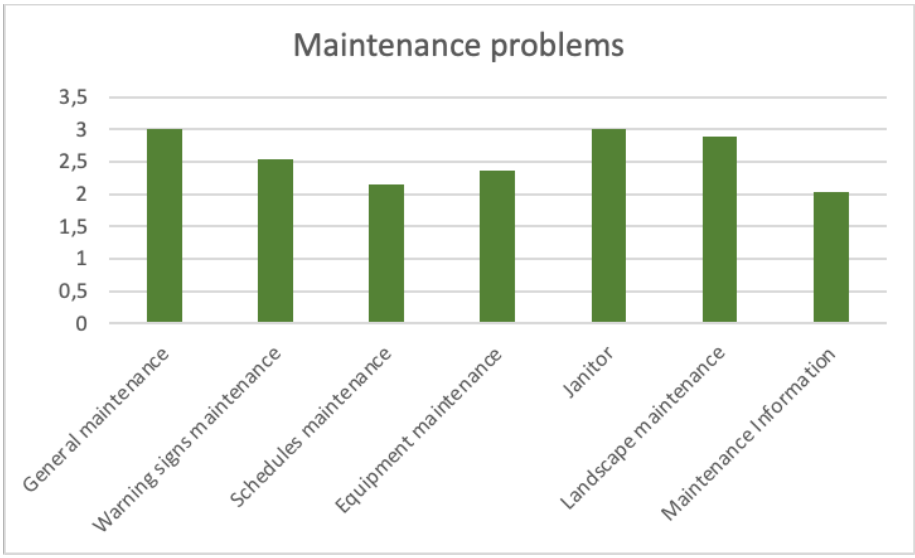


Figure 8 - Maintenance problems

Inside facilities and urban furniture problems (See Figure 9), lack of toilets (M: 3.31 and SD: 1.643), lack of bins (Mean: 3.24 and SD: 1.779), and lack of shades (Mean: 3.08 and SD: 1.627) presented high values from the respondents.

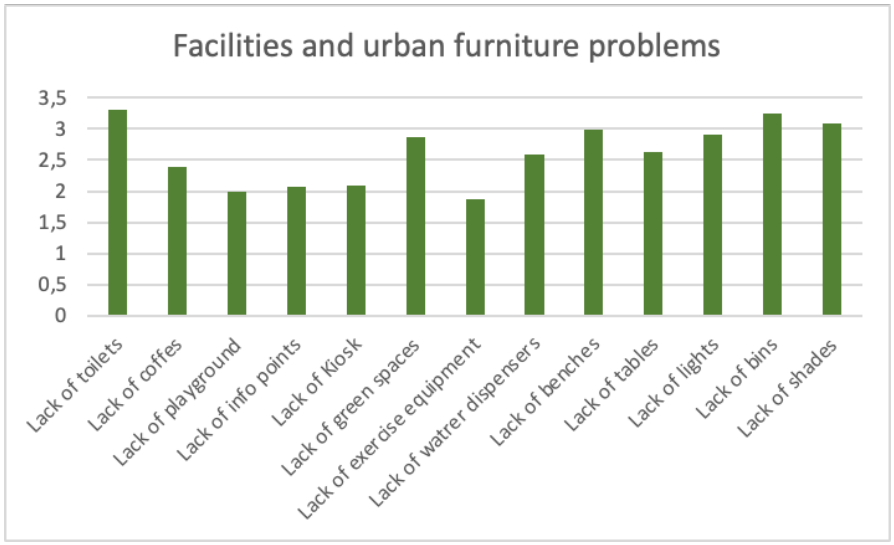


Figure 9 - Facilities and Urban Furniture problems

This might be related to the users' comfort since Lisbon generally has few public toilets, and Portugal is situated at a point of the globe, giving him very sun hours. The lack of bins can be related to what respondents mentioned before about not liking to visit parks that do not have many bins and are full of garbage. A lack of shades can reflect a lack of threes or artificial shades. Shades are essential when weather conditions are more extreme.

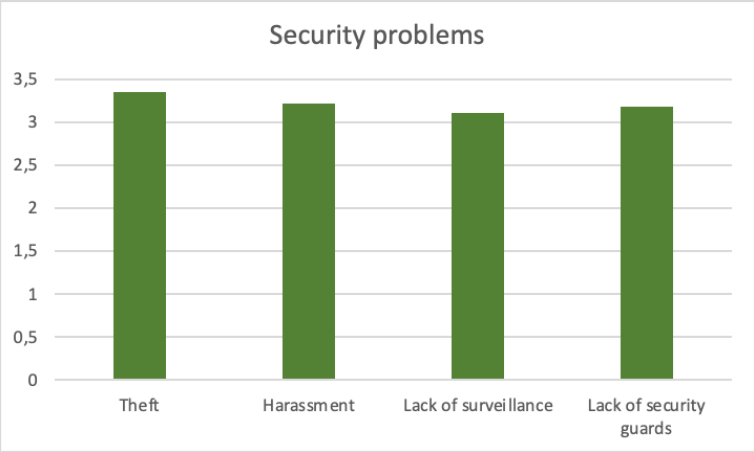


Figure 10 - Security problems

The security group (See Figure 10) presented the highest mean values. Theft (Mean: 3.35 and SD: 1.871), Harassment (Mean: 3.21 and SD: 2.037), Lack of surveillance (Mean: 3.10 and SD: 1.726), and Lack of security guards (Mean: 3.18 and SD: 1.802) presented high values. These four sub-problematics complete all the problematics inside the security group, which means this group is critical to study.

Ribeiro et al. (2015) said that only non-violent crimes were related to low LTPA in women. These results concord with the results achieved by Ribeiro et al. (2015) in their study because most respondents are female, and all the questions have high-value rates. For example, harassment values might be related to the high percentage of female respondents.

The results highlight a big discomfort from users, and this can present a big barrier to using public parks. Ribeiro et al. (2015) highlighted the low crime rates in Portugal to justify that crime is unrelated to park usage, but perceived low security can also be a problem for users. Crime rates and perceived problems might have different influences on users; this way, reinforcing surveillance and security guards can solve this problem, and more citizens would likely use public parks.

From the big group problem, park cleanness problems (See Figure 11) were shown to be very important for the respondents. Natural trash was definitely the dirt problem less considered by respondents. From this group, the other problems had very high means. The problem that deserves more attention is the dog poop (Mean: 3.50 and SD: 1.710). This problem might be related to a lack of incentive for dog owners to clean the dirt from their dogs or to a lack of civility. The second most important problem is the cigarette buts (Mean: 3.42 and SD: 1.691). This problem has the lower SD of this group, showing that more users think the problem to be severe has its mean

highlights. More surveillance and bins, or specific places for smoking, may reduce the number of cigarette buts on the floor.

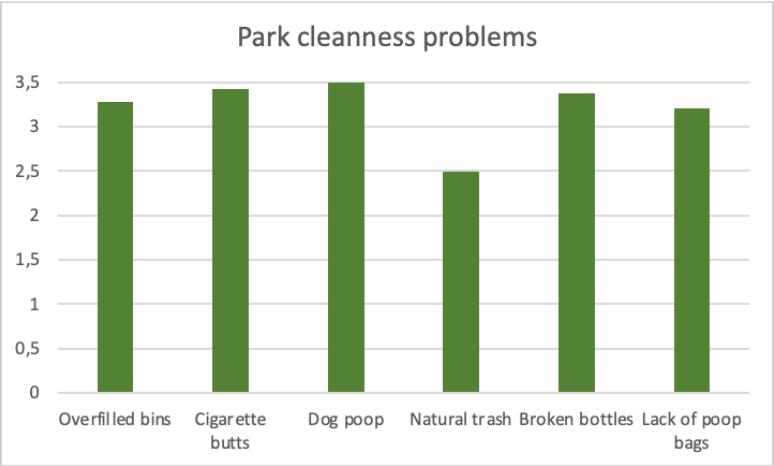


Figure 11 - Park cleanness problems

Even though broken bottles can be related to vandalism, they can also be grouped inside park cleanness because they can be found around bins or cafés. This problem presents to be also very important to users (Mean: 3.37 and SD: 1.887). Since the park is used by vulnerable groups, it is important to focus on this kind of dirt because it can affect users who visit the park. Motivation to recycle this kind of garbage is needed. Another reason for the broken bottles found on the floor is the overfilled bins. The overfilled bins (Mean: 3.28 and SD: 1.837) has also high rate, showing to be an important problem to users. Alerts of full bins and more bag changing are needed to avoid dirt all over the park.

Finally, the lack of dog waste bags (Mean: 3.20 and SD: 1.712) showed a high rate but was less important than the other problems. This might be influenced by respondents to have or not have dogs. Making them notice or not the lack of that object in the park.

After analyzing these problems, it is noticeable that a clean park can contribute to higher visitation. Analyzing the Vandalism problems group (See Figure 12), only broken windows (Mean: 3.01 and SD: 1.868) are worth mentioning, showing that graffiti, stickers, and tags or engraved text in plants do not present a major problem to the respondents.

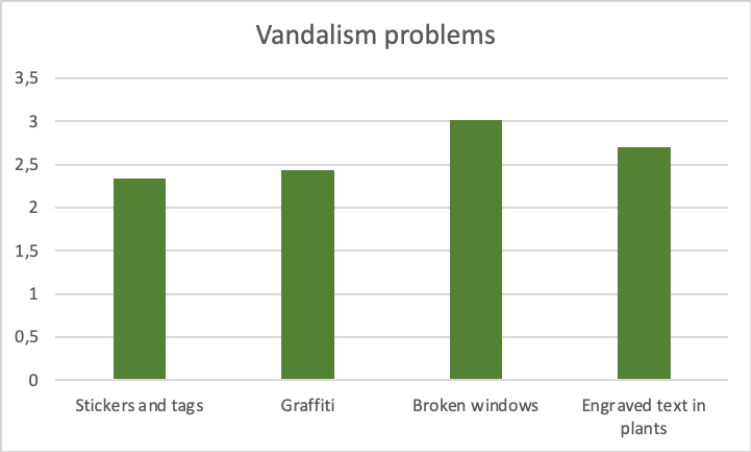


Figure 12 - Vandalism problems

The broken windows might be related to the fact that most of the parks mentioned in the response do not have or have windows. Nevertheless, this problem is worth looking at carefully.

The other problems group (See Figure 13) did not show to be a problematic group. The group does not present a critical problem to users. However, it deserves to be treated carefully because it considers new ways of mobility that citizens are still getting used to.

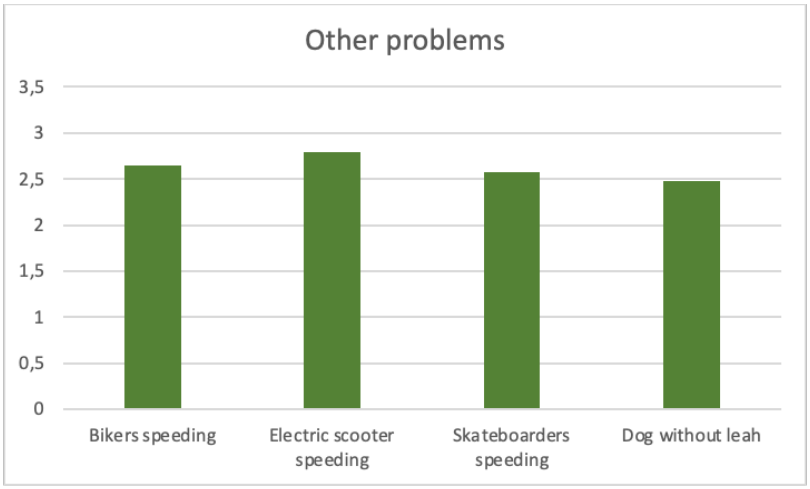


Figure 13 - Other problems

If we look at the Other problems graph, it is noticeable that new ways of mobility are the main problems. This might be related to parks needing special lanes for that kind of transport and to how some citizens use it, for example, as a toy rather than as a way to travel from A to B. Although this group has very similar values, they present different problems. Dog without a leash has a low value compared to other problems, but it deserves to be considered a problem because many users classify it as a big problem.

Question 38 aimed to understand if other problems were not mentioned in the questionnaire and that people would like to refer to. Some respondents referred to new problems, and others opted to reinforce the main problems they found in the questionnaire. The referred problems were: lack of surveillance and security, vehicle noise, dirt, and pollution, type of users, dog poop, lack of maintenance, lack of green areas, and lack of shadows. The new problems that respondents added were too many tourists in some parks, some motorcycle riders inside the park, and a need for more familiar places, like breastfeeding places.

The reinforced problems validate the results obtained on the problematic Likert evaluation. Although this idea of reinforcement can assure the results, at the same time, it can be seen as a halo effect because when we did not ask about these problems, they were not mentioned by respondents. The new problems stated by some respondents may be symptomatic of a specific place, meaning each park has its problems. For example, we cannot relate motorcycles inside the park and tourists to all Lisbon parks. They are related to different areas of Lisbon. For example, too many tourists can be seen in various parks in the monumental area of Belém, but the same does not happen for motorcycle riders.

Conversely, the lack of places for breastfeeding could be a problem related to most Lisbon public parks and probably to Lisbon public spaces.

Section 4: Insights and Contributions to Urban Green Spaces

Section 4 objective was to allow respondents to add more insights and contributions if they felt necessary. This section contained three open questions (Q.39, Q.40, and Q.41).

Question 39 meant understanding what respondents thought was missing in the park. People mentioned mainly the Lack of water dispensers, Lack of events, lack of kiosks, lack of surveillance and security, lack of toilets, lack of urban furniture, lack of trees, lack of places to do picnics, lack of maintenance, lack of shadows, lack of places to do sports, lack of cycling lanes, lack of garbage collecting and lack of dog parks.

Interestingly, respondents' complaints are more related to urban furniture, poor maintenance, lack of security, and lack of facilities. Problems like communication or lack of information were never mentioned, but lack of events was referred to. In some cases, lack of events can be related to the non-existence of events, but other times, it could be related to a lack of communication for park users, displaying the events that will occur.

The results of this question validate that respondents value good maintenance and security feelings. Question 40 was more related to what information respondents would like to get from parks. The answers reveal a big range of what is important for each user.

The answers to this question were: schedule time, facilities, and equipment; To know what fauna and flora exist; Maintenance interventions; Maps of parks; Rules; Information about surveillance and emergency numbers; To know if it is noisy or not; About the parks near residency and Activities and events. Some people want to know information about the park's characteristics. Others want access to intervention schedules, others want to know more about the nature of the park, others value a map of all parks near residency, and others want to know profound characteristics that can vary depending on the day and hour, like the noise.

The answers from respondents highlight the importance of ear users and citizens because they are a significant majority that will benefit from changes. The variety of information that could be extracted from a single park is essential to understand. It is also important to understand how to use this information.

The last questionnaire question aimed to make respondents feel part of the process and solution. Question 41 allowed respondents to give some ideas and insights into the problems they mentioned before.

The possible solutions and new implementations for public parks are shown in Appendix E.

4.2.6 Conclusion

This section aimed to learn more about what Portuguese citizens, specifically residents of Lisbon, consider the main problems when interacting with parks and how they interact with parks.

Section 1 aimed to understand who the respondents were and their characteristics. Also, this section questions were used to understand possible correlations, such as if the park's proximity is important and if the type of house where respondents live influences their park visitation. The first correlation test showed a positive correlation, meaning respondents tend to visit parks near their houses. The second test displayed that the type of house does not influence park visitation. This last result may be different with different samples.

Section 2 aimed to understand which parks respondents prefer to visit and why they visit them. This section was essential to collect data for observations, such as possible parks to observe and important characteristics to look at.

Section 3 aimed to understand what parks respondents dislike visiting, and the significant problems respondents face. This section built observations by gathering park information and essential problems for this representative population.

Section 4 aimed to allow respondents to contribute to other ideas and problems not mentioned before. A critical issue collected from this section was the lack of familiar places that can be used for breast-feeding purposes.

This questionnaire was exhaustive, with 41 questions that would be answered in about 20 minutes. This long period led to only 105 respondents, but when looking for the size and the time, 105 responses were a good ratio. The problem related to the snowball sampling was the lack of control with group heterogeneity.

Most of the respondents were young adults or had high education levels. The people older than 65 and lower than 18 should be more represented. Children are not represented. The questionnaire was built to collect information from people with disabilities, but only one respondent with disabilities responded to the questionnaire. This presents a flaw because there are several disabilities and levels of disability that deserve to be studied for park problem-solving.

After the results, it is important to have a special look during observations at the groups mentioned before: older adults, children, and people with disabilities.

It is important to understand that park users visit parks near their houses during the afternoon for some time between 1 to 2 hours. The questionnaire shows that people visit parks every day of the week. It is also important to refer to the fact that most of the respondents mentioned visiting parks eight days per month. Understanding how to bring more users to public parks is important.

For the Lisbon region, Parque da Quinta das conchas e lilases, Jardim Guerra Junqueiro, Jardim do Campo Grande, Parque Bensaúde, and Parque Eduardo VII were the parks indicated as the most to be visited. Monsanto, Jardim da Alameda Dom Afonso Henriques, Parque da Quinta das conchas e lilases, and Parque José Gomes Ferreira were indicated as the least to be visited.

Since these were the parks most mentioned, they represent the parks more suitable for the observation phase.

The next section presents the park selection for the observation phase. It is important to understand that the insights from the citizens section brought useful information for the observation phase.

4.3. Park Selection

The previous section aimed to define the motivations and problems that users find when visiting parks. Furthermore, this section uncovered the parks that the users like and don't like to visit.
The main objective of this section was to categorize all the parks and find which parks were the best to evaluate and analyze during observation.
Park selection was done at the same time as the questionnaire writing and questionnaire dissemination.

4.3.1 Method

For the selection of public parks and gardens, the clustering method was used. This method is a multivariate statistical procedure that tries to organize a set of entities (individuals or objects), which have detailed information into relatively homogeneous groups. It is an exploratory method, which makes iteration its great optimizer to arrive at concrete results.
Several steps were taken to complete this process:
1. Selection of individuals to be grouped;
2. Definition of a set of variables from which individuals will be grouped;
3. Definition of a distance measure between every two individuals;
4. Choice of an aggregation criterion (definition of a partition algorithm);
5. Validation of the results obtained.

4.3.2 Material

An Excel sheet with all the parks from the Lisbon area that match the definition of urban public parks was created. Each one of the parks was evaluated according to 29 categories.

4.3.3 Procedure

The procedure was as follows:
1. Selection of individuals to be grouped
The selection of individuals started by a list of 219 parks in Lisbon councill, identified by examining various references (CML, n.d.-c, n.d.-b, n.d.-a). All the 219 parks were added to an Excel file.

The selection of individuals was based on the definition given by Swanwick et al. (2003) of urban public parks, because the choice of variables must be objective and based on old studies. In this study, we tried to understand which problems affect urban public parks, the best definition being that of Swanwick et al. (2003), which refers to these spaces as: "man-made urban open, public and green spaces designed mainly for recreation".

Firstly, for each park, its size, space manager, furniture, activities, and Lisbon area were evaluated.

Secondly, the variations of the same park were condensed into a single park, as was the example of Bela Vista Park, which has several sub-areas, even though these sub-areas are contiguous and belong to the same park.

Thirdly, the Zoo, the Galp Bridge, the Golf at Quinta dos Alcoutins, the slopes of the Águas Livres aqueduct, and purely horticultural land were excluded, because they don't match the definition of urban public parks chosen.

Finally, lines where the management team was not detailed, lines with missing values, parks with private management (e.g. Fundação Calouste Gulbenkian) and parks without concrete areas were excluded from the list.

After the selection of individuals, from an initial figure of 219 Urban Green Spaces in Lisbon, only 125 public parks fulfilled the criteria to be analyzed.

2. Definition of a set of variables from which individuals will be grouped

For each one of the final listed public parks, 29 categories were identified. The categories were as follows: Region, Management, Area, If they were free, If they were open all year, If they were walled, Accessibility, Playground, Café, Toilet, Eating zone, Dog access, Activities, Public transportation, Residential, Drinking Fountain, Urban furniture, Benches, Trashes, Statues, Fountains, Artificial lakes, Shades, Fitness Equipment, Tables, Monuments, Bandstands, Music furniture and Dog park.

3. Definition of a distance measure between every two individuals

The variables(categories) used to define the clusters and measure the distance between individuals were: Residential (if it was or not), Activities (if there was or not), Area (if its dimension was greater or less than 1ha), Accessibility (if it is accessible or not) and Free (whether or not it's free).

4. Choice of an aggregation criterion (definition of a partitioning algorithm)

The aggregation criterion chosen to generate the park clusters was the method of two-step cluster Analysis.

The TwoStep Cluster Analysis procedure is an exploratory tool designed to reveal natural groupings (or clusters) within a dataset that would otherwise not be apparent. According to IBM (2021), "the algorithm employed by this procedure has several desirable features that differentiate it from traditional clustering techniques: handling of categorical and continuous variables, automatic selection of the number of clusters, and scalability".

5. Validation of the results obtained

Validation of the clusters was made through the summary analysis. This summary measures the cluster quality and the predictor's importance of each variable(category).

4.3.4 Results

After applying the method, 7 clusters of representative parks were achieved. Each generated cluster can be defined through its specific attributes. The clusters are based on their predictive variables. Each cluster has its representativeness, and at the same time, all clusters may share similar characteristics.

Figure 14 displays the TwoStep model summary. The summary highlights the algorithm used, the inputs used (variables), and the number of clusters generated by the algorithm. Above the summary, there is an indicator that measures the cluster quality.

This indicator was used to generate the clusters, mainly as a decision maker for the number of clusters and inputs used to generate this park's grouping.

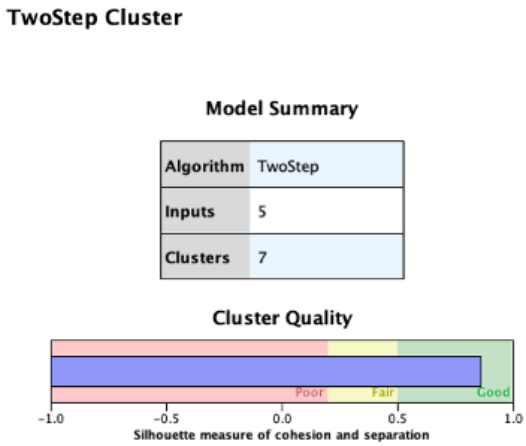


Figure 14 - TwoStep Cluster Model Summary

To achieve this number of clusters, it was needed to understand which predictors (variables) were more important for the model. As mentioned above, the cluster quality indicator was used as a tool to validate the clusterings and to choose the right predictors used. The 7 clusters were generated for five inputs: Residential, Activities, Area, Accessibility, and Freeness. Figure 15 displays the predictor's importance for this clusterization.

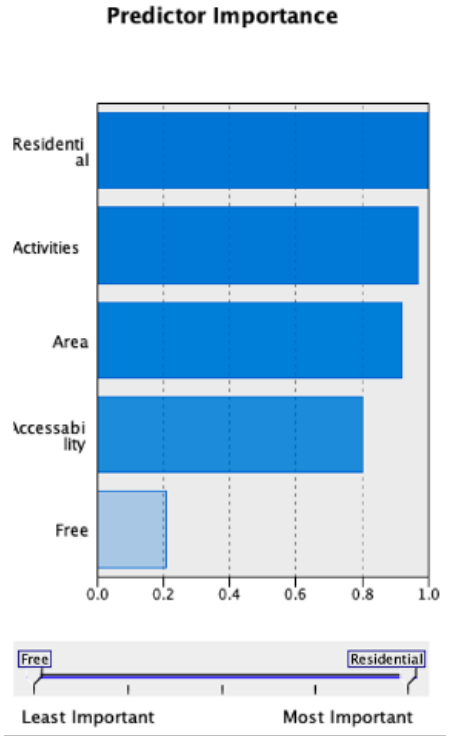
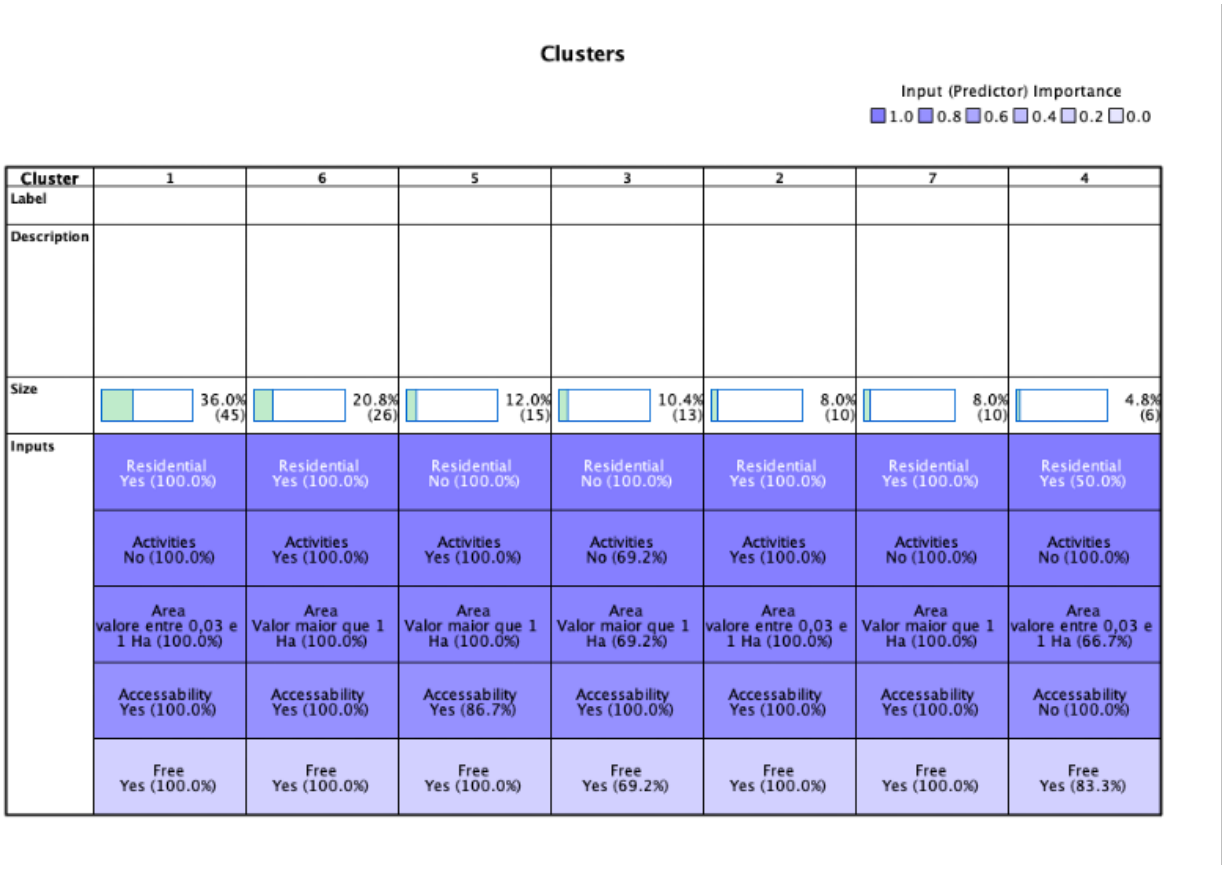


Figure 15 - Predictor importance

Analysis of the predictor importance highlights that Residential and Activities are very important predictors. Area and Accessability are not so strong predictors but represent very high rates of

predictability. Free is shown to be the predictor less important. This predictor was only fundamental to generate one of the clusters. Each cluster has its particularities. It is possible to characterize the cluster by the value of the predictor. The majority of the parks present in a specific cluster have the same predictor values. Sometimes, these values can vary; it happens when one of the predictors doesn't match the group, but all the other ones tend to a specific cluster. For example, if we look at Figure 16 for cluster one, all the predictors match 100%, but in cluster 3, for example, Activities, Area, and Free predictors only match 69.2% of the parks in that cluster.



Cluster	1	6	5	3	2	7	4
Label							
Description							
Size	36.0% (45)	20.8% (26)	12.0% (15)	10.4% (13)	8.0% (10)	8.0% (10)	4.8% (6)
Inputs	Residential Yes (100.0%)	Residential Yes (100.0%)	Residential No (100.0%)	Residential No (100.0%)	Residential Yes (100.0%)	Residential Yes (100.0%)	Residential Yes (50.0%)
	Activities No (100.0%)	Activities Yes (100.0%)	Activities Yes (100.0%)	Activities No (69.2%)	Activities Yes (100.0%)	Activities No (100.0%)	Activities No (100.0%)
	Area valore entre 0,03 e 1 Ha (100.0%)	Area Valor maior que 1 Ha (100.0%)	Area Valor maior que 1 Ha (100.0%)	Area Valor maior que 1 Ha (69.2%)	Area valore entre 0,03 e 1 Ha (100.0%)	Area Valor maior que 1 Ha (100.0%)	Area valore entre 0,03 e 1 Ha (66.7%)
	Accessability Yes (100.0%)	Accessability Yes (100.0%)	Accessability Yes (86.7%)	Accessability Yes (100.0%)	Accessability Yes (100.0%)	Accessability Yes (100.0%)	Accessability No (100.0%)
	Free Yes (100.0%)	Free Yes (100.0%)	Free Yes (100.0%)	Free Yes (69.2%)	Free Yes (100.0%)	Free Yes (100.0%)	Free Yes (83.3%)

Figure 16 - Size and input value for each cluster

Figure 16 presents the predictors' importance and, at the same time, presents the size of the clusters. The clusters are not homogenous, and they differ in size because what groups them is their level of similarity and not a specific cluster size. The sizes of the clusters vary between 45 parks (36%) to 6 parks(4,8%). See Appendix F to see which parks belong to which cluster.

Cluster one aggregates 45 parks (36%), which belong to the eastern part of Lisbon, are managed by the Parish Council, and have an area of less than 1ha. It is an accessible garden with access to

public transport and is located in a residential area., Cluster two aggregates ten parks (8%), Cluster three aggregates 13 parks (10,4%), Cluster four aggregates six parks (4,8%), Cluster five aggregates 15 parks (12%), Cluster six aggregates 26 parks (20,8%) and Cluster seven aggregates ten parks (8%).

After clusterization, an analysis of each cluster was done to generate a general characterization of the park.

Cluster 1: It is a park belonging to the eastern part of Lisbon, is managed by the Parish Council, and has an area of less than 1ha. It is an accessible garden with access to public transport, and is located in a residential area.

Cluster 2: The garden belongs to the northern part of Lisbon, is managed by the Parish Council, and has an area of less than 1ha. It is an accessible garden with a playground, fitness equipment, and access to public transport, and it is located in a residential area.

Cluster 3: The garden belongs to the western part of Lisbon, is managed by the city council, and has an area of over 1ha. It is accessible and has public transport nearby. It is not located in a residential area.

Cluster 4: The garden is inserted in the riverside area (either western or eastern), is managed by the parish council, and has an area of less than 1ha. It is not a very accessible space, it does not offer access to public transport (but you can), and it is not located in a residential area.

Cluster 5: The garden is defined as belonging to the Western region of Lisbon. It is managed by the Lisbon city council and has an area greater than 1ha. It is an accessible garden, with a playground, café and dining area. It is a space that allows for physical activities, has access to public transport, and provides water fountains, but is not located in a residential area.

Cluster 6: The garden belongs to the eastern region of Lisbon, is managed by the parish council, and has an area of over 1ha. It is accessible, has a playground, has a cafe, has a bathroom (or not), has a dining area, allows you to carry out physical activities, has a drinking fountain, serves a residential area, and is accessible by public transport.

Cluster 7: The garden is located in the central area of Lisbon (or north or east), is managed by the parish council, and has an area of over 1ha. It is an accessible garden, with a café, and access to public transport, and located in a residential area.

Appendix F shows the list of parques that belong to each one of the clusters.

4.3.5 Conclusion

In the previous section results from the questionnaire showed that participants indicated parks from cluster 6. The indicated parks were from the answers asking to mention parks users visit the most and parks users avoid visiting. Probably the reason why parks belong to cluster 6 is related to the fact that this cluster contains all the big parks in the Lisbon region, and it contains mostly residential parks.

The prototype park from cluster 6 must be located in the eastern region of Lisbon, has to be managed by the parish council, and has an area of over 1ha. It is accessible, has a playground, cafe, bathroom (or not), dining area, allows you to carry out physical activities, has a drinking fountain, serves a residential area, and is accessible by public transport.

The chosen parks for observation were Jardim Guerra Junqueiro, Jardim da Alameda Dom Afonso Henriques, and Parque Bensaúde.

These parks were chosen because, they are near each other, are more central, and belong to the same area of Lisbon. Another reason was the different UGS classification (Garden and park) because this way, we have a way to compare between different UGS. Since one of the problems was the schedule, we chose between walled and not walled parks to check if there were differences between these two types.

All these parks were mentioned as parks that people like to visit the most. All the parks belong to cluster 6. The three parks represent different categories of public parks, having the oldest public park, a recently renewed park in an old palace, and a park very central that has very good access through all types of transportation.

These parks have intervention from parishes and councils.

4.4. Field Research - Interaction between users and space

The objective of the field research is to observe and interact with space and to understand users in public parks. This stage will help understand and improve the categories of park problems found in the previous steps. (Limitations: the parks were visited during the daytime. The problems for night time are not included in the observations)

This section aims to give more information about park problems from the user's perspective. This method will be held in three parks in Lisbon, focusing primarily on young, disabled, and older users and secondarily on other users.

4.4.1 Method

The direct observation method is proposed to close the gap and find other problems not discovered in previous studies. This method allows the researcher to see and feel the problems users face.

4.4.2 Parks

Three parks from Cluster 6 were chosen to advance with the observations: Jardim Guerra Junqueiro, Jardim da Alameda Dom Afonso Henriques, and Parque Bensaúde.

Jardim Guerra Junqueiro, most known as Jardim da Estrela, is a public park that belongs to Estrela Parish in Lisbon. The park's inauguration was in 1852, and it was built in the style of English gardens with romantic inspiration. One of the central points of the garden is the green wrought-iron bandstand, where musicians play in the summer months. This bandstand was built in 1884 and was initially located in Passeio Público before the construction of Avenida da Liberdade, having been transferred to the garden in 1936 (Carapinha et al., 2009).

Jardim Guerra Junqueiro (See Figure 17) has 4.6 hectares, a significant diversity of plants and trees, and artificial lakes (Carapinha et al., 2009).

Since it was built, Jardim Guerra Junqueiro has undergone modifications. For example, more trees were added over time, and the park lanes were renewed to make the park more accessible. Also, the old kindergarten built at the early beginning of the park will give place to an environmental public library. Nowadays, this park has two playgrounds, eight drinking fountains, one kiosk, one café, statues, picnic tables, two bathrooms, and many benches and bins (Carapinha et al., 2009).

This free and walled public park is open every day, from seven in the morning until midnight.

Figure 17 - Jardim Guerra Junqueiro

Jardim da Alameda Dom Afonso Henriques (See Figure 18) is located in the Areeiro parish council. This park was originally built in 1948, and it has an area of 5 ha. This public park is not walled, and it is open all year. Also, it is recognized by its monumental fountain illuminated during a certain night period and by its large grass-flat areas (Carapinha et al., 2009).

Jardim Da Alameda Dom Afonso Henriques is situated in a residential area, and it has schools and a university nearby. Also, it is a point where a variety of transports cross. For example, from the park, you can use two underground lines and a great variety of buses, catch a taxi, ride GIRA or another shared micro-mobility vehicle, or use your own car (Carapinha et al., 2009).

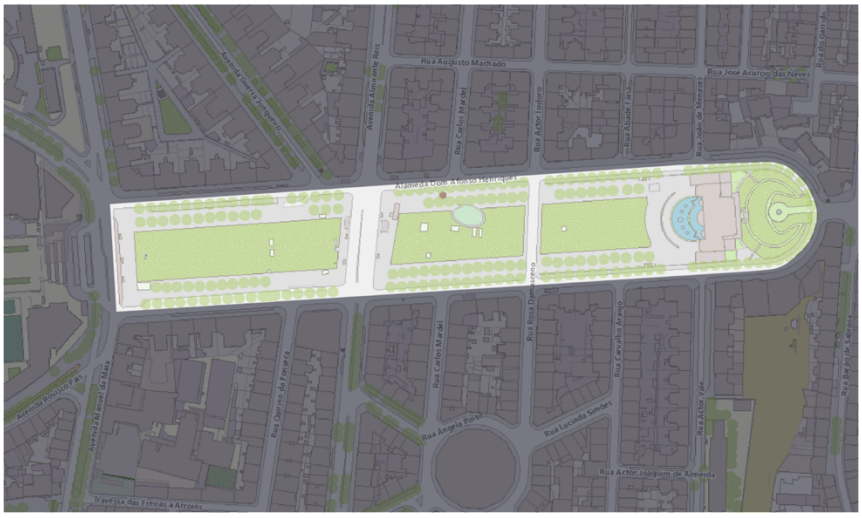


Figure 18 - Jardim da Alameda Dom Afonso Henriques

Parque Bensaúde (See Figure 19) is located in São Domingos de Benfica Parish, near a residential area. It has 3,5 ha, and it is a walled, free public park. This public park was built over an old farm

from the XVII century. In 2020 the park was opened to the public. Parque Bensaúde has a significant slope and old buildings that were renovated. Also, it has a kiosk and a dog park. What makes this park special compared to the other two is the existence of community gardens that citizens can apply to use for a specific period of time (Carapinha et al., 2009).

Figure 19 - Parque Bensaúde

4.4.3 Participants

Citizens and tourists of all ages using the parks Jardim Guerra Junqueiro, Jardim da Alameda Dom Afonso Henriques, and Parque Bensaúde interact with the environment. Also, the younger, disabled, and older populations had a special focus because they were underrepresented in the previously applied survey.

4.4.4 Material

Three observation sheets (Appendix G) were prepared, one for each park. The observation sheets were composed of five parts. The first part had the Observation hours, date, weather conditions, and temperature. The second part had the map and the name of the park. The third part was used to point out the place and time that the researcher did the observation and to mark specific park characteristics. The fourth part was used to take notes, such as the interactions and problems in the park. The last part was used to organize the information through AEIOU Framework (Hanington & Martin, 2021). Observations sheets were transformed into PDFs to be filled using a tablet with a pen. A mobile camera was used to capture the most important observation insights.

4.4.5 Procedure

An observation protocol was prepared (see Appendix H). Each park was observed six times in a two weeks period (four during weekdays and two during the weekend). The schedule can be found in the observation protocol (Appendix H). The researcher stayed two hours in each park to guarantee that the period of one and a half hours of staying time was respected. Three different time schedules were identified because it was defined as peak hours in Google Maps. Park observation hours and days were based on Google Maps, busy areas, and average time spent by people. For each park, the least and most busy hours were chosen during weekdays and weekends. The observation procedure took four steps: First, the researcher sat in a specific park area and changed his position every 15 mins depending on the activities that were occurring in that specific area. Then, the researcher filled in the first part of the observation sheets in which he stated the time, observable weather conditions, date, and temperature (IPMA, n.d.). After, every time the observation location changed, the researcher marked all the park characteristics and specific observation locations on the map of the observation sheet. In the meantime, field notes were taken and pointed out in the fourth part of the observation sheets. These notes were related to problems, user characteristics, and identified interactions. At the end of each observation, the hour was noted, and the information was organized using the fifth part of the observation sheet, the AEIOU framework (See Figure 20).

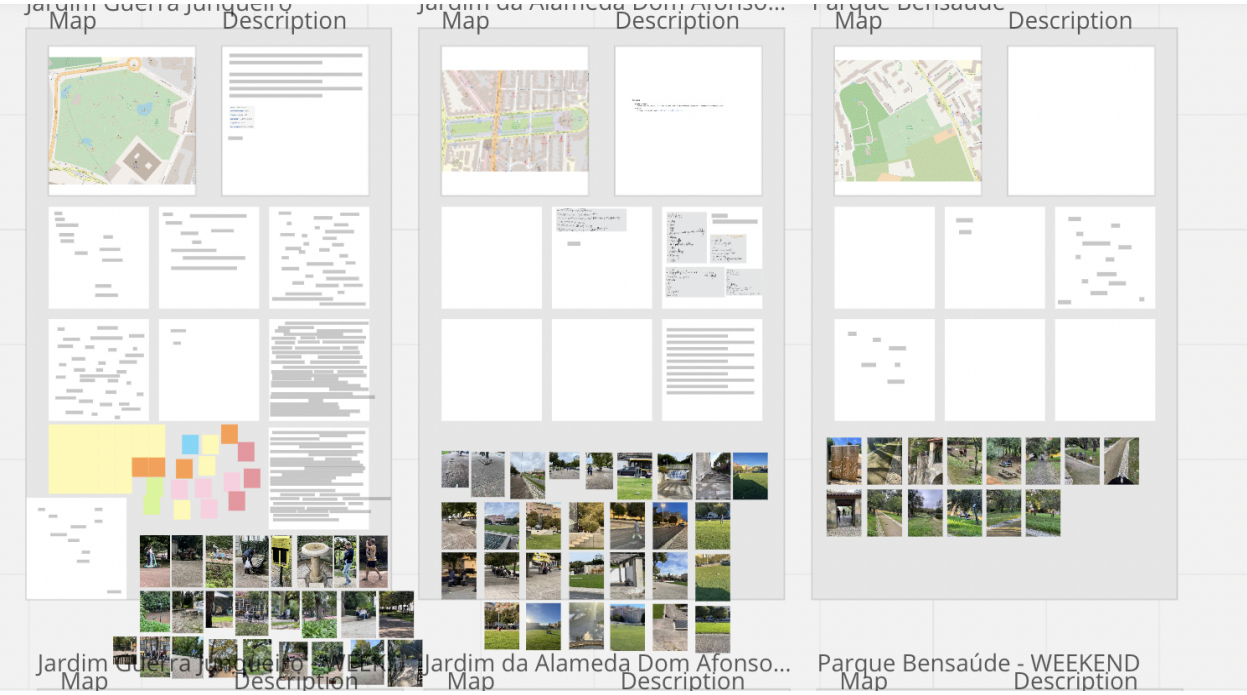


Figure 20 - Filled AEIOU Framework for each park (https://miro.com/app/board/uXjVMoXT6R0=/?share_link_id=956236191561)

4.4.6 Results and Analysis

Results will be displayed for each park separately, using the AEIOU framework as an organizer. This framework was chosen because it allows both the researcher and the readers to have an overview of the park's activities, environment, interactions, objects used, and users. Also, for each park, a table with the most observed problems was filled.

At the end of the results section, a general review of the parks will be done together. The most commonly identified problems will be categorized and grouped.

It is important to note that observation methods can be more objective than interviews and can have less bias than interview methods. Even though this is true, it is also important to consider the Halo effect. This effect can happen because the researcher's experience can affect the way he judges and perceive the world around him.

Jardim Guerra Junqueiro

Activities:

Jardim Guerra Junqueiro stands out as a remarkably diverse park, offering an extensive array of activities, ranging from individual pursuits to group engagements. These activities also span the

spectrum from highly active to more leisurely pastimes, with variations observed between weekdays and weekends and different periods of the day.

Weekdays:

- During lunchtime, visitors can be seen quickly eating at tables or benches.
- Dog walking is a common and recurrent activity in the park.
- Sports lessons, notably kickboxing, fitness, and yoga, are frequently held before and after lunch.
- Running emerges as the most prevalent physical activity among park users.
- For children, the park becomes a playground, featuring activities such as football, bike riding, basketball, and scooter riding. Running on the grass and climbing trees are also popular choices.
- Youth users often enjoy riding electric shared scooters within the park, viewing them as toys rather than mere means of transportation.
- The use of smartphones is widespread among both youth and adults, with activities like phone calls, picture-taking, gaming, texting, and music-listening being common occurrences.
- Video calls are a prevalent activity across all age groups, even among older visitors.
- Adults and young adults find utility in park amenities like the kiosk, café, picnic tables, and certain benches, using them for study and work purposes.
- Benches, which are distributed throughout the park, serve as spots for activities like reading, listening to music, conversing, and smoking.
- Weekends witness the park's transformation into a gathering place, attracting families and friend groups who indulge in picnics, birthday celebrations, and band training sessions.

Weekdays:

- The park becomes a resting spot for people during lunchtime on weekdays.
- Similar to Jardim da Alameda Dom Afonso Henriques, a group of older individuals engage in card games, but in Jardim Guerra Junqueiro, they prefer the café tables for these activities.
- Solving puzzle books, such as sudoku, word search, and crossword, is a common weekday occurrence.
- Both children and the older adults take pleasure in feeding animals like ducks and pigeons.

- Organized fairs on weekends lure visitors to the park for shopping.
- A notable observation in Jardim Guerra Junqueiro is the presence of parents walking with their newborn babies during weekdays, a sight less frequently observed in other parks.

The vast range of activities offered by Jardim Guerra Junqueiro contributes to its vibrant ambiance and ensures that visitors of all ages find something engaging and enjoyable during their time at the park.

Environment:

Based on our observations, Jardim Guerra Junqueiro stands out for its abundant greenery, adding to its overall charm. The park's old-style architecture further enhances its appeal. It provides a familiar setting with various amenities, including a kiosk, a library, a café, two playgrounds, and restroom facilities. The park predominantly features a flat terrain, making it easily accessible for most visitors. However, there are some points where the ground is uneven due to tree roots breaking through the pavement, and the playground surface consists of gravel, making these areas less accessible.

Regular maintenance teams are frequently seen working in Jardim Guerra Junqueiro, ensuring the well-treatment of the green areas and keeping the park clean. Additionally, a security guard is present in the park, ensuring the safety of park visitors. As mentioned earlier, the park boasts a remarkable abundance of greenery, with trees from various parts of the world that are protected by law. The lush grass areas further contribute to the park's natural richness. Its location in the heart of a residential neighborhood and its proximity to schools make it a convenient pathway that connects different areas, encouraging pedestrian activity.

Figure 21 - Most important features in Jardim Guerra Junqueiro

Interactions:

The park exhibits several types of interactions. The most prevalent interactions involve human-to-human engagement, such as chatting and participating in sports activities. Human-to-animal interactions, particularly between dogs and their owners, are also common. Furthermore, human-to-object interactions, primarily associated with smartphone usage, are frequently observed.

These interactions are consistent across the observed parks; however, Jardim Guerra Junqueiro stands out for its notable human-to-human interactions. For instance, we consistently observed parents actively engaging with their babies and children. Additionally, people engaging in conversations were frequently observed within the park. Moreover, the use of smartphones was a frequent occurrence, indicating a strong human-to-object interaction. However, when compared to the robust human-to-human interactions, the significance of human-to-object interactions was slightly less pronounced.

Objects:

In Jardim Guerra Junqueiro, a diverse park nestled within its green surroundings, a plethora of objects play a significant role in shaping visitors' experiences. From personal items that enhance convenience and comfort to the park's infrastructure and specific interactions, these objects contribute to the vibrant atmosphere of the park. This introduction sets the stage for exploring the observations related to objects in Jardim Guerra Junqueiro.

One notable aspect is the prevalence of personal objects utilized by park visitors. Smartphones, headphones, marsupials (baby carriers), strollers, and Tupperware containers are among the

commonly used items. These objects reflect the individual preferences and needs of visitors as they navigate the park's diverse activities and amenities.

Furthermore, the park's infrastructure offers essential objects that facilitate various interactions. Benches and tables, prominent features of the park, provide resting and gathering spots for visitors. These objects foster human-to-human interactions and serve as communal spaces for conversations, relaxation, and shared experiences.

Additionally, specific interactions highlight how visitors engage with particular objects within the park. Whether it's utilizing payment machines or handling money at the kiosk or café, engaging with coffee cups, bottles, and plates, or immersing themselves in solitary activities with books, smartphones, magazines, newspapers, and sudoku books, visitors make use of objects in ways that enhance their park experiences. Older visitors, in particular, demonstrate unique interactions by utilizing portable radios and playing cards.

Users:

The users of Jardim Guerra Junqueiro display a relatively balanced distribution in terms of numbers. The proximity of a nearby school contributes to a comparable presence of children, youth, and older individuals within the park. Another significant user group consists of families who visit the park during weekends or after working hours, seeking quality time together.

Adults typically frequent the park during lunchtime and after their work hours. On the other hand, older adults can be seen throughout the day, with a more noticeable presence during working time periods when other user groups are less prevalent. The park serves as a gathering place for older adults, particularly when other users are less active.

Compared to Jardim da Alameda Dom Afonso Henriques, Jardim Guerra Junqueiro does not appear to attract a homeless population. This could be attributed to the presence of a security guard and paid toilets, which may create an environment less conducive to homelessness. Additionally, marginalized groups, specifically disabled users, were rarely observed in the park. Only one individual with a profound disability was observed, being assisted by another person in a wheelchair. The park's uneven floor and limited accessibility in its surroundings might contribute to the relatively low usage among this particular group of people.

Problems:

The observations in Jardim Guerra Junqueiro have revealed that the challenges encountered by users differ between weekdays and weekends. Furthermore, these difficulties vary based on the

user type, highlighting that older adults and children may share certain issues while simultaneously facing distinct challenges. To provide a comprehensive overview, the problems can be categorized into two groups: weekdays and weekends, and further analyzed in terms of the user groups most affected by them. It is worth noting that the most commonly observed problems during both weekdays and weekends can occur in either period.

By organizing the identified problems in this manner, we can gain insights into the specific challenges faced by different user groups in Jardim Guerra Junqueiro, shedding light on the nuances of their experiences within the park. Problems can be seen in Appendix I.

Observations in Jardim Guerra Junqueiro have identified several problems faced by park users, which can be summarized and organized as follows for the weekdays:

- Decreased visitor numbers on rainy days: The park lacks closed facilities, leading to a significant decrease in visitors during rainy weather. Additional artificial sheds could be introduced to attract more visitors during rain or provide more coverage during the summer in underutilized open areas.
- Wet benches and tables: Users were observed carrying plastic bags and towels to dry these facilities. It is important to explore materials that dry quickly or implement solutions to expedite the drying process.
- Accessibility concerns: While the park is considered accessible, the presence of slippery and uneven areas poses challenges for users with mobility issues. Evaluating new mobility indexes and implementing intervention methods, such as improved pathways, can enhance accessibility.
- Lack of bike lanes: Jardim Guerra Junqueiro sees a high number of cyclists and scooter riders using the park as a path. The absence of designated bike lanes and potential conflicts between pedestrians and riders call for the establishment of proper lanes to ensure the safety and convenience of all users.
- Unleashed dogs: Dog owners sometimes allow their dogs to roam freely, leading to problems such as jumping on park users, eating inappropriate items, and causing disturbances. Designating specific areas for dogs and providing dog poop bags can help address these issues.

- Communication sign issues: The park has scattered communication signs, but some are invisible, poorly designed, or vandalized. Implementing new and improved signs, including a dynamic information display, can enhance communication with park users.
- Maintenance and improvements: While the park exhibits good maintenance of green areas, other aspects require attention. Uneven floors, damaged areas, and other issues should be communicated better, and maintenance efforts should be expanded to address these concerns.
- Drinking fountains and picnic tables: Frequent maintenance of drinking fountains is needed to prevent clogging. Some picnic tables require leveling, while additional tables could be added in specific areas to cater to the needs of workers, children, and youth.
- Underutilized fitness equipment: The park offers fitness equipment, but during observation, usage was low, primarily by children and youth using them incorrectly as toys. Exploring alternative solutions for children's activities and co-designing solutions with the older adults may be beneficial.
- Lack of civility: Instances of incivility, such as spitting on the floor, were observed, mainly among senior generations. Promoting and encouraging proper behavior is essential for maintaining a pleasant park environment.
- Noise pollution: Due to its proximity to busy roads, Jardim Guerra Junqueiro can be noisy in certain areas. Implementing sound barriers could help reduce the impact of automobile, bus, and motorcycle noise.
- Specific needs for children and youth: Providing designated areas and attention to ball games and activities involving skates, scooters, or bicycles can enhance the experience for these important user groups.
- Organized stroller parking: As parents frequently visit the playground with strollers, designated parking spots should be implemented to prevent obstruction of walking paths and ensure better organization.

These observations provide valuable insights for improving Jardim Guerra Junqueiro, addressing various issues and enhancing the overall experience for park users.

Following problems have identified several problems faced by park users, which can be summarized and organized as follows for the weekends:

- Loud Music from Speakers: During weekends, when groups gather in Jardim Guerra Junqueiro for celebrations, picnics, or reunions, they often bring speakers to enhance their experience. However, this can lead to the issue of loud music playing in the park. While it may be enjoyable for the group involved, it can disrupt the peace and quiet that other park users may be seeking.
- Garbage in the Grass: When visitors engage in group activities such as picnics or celebrations, they often bring food and beverages to enjoy in the park. Unfortunately, some users neglect to properly dispose of their garbage, leaving it scattered on the grass and the park floor. This creates an unsightly and unclean environment for others and detracts from the overall beauty of the park.
- Scarcity of Benches: Due to the higher number of visitors during weekends compared to weekdays, finding available seating, particularly benches, can be a challenge. The limited number of benches in the park may not adequately accommodate the influx of users. This can result in discomfort for individuals who need a place to rest and relax during their visit.
- Difficulty Finding Rest Areas: In addition to the scarcity of benches, there may be a lack of designated rest areas in the park during weekends. Visitors seeking a place to sit and unwind may struggle to find suitable alternatives. The absence of dedicated rest areas can lead to fatigue and inconvenience for parkgoers.
- Noise Disruption: With groups congregating in the park during weekends, the use of loudspeakers or music can create a noisy environment. While enjoyable for those participating in the group activities, it can be disruptive for individuals who are seeking a quieter and more peaceful setting. The noise can interfere with relaxation and hinder the overall park experience for some visitors.

Addressing these specific issues during weekends can help improve the overall quality of visitors' experiences in Jardim Guerra Junqueiro. Implementing measures such as managing noise levels, promoting responsible waste disposal, increasing the number of benches or alternative seating options, and designating quiet areas can contribute to a more enjoyable and harmonious park environment.

Jardim da Alameda Dom Afonso Henriques

Activities:

In this public park, a wide variety of activities are observed, with distinct patterns between weekdays and weekends. Based on our observations and interactions with park visitors, we have identified the following key activities:

Weekdays:

- Walking and running are common physical activities.
- People practice praxis and engage in reading books during leisure time.
- Visitors can be seen enjoying meals at the park's café or sitting on benches.
- Playing card games is a popular pastime, especially among older male users.
- Dog walking is a frequent sight in the park.
- Parents often visit the playground with their children.
- Outdoor fitness classes, including kickboxing, fitness, and yoga, are regularly held.
- Drawing, listening to music, and making video calls are prevalent smartphone activities.
- Some individuals use the park as a waiting area for public transport connections between points A and B.
- Sunbathing and reading journals are also observed during weekdays.
- Young adults engage in various activities, such as eating, exercising, and using the kiosk as a workstation.

Weekends:

- Grouped activities with family and friends are more common.
- Picnics and band meetings are popular weekend pastimes.
- The park hosts organized events, including fairs (gastronomic, popular, general, and book), concerts, and celebrations of specific holidays (religious and non-religious).
- Due to its emblematic fountain, the park is used for filmmaking recordings.

Age-Dependent Activities:

- Older individuals tend to rest, walk, chat, and play card games, often at the café tables.
- Young adults have a broader range of activities, including reading, eating, exercising, sunbathing, and using the kiosk as a workstation.

Overall, Jardim da Alameda Dom Afonso Henriques offers a diverse and vibrant atmosphere, catering to the unique preferences of its visitors based on their age and the day of their visit.

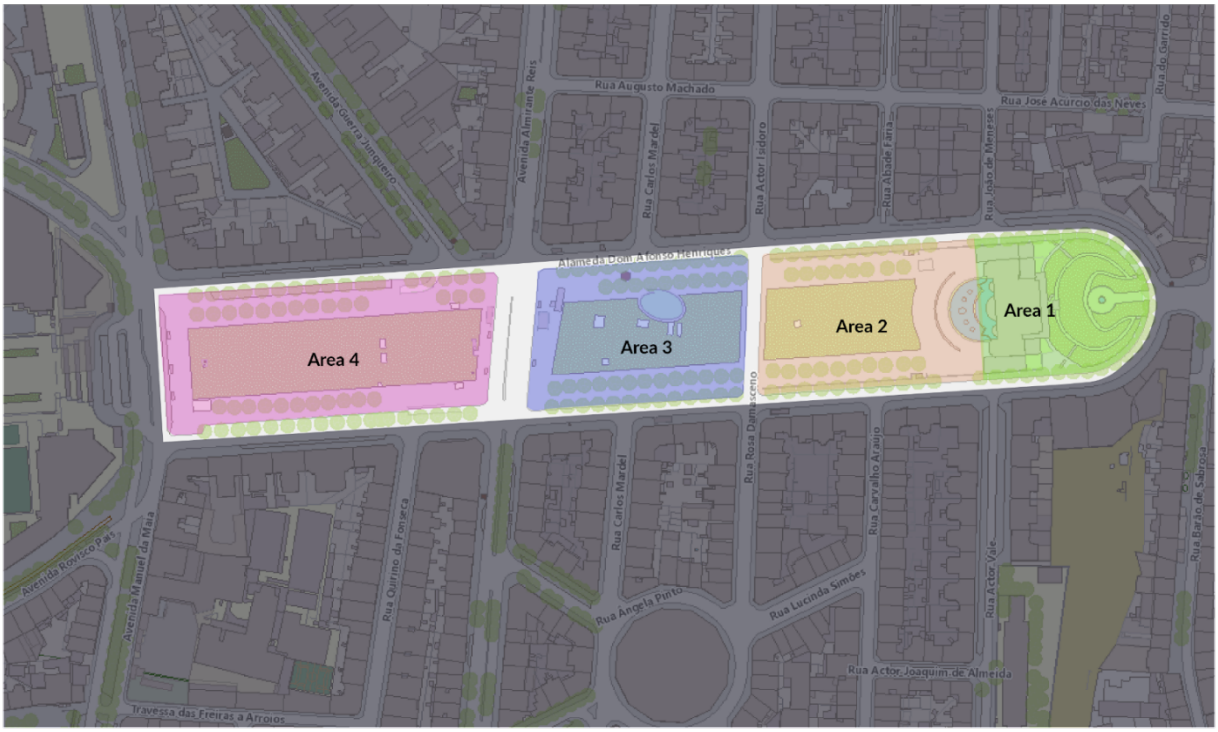


Figure 22 - Most important features in Jardim da Alameda Dom Afonso Henriques

Environment:

Jardim da Alameda Dom Afonso Henriques Park exhibits a remarkable diversity of activities, divided into four distinct areas. The first area houses a small green space with tables and benches surrounding the fountain, attracting youth people in the green zone and homeless individuals seeking refuge in the viewpoint region. Tourists often frequent the viewpoint area, but its abundance of pigeon droppings discourages prolonged stays. The second area, with a lower fountain part and a spacious grassy area surrounded by trees and benches, sees more older adults visitors, dog owners, and young people sunbathing. It also becomes a temporary shelter for the homeless, thanks to the availability of public toilets. The third area, the most utilized, features a kiosk, changing food trucks, and a playground. Old male adults gather around picnic tables for card games. Being the central hub, it provides access to the underground station, two bus stops, and serves as a focal point for various activities along Avenida Almirante Reis. The fourth area stands out with its uneven landscape, primarily used by dog owners and people seeking a passage from point A to B. The steep slope and lack of seating options make it less attractive to visitors. However, the park overall sees significant footfall, especially in the flat and well-connected central regions. Surrounded by residential buildings, the park is complemented by schools, street shops,

and the presence of Instituto Superior Técnico. Its diverse transport options, including two underground lines, bus stops, a cycling lane, and shared council bikes (GIRA), ensure easy accessibility for visitors to enjoy the multitude of activities it offers.

Interactions:

Various levels of interactions occur within the park, encompassing Human with Human, Human with Animal, Human with Object, and Animal with Object interactions. Among these, the most prevalent interactions involve Humans with Humans, followed closely by Humans with Animals, and Humans with Objects. Animal with Object interactions are primarily seen between dogs or pigeons and garbage.

Among Human with Human interactions, common activities include chatting, playing games, and participating in fitness classes. Human-animal interactions typically involve dog owners and their pets or dogs interacting with other park users. Occasionally, users also interact with pigeons or seagulls, often with the intent of shooing them away. Human-object interactions revolve around personal items such as food, smartphones, and books, with a stronger reliance on personal possessions rather than public amenities. Nonetheless, interactions with park benches and bins are also observed. Additionally, sports-related interactions, like using balls and yoga mattresses, add to the diverse range of engagements in the park.

Objects:

The objects found in the park can be classified into two main groups: public and personal. Personal objects pertain to the belongings of individual users, with smartphones emerging as the most widely utilized item across all age groups. Additionally, specific objects are commonly seen: card decks are popular among older adults, books are prevalent among young adults and adults, and towels are frequently used by larger groups during picnics. Tupperware containers are notably present, particularly during lunch periods, while leashes are abundant due to the high number of dog owners in the park. Balls and yoga mattresses are commonly seen in the morning and late afternoon. Photographic cameras are also widely used for capturing moments in the park, and headphones and earphones are popular among specific user groups, often correlated with age.

Among the public objects, the park features urban furniture, billboards, fitness equipment, chairs, tables from kiosks, and bins. These amenities are conveniently accessible to all park visitors, contributing to the park's overall appeal and functionality.

Users:

Among the three public parks studied, Jardim da Alameda Dom Afonso Henriques stands out for its remarkable diversity of users. This park attracts individuals from various income levels, ranging from those with low incomes to higher income groups. Additionally, users of all age groups can be seen enjoying the park's amenities. Notably, homeless individuals are also observed as a significant user group in the park. Interestingly, the composition of park visitors differs between weekends and weekdays. Weekends witness the presence of families and groups of friends, while weekdays see a diverse mix of users, including older adults, dog owners, students, and workers.

Moreover, variations in park usage occur throughout the day. Workers tend to visit during lunch breaks and after work hours, while the older adults are seen before and after lunchtime. Students utilize the park during their free time or between class schedules. A noteworthy aspect of Jardim da Alameda Dom Afonso Henriques is its embrace of multiculturalism, bringing together individuals from different cultural backgrounds in a harmonious environment. This diversity adds to the vibrant and inclusive atmosphere of the park.

Problems:

The identified problems that users face vary from weekdays to weekends. Also, those problems vary depending on the users. Bellow, the problems will be organized into two categories: weekdays and weekends. Problems can be seen in Appendix J.

Henriques during weekdays:

- Underused Flat Grass Area: The flat grass area sees lower usage during the day and turns muddy when it rains, deterring users from utilizing it. Additionally, the older adults and individuals with disabilities avoid this region due to its uneven terrain.
- Proliferation of Pigeons: The park is plagued by a large number of pigeons, resulting in various issues. Interactions between users and pigeons can lead to uncomfortable situations, such as users throwing objects to shoo them away. Moreover, the abundance of pigeons contributes to unsightly and unhygienic conditions, especially around the fountain area.
- Dog-Related Concerns: While dogs are a popular attraction in the park, some issues arise from their presence. The lack of leashes, which are mandatory by law, poses safety concerns. Additionally, some owners fail to clean up after their dogs, leading to unclean areas. Dogs also tend to urinate on the grass, further impacting the park's cleanliness.

- Crowded Walking Areas: The underused grass area results in most visitors walking around the same paths, leading to congestion and overcrowding in certain regions of the park.
- Accessibility Barriers: The park's layout presents accessibility challenges for individuals with mobility disabilities. Steep slopes, high sidewalks, tree root-caused holes, and long paths hinder the movement of people using wheelchairs or walking aids.
- Underutilized Fitness Machines: The park's fitness machines are not extensively used, often being treated as play equipment rather than exercise tools. Reevaluating their design and placement may increase their usage.
- Lack of Accessibility for People with Disabilities: The playground's gravel surface prevents children with mobility limitations from using it, and their caregivers face difficulties accessing the area. A complementary accessible play area is needed for children and adults with limitations.
- Lunchtime Space Constraints: During lunch hours, visitors struggle to find suitable spots to eat due to limited seating options. While picnic tables are available, they are often occupied by older users engaged in card games.
- Insufficient Benches: Despite the park having numerous benches, some areas, such as region 4, could benefit from more seating options to enhance user comfort.
- Park Litter and Garbage Disposal: After busy periods like weekends and holidays, the park becomes littered and dirty due to inadequate garbage disposal practices. More bins and awareness campaigns can help combat this issue.
- Noise Pollution: Car noises and emergency sirens from nearby roads contribute to noise pollution within the park. Planting natural barriers like bushes could help reduce the impact of automobile noises.

Observations have identified several problems faced by park users, which can be summarized and organized as follows for the weekdays:

- Accessibility and Park Design Issues: Problems related to accessibility persist during weekends, affecting users with mobility challenges and limitations. Specific design issues, such as the lack of a designated dog park, contribute to user inconveniences.
- Lack of Shade: During weekends, users tend to spend more time in the park, leading to increased demand for shaded areas.
- The scarcity of shaded spots can cause discomfort for visitors seeking relief from the sun.

- Garbage and Litter: The problem of improper garbage disposal remains prominent on weekends due to increased foot traffic. Inadequate trash disposal can lead to an unclean and unsightly environment for park visitors.

Parque Bensaúde

Activities:

In this public park, a wide variety of activities are observed, with distinct patterns between weekdays and weekends. Based on our observations and interactions with park visitors, we have identified the following key activities:

Weekdays:

- Walking and running are common physical activities.
- People practice praxis and engage in reading books during leisure time.
- Eating and going to cafés are popular during lunch hours.
- Outdoor fitness classes and exercising with fitness equipment are seen before and after work.
- Many visitors engage in activities on their smartphones, such as making video calls, texting, and using social media.
- People play card games, particularly older adults at the café tables.
- Some individuals sunbathe and rest on the grass and benches.
- Students can be seen studying or working at the park's kiosk and café.
- The playground is often occupied by children after school hours.
- Dog walking is a common activity throughout the day.
- On weekdays, the park serves as a resting spot for people during lunch breaks.

Weekends:

- People engage in more grouped activities, such as picnics and birthday parties.
- Families and friends gather in the park for celebrations and reunions, often bringing speakers to play music.
- The grass area is utilized for picnic-style meals, and garbage can be a concern during these gatherings.
- Dog walking remains prevalent, with dogs freely roaming in various areas of the park.

- Individuals of all ages participate in activities like listening to music, sunbathing, and observing nature.
- Taking photos becomes more frequent, capturing interesting aspects of nature and the park's architecture.
- The café attracts users of all ages, especially during lunchtime and after working hours.
- The playground sees increased usage during weekends, with children accompanied by their grandparents and families.

Environment:

Parque Bensaúde, located in São Domingos de Benfica parish, was established on the grounds of an old farm, contributing to its unique and natural ambiance compared to the other two parks. Characterized by a sloping terrain, the park features meticulously restored old structures, evoking a sense of timeless elegance. One of its distinguishing features is the presence of community gardens, offering park users the opportunity to engage in gardening and agriculture amidst the urban setting.

The park provides free toilet facilities, catering to the needs of visitors during their park outings. Additionally, an open greenhouse element serves as an intriguing focal point, where users can find relaxation and tranquility amid the greenery.

The presence of a café near one of the entrances centralizes the sounds and activities of park-goers in that particular area. Meanwhile, certain parts of the park retain the original floor parts and bricks, adding to its nostalgic charm. However, the majority of park paths have been refurbished, yet the combination of a sloping landscape and high humidity leads to the floor becoming slippery, presenting a potential safety concern for park visitors.

Figure 23 - Most important features in Parque Bensaúde

Interactions:

The park's most frequent interactions primarily involve human-to-human interactions, which take various forms, including communication, physical activity, and parenting. These interactions facilitate social connections and engagement between park visitors. Moreover, when dog owners take their pets for a walk, human-to-animal interactions occur, leading to potential human-to-human interactions as different dog owners engage in friendly chats.

In addition to human-to-animal interactions, users also have human-to-object interactions while interacting with their pets, particularly through the use of dog leashes. This interaction highlights the close bond between owners and their furry companions during their park visits.

Another prevalent interaction observed in the park is animal-to-object interactions. This type of interaction often involves animals engaging with natural elements like branches and leaves, as well as physical objects within the dog park area.

Similar to other parks, human-to-object interactions are present, notably related to the use of smartphones. However, an interesting and distinct interaction frequently noticed in this park is the interaction with books and newspapers. This suggests that park visitors in this specific location often engage in traditional reading and leisure activities amidst the tranquil park setting.

Objects:

Parque Bensaúde stands out with a limited variety of objects used by its users, indicating a lesser dependence on external items during park visits. While smartphones are still commonly present

like in other parks, they seem to be more essential for users in this specific park. On the other hand, books and newspapers are more prevalent among visitors here. This suggests that park-goers in Parque Bensaúde may engage in more traditional leisure activities, such as reading and relaxing in a quieter and serene environment.

Dog owners in the park are conscious of using leashes for their pets, although at times, they allow their dogs to roam freely in the natural surroundings. Strollers and baby carriers are common items used by young adults, with strollers being more prominent in this park compared to baby carriers. For park users engaging in physical activities or walking, earphones or headphones are frequently seen, particularly among adults. This indicates that many visitors come to the park to enjoy their personal fitness routines or take leisurely walks while enjoying their favorite music or podcasts.

An intriguing observation is the presence of gardening tools in the park. These private tools are left in designated areas by gardening users for their convenience. It suggests that the park fosters a sense of community involvement and allows enthusiasts to engage in gardening activities within the park's designated spaces. Tupperware and other food containers are commonly used by visitors to carry food into the park, indicating that the park is a popular spot for picnics and outdoor dining experiences. During weekends, the park features elements related to picnics and birthday parties, such as balloons, towels, plates, games, and food, indicating a lively and festive atmosphere during these times. Objects like balls, children's bicycles, and scooters are often found near the children's playground during weekends, showcasing the park's appeal to families with young children seeking recreational activities and outdoor play areas.

Users:

The user demographics in Parque Bensaúde encompass various groups, including older adults, youth, children, families, and dog walkers. The park's location in a residential area and proximity to schools makes it easily accessible for youth users, while its residential nature attracts adult visitors as well. Children typically visit the park accompanied by their parents or grandparents.

Dog owners constitute a significant user group in the park, with their presence contributing to the park's popularity among citizens. On the other hand, homeless users were not observed in the park, likely due to its relatively remote location from central areas where they may find opportunities. Despite offering public toilets, the park does not seem to attract this group.

Another marginalized group that was notably absent in the park was users with disabilities. While considered accessible by CML, the park does not fully accommodate users with mobility challenges, owing to its slippery floor and sloping terrain.

Problems:

The problems observed in this park can be consolidated into one table since there were no significant differences in problems between weekdays and weekends. Problems can be seen in Appendix K.

Observations have identified the problems faced by park users, which can be summarized and organized as follows for the weekdays as well as weekend:

- Misplaced Park Map Orientation: One of the park entrance signs with the map orientation was wrongly positioned, leading to confusion among users trying to navigate the park.
- Accessibility Issues: Despite being considered accessible, the park has several accessibility problems. The slippery floor, steep slopes, and cobblestone path make it challenging for wheelchair users and individuals with mobility issues to navigate the park comfortably. Accessing the toilets is also difficult for users in wheelchairs.
- Temperature and Lighting: The park's orientation and slope result in a significant temperature range during the day. The park becomes darker and colder in the afternoon, causing some users to leave earlier. Additionally, the lack of sufficient illumination points limits park usage after dark.
- Underutilized Amenities: The park has a Korfball post, but it is not a popular activity among users. Also, the fitness machines are underused, often serving as play areas for children and resting spots for adults.
- Water Dispenser Height: The water dispenser near the children's playground is not at an appropriate height for children to access comfortably, potentially causing inconvenience for young users.
- Lower Number of Observed Problems: Parque Bensaúde has fewer observed problems compared to the other parks, which could be attributed to its lower number of users and fewer observable interactions between users and the environment.

4.4.7 Conclusion

During the extensive observation of the three parks, several points of fragility were evident, presenting challenges to be addressed. However, within these challenges lie opportunities for potential solutions and improvements. As a designer, viewing problems as stepping stones to innovation becomes essential in shaping the parks' future.

Each of the three parks showcases distinct characteristics in terms of their primary user groups, peak hours of usage, visitor count, range of activities, available facilities, and prevalent problems. Analyzing these differences allows for identifying correlations and patterns that relate to the main issues faced by each park. By understanding these correlations, designers can effectively strategize and implement tailored solutions for the parks' unique contexts.

Figure 24 - Visual grouping of the identified problems

Figure 24 presents a visual representation of the identified problems, organized by proximity and color-coded into five main groups based on their frequency. The five prominent groups of problems encompass: 1) maintenance-related issues, 2) challenges associated with dogs, 3) concerns regarding urban furniture, 4) weather-related difficulties, and 5) accessibility problems. These groups capture the most recurring issues across the three parks.

In addition to the grouped problems, the analysis also revealed several smaller issues and real user scenarios. Real user scenarios are firsthand accounts from park visitors, describing their interactions with the environment and the touchpoints they encounter. These scenarios often stem

from the problems users encounter and serve as valuable insights for understanding where and how design interventions can enhance their experiences.

Table 10 highlights four common problems observed in all three parks, which will be thoroughly examined and addressed in Chapter 5. By delving into these key issues, the study aims to develop comprehensive solutions that enhance the parks' overall functionality and user experience.

Table 9 - Grouped problems

Problems
Animals: Unwanted distractions by animals (pigeons, dogs)
Equipment and Maintenance: benches, fitness equipment, card game area, bins (overuse), water fountains (full of water)
Accessibility and Maintenance: Strollers parked near playground, high sidewalk (cane), uneven floor
Weather & Communication signs (maintenance, slippery floor): Sun (shades, warmth), Rain (slippery floor)

During the observation, a multitude of problems were identified and highlighted, but it also brought to light a range of opportunities. An interesting example can be found in Jardim da Alameda Dom Afonso Henriques, where a bench with its legs taken off is still being used by park visitors, as depicted in Figure 25. This figure demonstrates that innovative and unconventional solutions can be applied to public parks. Emphasizing co-design and involving users in the process can lead to more thoughtful and creative approaches in finding new solutions for enhancing public parks.

Figure 25 - Different use of urban furniture

In the next section, four user scenarios will be covered, and possible future solutions will be discussed for each one of the scenarios.

5. Real-world user scenarios

From the previous section, four group problems were identified. These problems will be described through real-world user scenarios, and after this, suggested solutions to how we can deal with those problems will be done.

5.1 Method

According to the Interaction Design Foundation, User scenarios are detailed descriptions of a user – typically a persona – that describe realistic situations relevant to the design of a solution (Interaction Design Foundation, n.d.-b). By painting a "rich picture" of a set of events, teams can appreciate user interactions in context, helping them to understand users' practical needs and behaviors.

Storyboards are sets of images that turn visual scenarios. This storytelling process enriches every designer's understanding of the flaws, problems, users, and touchpoints. This step makes context, touchpoints, and problems more obvious and easily approached (Rachel Krause, n.d.).

5.2 Scenarios

Scenario 1: A game day for older adults

Description:

This scenario is based on the observations made in Jardim da Alameda Dom Afonso Henriques and Jardim Guerra Junqueiro. It is very common for older men to play cards as a group activity (Figure 26). This scenario's main problem is unwanted pigeons (Figure 27). However, it was also observed that some people are causing this problem by feeding them (Figure 27) even though it is forbidden. The secondary problem concerns urban furniture not designed for older adults.

Figure 26 - Older men playing games

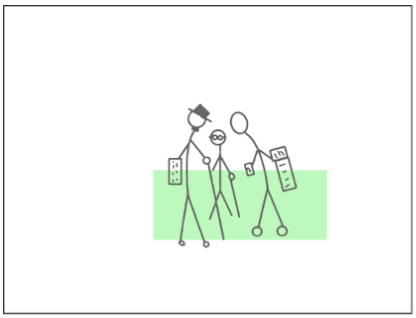
Figure 27 - Pigeons

Scenario:

In the tranquil park, a gathering of seasoned men eagerly assembled for their beloved card games, their eyes sparkling with anticipation. They arranged themselves at familiar picnic tables, displaying thoughtfulness by placing cardboard to protect the wood from the city's grime and discomfort. Laughter and camaraderie filled the air as the games commenced, fostering a sense of cherished companionship.

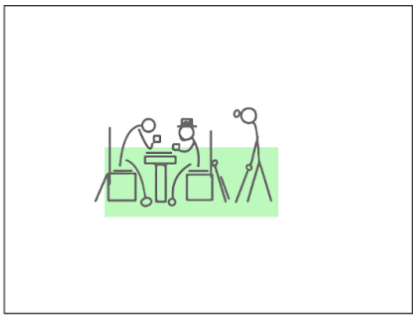
Unexpectedly, a mischievous pigeon landed on a nearby branch, leaving an unwelcome surprise on the table. This incident brought forth frustration among the older players, turning their grins into scowls. Swiftly, they grabbed stones, attempting to shoo away the unruly intruder. Once the momentary commotion settled, the gentlemen cleaned the table with a hint of annoyance, sharing lighthearted complaints about the persistent birds. Despite the interruption, the camaraderie endured, fueled by their love for the game and each other.

Storyboard:



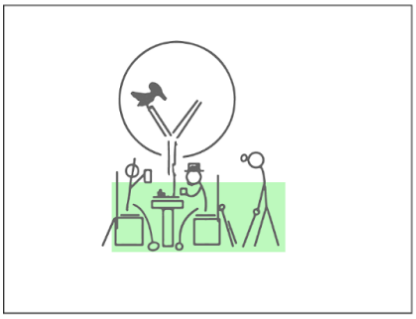
1. Gathering at the park

On a beautiful sunny morning, a group of older male users gathered at the local park. Excitement filled the air as they prepared to engage in their beloved card games with fellow seniors.



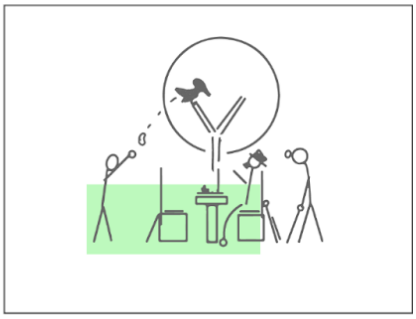
2.Making the Tables Comfortable

Upon reaching the picnic area, the group realized that the provided tables and chairs were not as comfortable as they desired. Resourceful and thoughtful, they took out cardboard pieces they had brought along. They covered the tables and chairs with cardboard, creating a more pleasant seating arrangement.



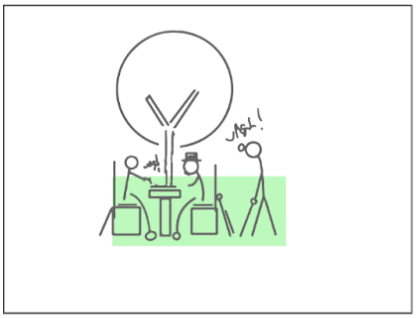
3.Unfortunate Encounter with a Pigeon

As the card game intensified, a pigeon perched on a nearby branch caught their attention. Just as the competition reached a crucial moment, the bird unexpectedly relieved itself, dropping a bit of an unwelcome gift onto the table where the card game was taking place.



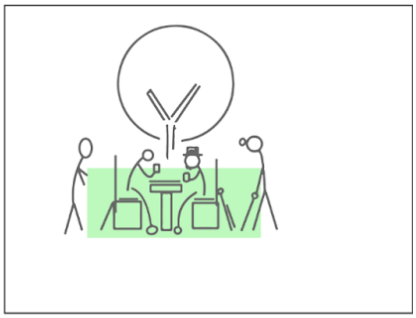
4.A Hasty Reaction

Frustration mounting, one of the players hastily grabbed a nearby stone and hurled it toward the bird, hoping to shoo it away. The others reacted with surprise at the sudden outburst.



5.Cleaning Up and Complaints

With the bird momentarily deterred, the older man who threw the stone quickly turned his attention to the filthy table. He expressed his discontent with the bird's presence, voicing his frustration to the other players and lamenting the challenges they posed during their cherished card games. He then grabbed a cloth or tissue from his pocket and diligently wiped away the unwanted souvenir left by the pigeon.



6.Resuming the Games

Despite the unexpected interruption and initial frustration, the older male users continued their card game. They shook off the minor setback, their spirits undeterred, and resumed their friendly competition and camaraderie under the warm sunlight at the park.

Figure 28 - Storyboard 1

Proposed Solutions:

Design Solution: The urban furniture should be codesigned for multi-usage.

Management and Policy Solution: A more biodiversity approach could be used by management. The cleaning schedules should be adapted for different parts of the park. Penalties should be imposed on users who feed animals. Education of people from an earlier age: school trips to parks could be a good moment.

Technological solution: The smart park can track where more pigeons are, where they smudge the environment, and where people are disturbed. Devices (e.g., ultrasound) can be placed in specific parts to avoid pigeons.

This scenario highlights two main problems: the number of pigeons and the uncomfortable picnic tables (The cardboard is used to make chairs and tables more comfortable and avoid dirt). Regarding those two problems, three separate or one global solution can be thought of.

Pigeon problems can be dealt with through management teams by using other animals, for example, eagles, because they are very territorial. Another approach is to use technology to drive away pigeons. For example, ultrasound devices can make these animals go away. The pigeons don't need to be excluded from all park areas, only from specific areas like rest areas.

To address furniture problems, design and technology can have a special role. Through design, we can understand and design better furniture for users. Design approaches like co-design and participatory design can have a special role in achieving the best solutions for each park. On the other hand, technological solutions(most related to engineering) mixed with design solutions can create new approaches, like retractable awnings, adjustable benches and tables, warm tables and benches, or furniture places to recharge mobiles.

Future gameplay areas for older adults can be introduced through technology (most related to engineering) and design. solutions. Intergenerational spaces can be considered (co-design).

Scenario 2: A day to do fitness

Description:

This scenario is based on the observations made in the three parks. Generally, it is very common for older women to visit public parks to be active, and these three parks were preferred places for fitness activities(Figure 29).

Figure 29 - Older women being active

The main problem identified in this scenario is the low active period that older women and men have in the park. Usually, these users dressed in comfortable sports outfits walk around the park and avoid using the fitness machines implemented for those activities(Figure 30). Also, those users tend to spend more time seated on park benches.

Figure 30 - Non-usage and wrong use of fitness equipment

Scenario:

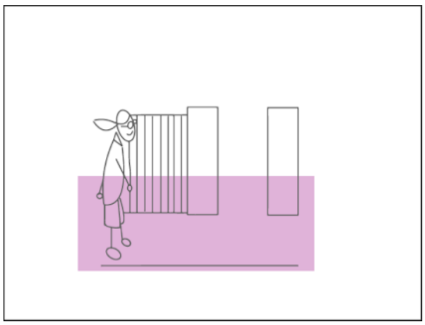
In the park, a group of older women gathered, their eyes filled with anticipation for the day ahead. Donning sporty attire, they embarked on a stroll, relishing the beauty of their surroundings while engaging in lively conversations. As they meandered along the path, they came across the park's fitness equipment, seemingly encouraging them to partake in physical activity.

However, the women saw an opportunity for comfort and rest instead of vigorous exercise. With giggles reminiscent of their school days, they playfully used the machines as resting spots, catching their breath and sharing joyful moments. Although they didn't fully embrace the exercise aspect, they continued their unhurried walk, savoring every moment.

On their next encounter with the fitness machines, curiosity led one of the women to attempt to use them. The minor challenge didn't deter their spirit despite their unfamiliarity with the equipment. However, she soon realized that her true happiness resided in the simple pleasure of walking and conversing with her dear friend.

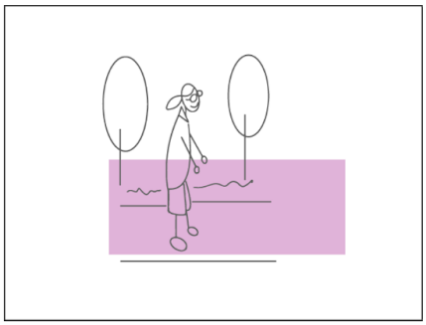
As the day gradually ended, the older woman found contentment on a secluded bench, away from the fitness equipment. This moment encapsulated the essence of her park visit - the cherished companionship and the beauty of fleeting yet meaningful moments spent together.

Storyboard:



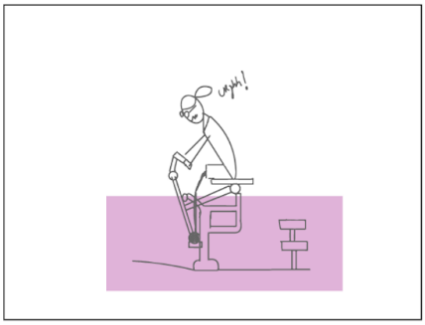
1. Arrival at the Park

An older woman gracefully arrives at the park, adorned with a warm smile. A sense of excitement and anticipation accompanies her as she looks forward to enjoying the day and reconnecting with her friends.



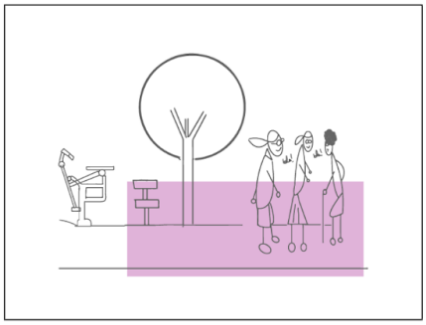
2. A Tranquil Walk in Nature

The older woman is dressed in comfortable sports attire and embarks on a leisurely walk along the park's winding pathways. She takes in the scenic beauty surrounding her, appreciating the vibrant colors of the flowers and the gentle rustle of leaves in the breeze.



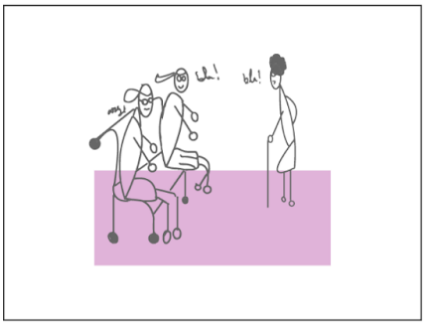
3. Curiosity and Fitness Equipment

As she strolls through the park, the older woman comes across a set of fitness equipment machines in a designated area. Curiosity piqued, she decided to give them a try. Determined, she attempts to use the devices, giving them two valiant efforts. However, the machines don't align with her preferred form of exercise and with the satisfaction she had hoped for.



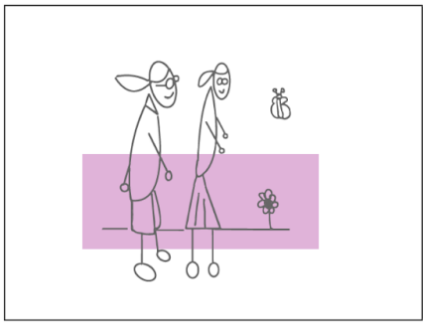
4. Conversations and Connections

Having explored the fitness equipment briefly, the older woman returns to what truly brings her joy. She continues her walk and engages in animated conversations with her friends whom she encounters along the way. Laughter and the exchange of stories fill the air as they share cherished moments and deepen their connections.



5. Finding Solace on a Bench

As the day progresses, the older woman, feeling a hint of fatigue, seeks a peaceful resting spot. She discovers a bench far from the fitness equipment, offering solitude and serenity. With a contented smile, she settles on the bench, allowing herself a moment of tranquility to gather her thoughts and recharge.



6. Blending with Nature's Embrace

The scenario concludes with the older woman gradually blending into the park's natural rhythm and ambiance. She becomes one with the park's essence, disappearing into its embrace as she finds solace, friendship, and contentment in the simple pleasures of a serene stroll.

Figure 31 - Storyboard 2

Proposed Solutions:

To address these problems, design, management, technological, and mixed solutions can be considered.

Design solutions: New fitness pieces of equipment need to be brainstormed and created with citizens and regular users who live near the park. Co-creation and participation can highlight the true necessities of users. As mentioned in Chapter two, solutions planned for a specific place, culture, and country might not fit other populations. According to it, already implemented solutions in specific areas shouldn't be considered as solutions to be implemented without consulting the real users.

New areas for fitness activities should be designed. For example, adaptable places or new challenges should be considered.

Management solutions: New ways of measuring fitness activity in specific fitness areas must be considered. Creating new programs for older adults might influence future usage of the park. This is important because active citizens tend to have higher indexes of well-being and be more healthy. This way, investing in fitness areas can lower the investments needed in healthcare for preventable diseases.

Technological solutions: Interactive fitness areas, interactive spaces, and screen billboards can make users visit the park more often and be more active. Also, solutions that make the conditions of the park easier to access allow users to plan and choose the perfect hours to do their maintenance and activities.

Another area where technology can improve the experience in parks is by giving users feedback while using fitness equipment. Other perspectives could be the connection of users to emergency places, fitness instructors, and other important new park stakeholders.

Urban furniture, in their majority, is seen as a single use only (e.g., benches to sit or fitness machines for a specific exercise). If park users do not do what these pieces of equipment are meant to do, then park users will not use those pieces of equipment. Street furniture must be multi-user and multipurpose. Co-design and observation can highlight the other functions new furniture pieces of equipment can have.

Scenario 3: A difficult day to access the park

Description:

This scenario is based on the observations made in the three Parks. Older users were frequently observed in the park visiting it. The most common period was the morning period. In the three parks, accessibility problems were observed. The accessibility problems were related to uneven floors, broken floors, high sidewalks, and other elements (Figure 32).

Figure 32 - Accessability problems

These problems result in low usage of specific park areas, making older adults avoid specific park areas like grass areas and paths with holes in the floor. Another common problem in the Jardim da Alameda Dom Afonso Henriques was car roads crossing the park. This decision gives more privilege to car drivers than to park users because it only gives safe passage to users to cross the road in the extremities. Users tend to make risky, unsafe road crossings to shorten the course (Figure 33).

Figure 33 - Crossing out the crosswalk

Scenario:

Upon arriving at the park, the older adult opts for a direct route, crossing the middle of the road to reach the green expanse. Despite crosswalks providing safer access, the allure of a shorter path beckons them outside the designated crossings. While navigating the road's ascent to the sidewalk, the user encounters difficulty due to the height difference, slowing their progress. However, the challenges continue, as the park's walkways reveal an uneven terrain marred by tree roots, creating bumps and holes. Undeterred, the older adult steers clear of the alluring grassy areas, mindful of their uneven nature and the potential hazards they present. As they explore further, the park's slopes and roads intersecting the heart of the green space prove insurmountable obstacles, leaving parts of the park uncharted during their visit. Despite these constraints, the older adult cherishes the moments spent amidst nature's embrace, finding delight in the portions of the park they can navigate and vowing to return to enjoy the undiscovered serene corners.

Storyboard:

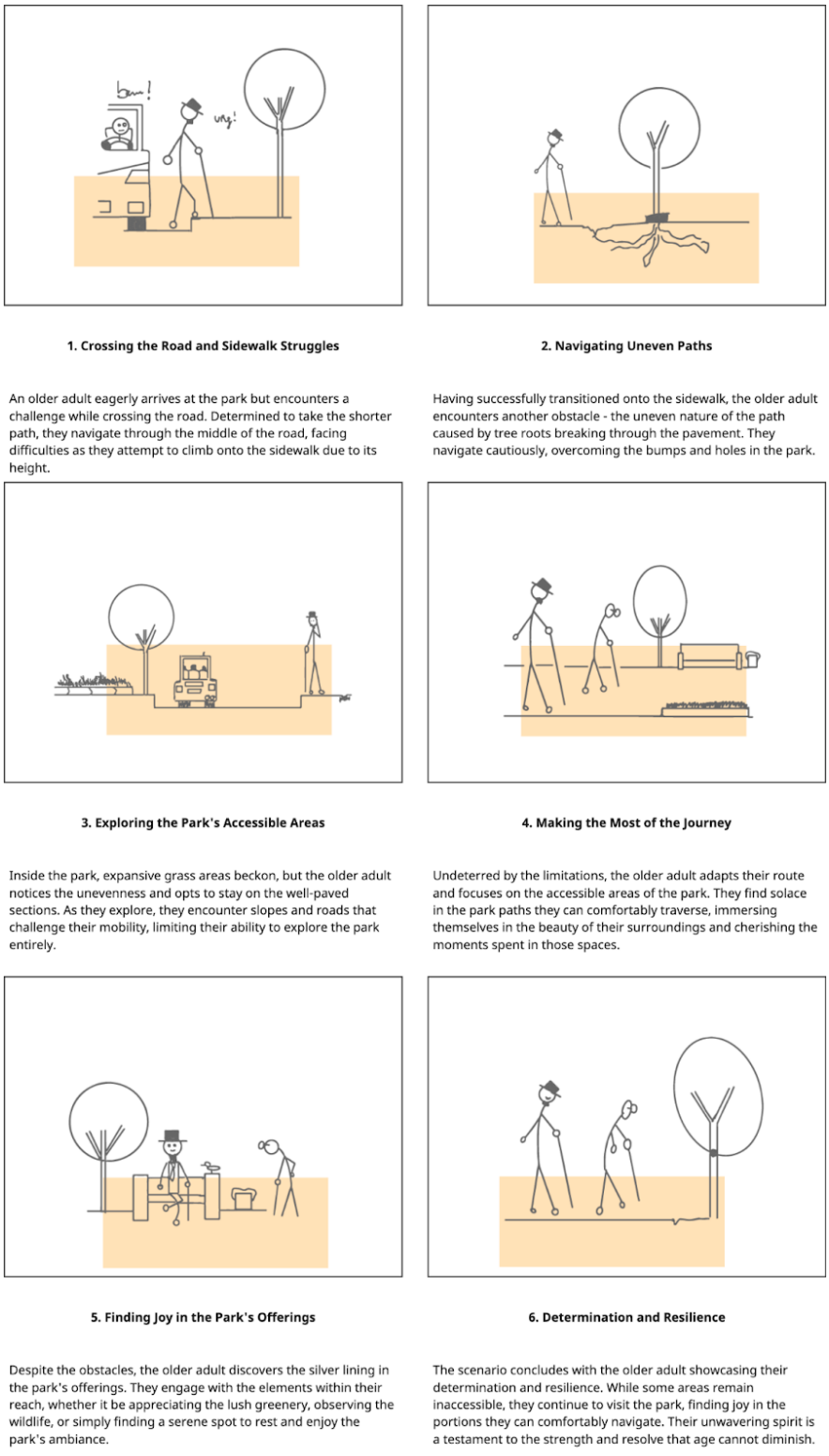


Figure 34 - Storyboard 3

Proposed Solutions:

To address these problems, design, management, technological, and mixed solutions can be considered.

Design solutions: Low sidewalks, new barriers for roots to not crack down the floor, and other facilitators for older users to walk safely need to be designed. Also, soft paths need to be thought of.

To think of safe paths that cross in the middle of the park must be mandatory, facilitating walkability and allowing older adults to use the park area.

Specific friendly paths and map roots for users with mobility problems can be considered.

Technological solutions (CIT): New IoT devices to detect accessibility problems can be implemented in the more underutilized parks. These devices need to respect the privacy of the user, but at the same time, collect information about the problems users face.

Management solutions: Reinforce the checking of the underutilized parts of the park can give a notion to managers of how to improve those park areas and the user experience inside the park.

Also, managers should focus on low-maintenance and high-resistant materials. Focus on this can lower the money needed to maintain these areas and decrease the unutilized days due to maintenance interventions.

Mixed solutions: IoT devices that measure resting and most used areas are important. This type of technology can help build heatmaps that managers can use to understand the underutilized areas, making it easier to understand the most priority areas of intervention.

Scenario 4: A rainy day in the Park

Description:

This scenario is based on the observations made at Jardim Guerra Junqueiro and Jardim da Alameda Dom Afonso Henriques. In Lisbon, the rainy season is very short but very intense. Even though we have fewer rainy days in Lisbon than in London, the quantity of rain that drops is higher in Lisbon than in London. During rainy days, older users tend to avoid using the park. This external factor influences older adults to use the park or not. However, some observations saw older adults using the park in specific areas or during cloud openings. According to that, some features can influence whether people visit or not visit the park on rainy days. Since rainy days are fewer than sunny days in Lisbon, the parks showed to be prepared only for sunny days.

Figure 35 - Aftermath rainy days

Through observations during rainy days, it was noticeable that only covered places were used in the park. The lack of these spaces led users to don't use the park. This scenario presents a typical rainy day in Lisbon Public parks.

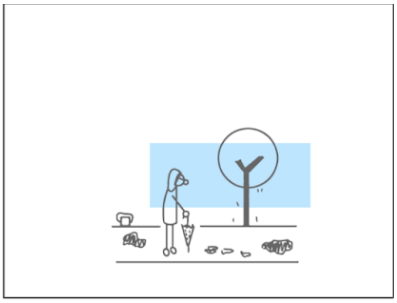
Scenario:

Following a refreshing rain shower, an older adult ventures into the park, wearing a raincoat and holding an umbrella for added protection. As he sets foot on the park's path, he encounters a perilously slippery surface covered in wet leaves, prompting him to tread carefully and focus. His primary goal is to avoid any accidents. Although carrying a closed umbrella, water still trickles down from the trees above, leaving him slightly damp. Undeterred, he persists in finding a dry bench, only to discover they are all damp from the recent rain. However, his determination and resourcefulness come to the fore as he cleverly uses a plastic bag he has brought along. Employing one side of the bag, he meticulously dries the bench. Once the bench is dry, he places the bag over it and comfortably settles down, skillfully avoiding getting wet. This scene exemplifies the resourcefulness and resilience that come with experience and wisdom, showcasing how the older adult adeptly overcomes challenges in his environment.

Storyboard:

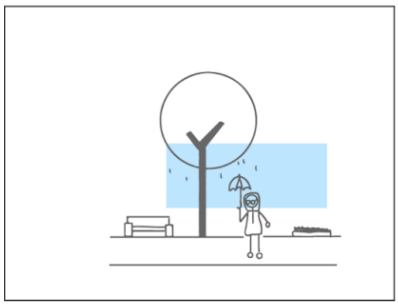
1. Embracing the Rainy Park

Following recent rainfall, an older adult arrives at the park, greeted by the fresh scent of petrichor(an earthy scent produced when rain falls on dry soil). Prepared for the wet conditions, he wears a raincoat and carries an umbrella. With determination in his eyes, the older adult venture into the park, ready to embrace the tranquility and beauty it offers despite the damp surroundings.



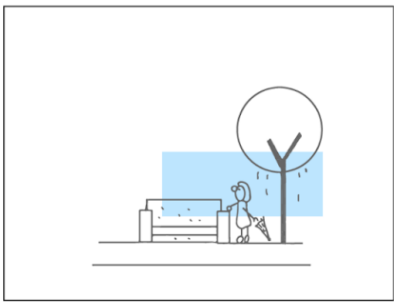
2. Navigating Slippery Ground

As the older adult walks more profoundly into the park, he encounters the aftermath of the rain—slippery ground covered with wet leaves. Aware of the potential hazards, the older adult proceed cautiously, taking slow and deliberate steps to ensure his safety.



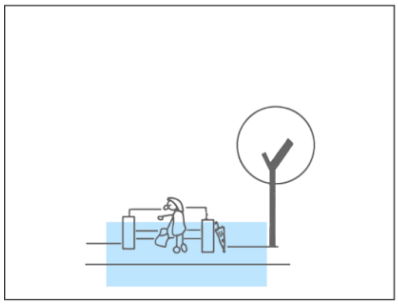
3. Raindrops from Above

While the umbrella shields him from the rain, the older adult notices water droplets sliding down from the trees, occasionally landing on his head and shoulders. The older adult adjusts the umbrella's position to find the best way to shield him from the sporadic drips.



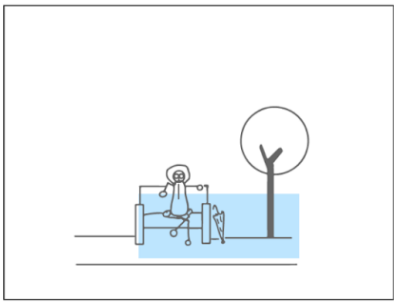
4. Seeking a Dry Spot

After exploring the park, the older adult seeks respite on a bench, hoping to find a dry spot to sit and enjoy the surroundings. He scans the area, searching for an unoccupied and dry bench.



5. A Disheartening Discovery and Resourceful Solution

To his disappointment, the older adult realizes that all the benches are damp from the recent rain. However, he reached into his pocket and retrieved a plastic bag he had brought. With determination, the man uses one side of the bag to wipe off the moisture from a bench, ensuring it is as dry as possible. He then places the bag on the bench, creating a makeshift barrier between the dampness and himself. Sitting on the bag-covered bench, he finds a comfortable resting spot sheltered from the wetness.



6. Embracing Resilience and Serenity

Undeterred by the challenges, the older adult embraces the park's beauty and finds moments of solace amidst the rain. He adapts to the circumstances with resourcefulness and resolve, illustrating his resilience and determination to make the most of his time in the park, even on a damp and challenging day.

Figure 36 - Storyboard 4

Proposed solutions:

To address this problem, new design solutions can improve park usability during rainy days. For example, new materials for benches that make them water repellent. Another design solution could be the introduction of covered areas.

Technology solutions, such as sensors, can help decision-makers to understand the critical park areas. Also, these technological solutions can contribute to managing water usage when not needed. Recognition of fallings can help users become more comfortable using public parks. Lightning controls, when the clouds are very dense, can also improve the park's usability on those days.

5.3 Conclusion

The four user scenarios above highlight the many problems older users face while in the park. This stakeholder and user were chosen due to the need to get more information about them. Those problems can be solved through a variety of solutions. These solutions can be categorized as Design Solutions, Management and policies solutions, Technological solutions, and Mixed solutions.

Even though these solutions are already established and implemented, the methods behind them need to be properly implemented. Those solutions must focus on two important elements: the user and the community. Also, solutions implemented in specific contexts may not fit similar problems in different contexts.

Focusing on the two abovementioned elements is important to achieve the right solutions. Design thinking methods, co-design, and participatory design must be used while transforming and solving park solutions.

According to IDEO, Design thinking can be defined as “a human-centered approach to innovation that draws from the designer’s toolkit to integrate the needs of people, the possibilities of technology, and the requirements for business success”. Also, Design Thinking (IDEO) is a method characterized by two big steps, diverge and converge, and various sub-steps that vary according to the design thinking approach. This method makes it easier to understand problems, generate ideas, choose the best one, prototype, and test it until it achieves the right solution. Also, another important characteristic of this method is that it is iterative, allowing the process to restart at any moment.

The Interaction Design Foundation defines the Design Thinking method as a Five-step method. According to them, the five steps are Empathize, Define, Ideate, Prototype, and Test. Figure 37 displays the five-step method and its iterative approach.

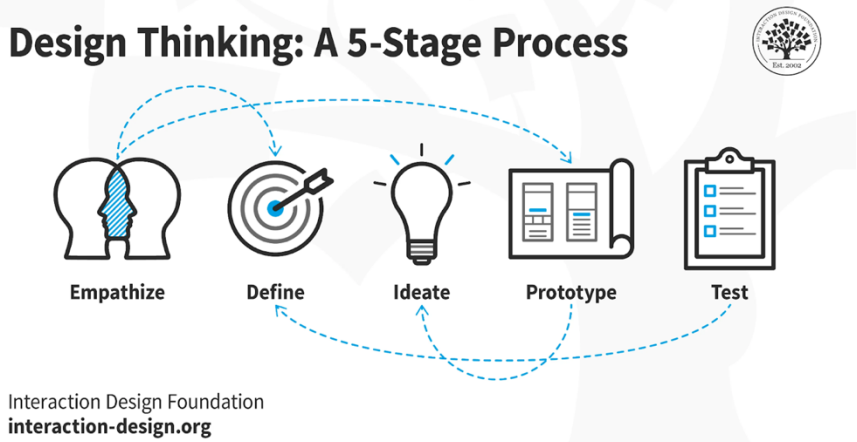


Figure 37 - Five-step Design Thinking Method (Interaction Design Foundation, N.A.)

It is crucial to understand that Design Thinking is not a static definition, having various definitions and designs. It is also an ongoing open process that can always be adapted to different circumstances.

Participatory Design is "a collaborative design approach that involves end-users in the design process. It aims to create products and services that better meet the needs and expectations of users by applying their knowledge and experiences" (Interaction Design Foundation, n.d.-a). Other forms of calling are cooperative design, co-design, or community design. This important method can be used in architecture, urban planning, UX, and product design.

Particularly, what makes this method special is the involvement of the true user in the process, lowering the risk of applying a wrong solution to a problem.

According to the Interaction Design Foundation, this method improves user satisfaction, increases user engagement, reduces development costs, improves innovation, and increases social inclusion. These benefits are all aligned with how design managers and other designers should use to improve community life.

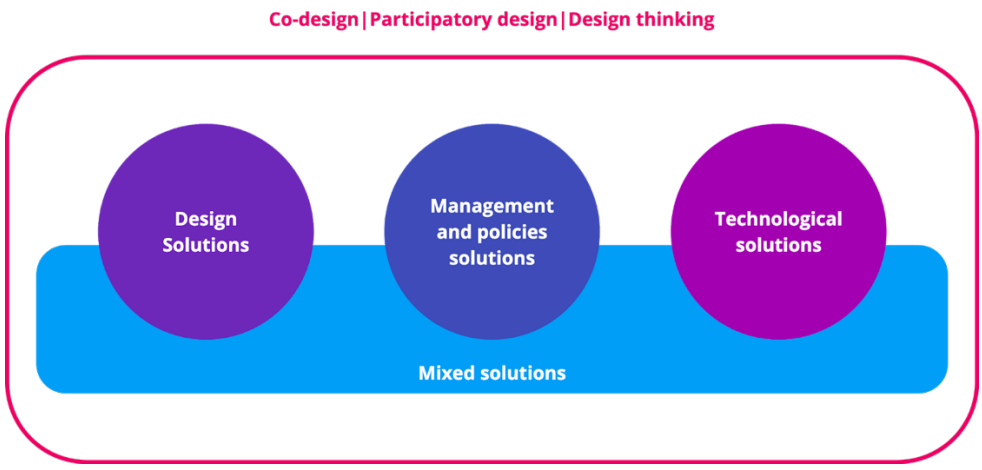


Figure 38 - Methods used to guarantee that the solutions are more suitable for the user

To achieve higher numbers of visits and usage of public parks, it is important to involve the real users of each park. Even though there are already planned solutions, there may be other ones the real users need, and they may not be a priority for those users. Figure 38 shows that independently of the solution type, the user must always be part of the process—that is why methods like design thinking and participatory design must be integrated when improving the parks.

6. Conclusion

6.1 Conclusions and Implications of the Research

This thesis set out to address the following research inquiries: Question 1: "What types of issues are prevalent in public parks in Lisbon?" and Question 2: "Can design interventions enhance the user experience within Lisbon's public parks?"

The core objective of this thesis was to classify the problems observed within public parks and devise practical solutions to create real-world user scenarios. To fulfill this primary aim, five additional objectives were formulated. These secondary objectives encompass:

1. Enhancing the understanding of the concept of public parks.
2. Identifying and categorizing the challenges encountered in public parks.
3. Investigating the dynamics of park management and the interaction between citizens and public parks.
4. Crafting real-world user scenarios.
5. Speculating on prospective solutions to elevate the quality of public park amenities.

This chapter encompasses the fulfillment of the secondary objectives as delineated, achieved by summarizing the preceding chapters and elucidating their contributions toward addressing the research question. The latter section will delve into the implications derived from the study, followed by suggestions for future investigations and concluding thoughts. In the forthcoming text, each secondary objective will be systematically addressed by elucidating the methodologies employed to attain the objective, presenting the results obtained, and providing the concluding remarks.

The first secondary objective was "Enhancing the comprehension of the public park concept". In order to reach that objective, a literature review and interviews with Lisbon public parks were performed. The literature review showed different definitions for the same concept worldwide, which vary depending on the research field, the country, and the city. Also, the broader concept of Urban Green Spaces encompasses all kinds of green areas, including public parks. This concept allows managers to understand the different levels of green space available in their area, allowing them to prioritize interventions. Additionally, from the literature review, the definition used by the Lisbon Council was taken. From the managers' interviews, it was possible to understand how Lisbon parks can be managed and the impact that Lisbon parishes have on their public parks.

In conclusion, it is essential to understand that every place/area/country/council/parish can have its definition of a public park, and the same happens according to the field of study the research is conducted. Lisbon Council defines various green spaces according to their size and purpose. It was important to notice that the Lisbon council is responsible for the most important parks in Lisbon, that the other ones are managed by the parish they are in, and that the funds come all from Lisbon Council CML.

The second secondary objective was "Identifying and categorizing issues encountered in public parks." To achieve this objective, various methods were used: Literature review, interviews, and a questionnaire. From the Literature review, a variety of public park problems emerged. Also, different forms of categorizing the same problem were found in different articles. The results from interviews with managers highlighted the problems each parish faces the most: those problems related to managers' perspective rather than from users' perspective. The problems collected in the previous two methods were used to construct the questionnaire. From the questionnaire applied to public park users, an extensive range of problems were defined. Those problems were the most important ones to follow to complete the following objectives.

For respondents, it was noticeable that security and park cleanliness were the group problems they found more problematic. It was also relevant for respondents' problem groups related to maintenance, facilities, vandalism, and other problems.

In conclusion, several problems were identified and grouped into different categories to be used in other secondary objectives.

The third secondary objective was "Investigating the dynamics of park management and the relationship between citizens and public parks".

To reach this objective, three methods were used: interviews with managers, a questionnaire to public park users, and observations in three parks. The results from the interview highlighted the different goals each manager and parish has for their public parks. For example, some managers focus more on the environment and resources, and others focus more on park users. From the questionnaire, results showed that park users visit parks near their houses during the afternoon for some time between 1 to 2 hours. Also, people visit parks every day of the week. It is also essential to refer to the fact that most respondents mentioned visiting parks eight days per month. Understanding how to bring more users to public parks is essential.

Moreover, the questionnaire highlighted the preferred activities users tend to do. It was noticeable that users have different motivations to visit a park, making parks with more variability more attractive to citizens. The most mentioned activities were walking, being in nature, being with friends, going for a coffee, doing picnics, listening to birds, and exercising.

Additionally, the questionnaire highlighted what brings those users to public parks and what makes them avoid visiting them. The observations performed in three parks highlighted various problems users face. Also, this method gave information about underrepresented groups in the other methods used, such as older adults, users with limitations, and homeless people. This method made the information collected richer, with details that could only be observed.

In conclusion, it is essential to understand that on-field methods gave more specific results than the other methods. This objective provided the insight to craft real-world user scenarios.

The fourth secondary objective was "Crafting real-world user scenarios". In order to reach this objective, results from observation were used to write scenarios and then transformed into storyboards, making those scenarios more visual and easy to understand possible user pain points and paths of change. The results highlighted four moments turned into scenarios that highlight the experience of older users in an authentic context.

In conclusion, this objective transformed real situations into stories that can efficiently be worked on to solve the identified problems.

The fifth and last secondary objective was "Speculating on future solutions to enhance public park amenities".

Several possible solutions were speculated for each of the four scenarios to reach this objective. Those solutions were of four types: Design, Management and policies, Technological, and Mixed.

Examples of Design solutions were Co-designing new urban furniture and new areas for fitness activities (adaptable places or new challenges should be considered). Also, designing specific friendly paths and map roots for users with mobility problems can be considered.

Examples of Management and policy solutions were to reinforce checking of the underutilized parts of the park and create new programs for older adults to influence more park usage.

Examples of Technological solutions were IoT devices to detect accessibility problems and interactive technology (For example, interactive fitness areas, interactive spaces, and interactive screen billboards).

Examples of Mixed solutions were technological devices, such as sensors, which can help decision-makers understand the critical park areas (For example, recognition of falling points). Also, these technological devices can contribute to managing water usage when not needed.

In conclusion, this objective highlighted the possibility of smartening public parks to improve older users' experience in public parks by bringing them more "comfort" and by turning parks safer for them(For example, more accessible and more controlled by them).

These objectives together contributed to achieving the primary objective: "categorize the problems within public parks and formulate practical solutions to craft real-world user scenarios". In conclusion, this objective highlights the importance of the design thinking method and participatory design to improve the public park users' experience by finding better solutions for the identified problems.

In a broad summary, the outcomes of this thesis underscore numerous challenges within public parks that can be effectively addressed through the application of design as a technical field and the utilization of design methodologies and tools. These enhance every facet of the process, from understanding the issues to devising solutions. For instance, design thinking, service design, co-design, and participatory design serve as essential approaches for comprehending and resolving issues within public parks. These design approaches approximate the users from managers, making solutions more suitable for them and lowering money waste in solutions that do not fit the park population. As a design management student, it is vital to notice that the research perspective focuses more on strategy and process than the final deliverables.

From the results, the thesis presents some implications for designers, managers, and park users (residents, specifically older users). For designers, it is essential to remember that solutions in specific areas and contexts may not work or fit similar regions and contexts. Also, new ways of understanding public park interactions should be thought of. To know how users interact with the public park, every designer must focus first on understanding the variable "user". Having the variable "user" decoded, it is possible to work based on the community, making the solutions work on a broader range of users, not excluding marginalized groups such as older adults, homeless, and disabled users.

For managers, the thesis highlights the importance of being more transparent with citizens. It is necessary to inform the citizens about interventions and modifications that happen in the park.

Also, having feedback from citizens and park users can help managers do a better job and help citizens become park users.

For users, it is important to notice their needs. Also, more education about what users and citizens can do to be more interventive in parish decisions has to happen in schools.

This work has implications for the future of public parks in Lisbon. New parks and new solutions should be explored to their potential. Technology can help improve existing public parks and develop new parks and other green areas that citizens can use. New formats of gardens should be thought of. The paths to parks and between parks can be more explored.

6.2 Limitations and Future Research

During the realization of the research, several limitations were identified:

Since the questionnaire was open during summertime, all the identified problems were related to the weather conditions of that period. Also, the number of answers to the questionnaire could have been higher, but the filling time of 20 minutes made several respondents only answer some of the questions.

Not all Lisbon parishes showed to be open to being interviewed for this research, and the same problem happened with Lisbon Council. This limitation caused some problems getting detailed information about parishes and council procedures, ways of work, and forms of action. Nevertheless, the information gathered from some of the parishes helped to understand how parishes can proceed to manage Lisbon public parks.

The observations happened during day periods, highlighting only users' daylight problems. For example, all the problems related to nonlight periods were excluded. For example, places with a lack of light or with higher levels of crime related to darkness were not observed.

Citizens/users interviews were not performed due to time constraints. Also, when trying to apply this method in Jardim da Alameda Dom Afonso Henriques, users did not want to be interviewed or, in some cases, didn't want to have their voices recorded.

Most of the possible solutions written on scenarios were focused on tech and design because that is the area of knowledge of the researcher. To present solutions from the manager type, other approaches needed to happen.

For future work, observations need to be performed at all day periods and all four seasons. Also, interviews have to be done at various public parks. Management problems must be explored more

because those problems impact users' lives. Also, specific research on homeless users, children users, and users with disabilities must be done. Through that specific research, public green areas can be used and prepared for everyone, even those that are usually not considered.

Finally, technology and new ways of solving problems should be explored to understand how Smart public parks can facilitate and improve citizens' and managers' lives.

Future research insights:

- Explore worker's pain points;
- Explore new green areas inside cities;
- Explore barriers that exist before and after park visitation;
- Explore public health contributions of public parks to lower public expenses in health.

6.3 Contribution

The study contributes to a better understanding of problems and how people interact with public parks.

This study's scientific contributions are an article entitled "Active Aging and Smart Public Parks" published in Geriatrics Journal in MDPI and part of the Special issue "Age-Friendly Ecosystems: Voices from around the World" (September 2023), and the presentation of the research entitled "A Study of Lisbon Public Parks: Identifying and Classifying Problems" at Design Principles and Practices Conference (March 2023).

6.4 Dissemination

After the conclusion and presentation of the Dissertation, the desired form of presentation would be its publication. The knowledge of the thesis should be open to all the people, companies, and universities interested in the theme and topics.

The dissemination should occur:

1) Within the IADE faculty and their library
2) Through scientific events presenting the work
3) In academic publishers and websites such as Design Principles and Practices Journal

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Appendix

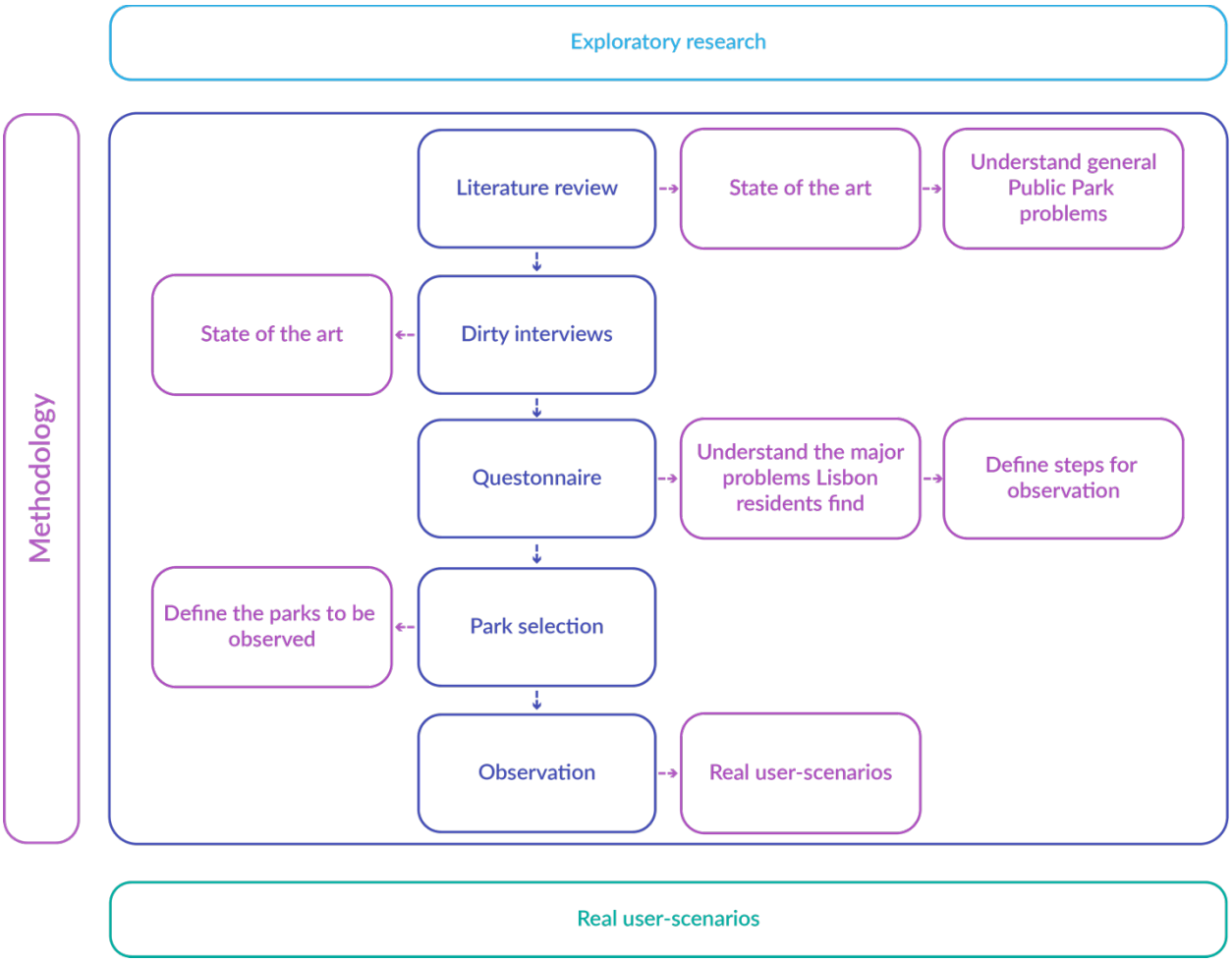
Appendix A - Categorized articles

Authors	Objective	Environment	Solution	type of research	Country
Enssle & Kabisch (2020)	Overview of visitation patterns	Outdoor	Better planning	Data analysis	Germany
Bonaccorsi et al. (2020)	Understand the impact of built environment in older adults physical activity	Outdoor	Design solution	Review	Italy
Anghel et al. (2020)	Smart Environments and Social Robots for Age-Friendly Integrated Care Services	Indoor	Technological	Review	Romania
Lee et al. (2020)	Smart Residential Environments for Older Adults	Indoor	Technological	Review	South Korea
Lachtar et al. (2020)	Development of a cane with LoRa and MQTT	Outdoor	Technological	Applied research	Tunisia and France
Lee, Asce, et al.(2020)	Wearable biosensors and hotspot analysis used to detect stress areas	Outdoor	Technological	Applied research	United States of America
Onose et al. (2020)	Understand how older adults interact inside public parks	Outdoor	Better planning	Qualitative	Romania
Veitch et al. (2020)	Understand why older adults visit public parks	Outdor	Better planning	Qualitative	Australia
Chang et al. (2020)	Understand the factors that influence older adults psychological wellbeing	Outdoor	Better planning	Qualitative	Taiwan
Sundevall & Jansson (2020)	Understand the impact of multifunction in public parks	Outdoor	Better planning	Qualitative	Sweden
Maresova et al. (2020)	Health–Related ICT Solutions of Smart Environments for older adults	Indoor	Technological	Review	Czech Republic, Bosnia and Herzegovina and North Macedonia
Alves et al. (2020)	Development of a walkability index for older adults health	Outdoor	Mixed solution	Review	Portugal
Gaglione et al. (2021)	Development of a tool to support decision makers in the development of policies aimed at improving pedestrian accessibility to urban services	Outdoor	Mixed solution	Applied research	Italy and United Kingdom
Podgórniak-Krzykacz et al. (2020)	Analysis of Institutional and Individual Conditions for a New Concept of Smart Development of Ageing Communities	Outdoor	Better planning	Data analysis	Poland
Zhai et al. (2020)	Seniors' Physical Activity in Neighborhood Parks and Park Design Characteristics	Outdoor	Better planning	Data analysis	China
Marques et al. (2020)	Innovative and Assistive eHealth Technologies for Smart Therapeutic and	Outdoor	Technological	Review	New Zealand and Australia

	Rehabilitation Outdoor Spaces for the older adults Demographic				
Zhai et al. (2021)	Urban park facility use and intensity of seniors' physical activity	Outdoor	Technological	Data analysis	China
Chang (2020)	Effects of the built and social features of urban greenways on the outdoor activity of older adults	Outdoor	Better planning	Qualitative	Taiwan
Nápoles et al. (2020)	Smart Bus Stops as Interconnected Public Spaces for Increasing Social Inclusiveness and Quality of Life of Elder Users	Outdoor	Technological	Applied research	Spain
Flores-Martin et al. (2021)	Smart Nursing Homes: Self-Management Architecture Based on IoT and Machine Learning for Rural Areas	Indoor	Technological	Applied research	Spain
Marques et al. (2019)	Healing spaces: improving health and wellbeing for the older adults through therapeutic landscape design	Outdoor	Design solution	Review	New Zealand
Benton et al. (2021)	Impact of a low-cost urban green space intervention on wellbeing behaviours in older adults: A natural experimental study	Outdoor	Design solution	Qualitative	United Kingdom
Rocha et al. (2021)	Smart Cities' Applications to Facilitate the Mobility of Older Adults	Outdoor	Technological	Review	Portugal
Wang & Jang (2020)	An IoT-enabled smart living environmen for older adultst	Indoor	Technological	Applied research	United States of America
SZEWCZENKO (2020)	The concept of smart city in terms of improving the quality and accessibility of urban space for older adults	Outdoor	Technological	Review	Poland
Yu et al. (2021)	Older adults Suitability of Park Recreational Space Layout Based on Visual Landscape Evaluation	Outdoor	Mixed solution	Qualitative	China
Shan & Sun (2022)	Data-Driven Winter Landscape Design and Pleasant Factor Analysis of older adults Friendly Parks in Severe Cold Cities in Northeast China	Outdoor	Technological	Applied research	China
Tian et al. (2020)	Research on older adults Friendly Park Based on Inclusive Design Concept	Outdoor	Design solution	Review	China and South Korea

Appendix B – Flow chart and methodology diagram

Task/Method	May	June	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September
State of the art																	
Questionnaire																	
Park selection																	
Dirty Interviews																	
Dirty Interviews analysis																	
Questionnaire analysis																	
Observation																	
Observation analysis																	
Real-world user scenarios																	
Write the thesis																	


Exploratory research
Methodology
Literature review
State of the art
Understand general Public Park problems
State of the art
Dirty interviews
Questonnaire
Understand the major problems Lisbon residents find
Define steps for observation
Define the parks to be observed
Park selection
Observation
Real user-scenarios
Real user-scenarios

Appendix C – Online questionnaire layout

SMARTOUT

[PT]

A UNIDCOM/IADE está a desenvolver um projeto de investigação que visa obter dados sobre a forma como os utilizadores dos parque públicos interagem com estes equipamentos urbanos.

Para que a nossa investigação seja mais robusta, necessitamos da sua colaboração. Para tal, solicitamos que preencha este questionário da forma mais completa possível. Poderá interromper ou finalizar este questionário sempre que quiser.

Após o preenchimento, as informações recolhidas serão anonimizadas, através da geração de um código que será conhecido apenas por aqueles que estão diretamente envolvidos neste projeto.

Obrigado pelo seu contributo na valorização e no conhecimento dos espaços verdes urbanos.

Duração aproximada de preenchimento deste formulário: 20 minutos
Apoio e suporte ao preenchimento: joaomanuelboavida@gmail.com.

[EN]

At UNIDCOM/IADE, we are conducting a research project on the interaction between users and urban green spaces.

For that to happen, we need your valuable contribution. We are, thus, asking that you complete the following form. You can, at any moment, stop the filling and submit the form as it is.

All the information obtained will be anonymized and kept strictly confidential.

If you have any further questions, address them to joaomanuelboavida@gmail.com.

Thank you for your support.

Forecasted filling time: 20 minutes

*Obrigatório

1. Lingua | Language *

Marcar apenas uma oval.

- ◯ Português *Avançar para a pergunta 2*
- ◯ English *Avançar para a pergunta 43*

Dados demográficos

2. Que idade tem? *

Escreva o número

_____

3. Qual o seu género? *

Marcar apenas uma oval.

- ◯ Masculino
- ◯ Feminino
- ◯ Outro

4. Em que freguesia vive? *

_____

5. Onde reside? *

Marcar apenas uma oval.

- ◯ Moradia
- ◯ Apartamento

6. Qual o grau de escolaridade mais alto que alcançou? *

Marcar apenas uma oval.

- ◯ Menos que o ensino secundário
- ◯ Ensino secundário
- ◯ Licenciatura
- ◯ Mestrado
- ◯ Doutoramento
- ◯ Outra: _____

7. Qual o seu estado civil? *

Marcar apenas uma oval.

- ◯ Casado/a
- ◯ União de facto
- ◯ Solteiro/a
- ◯ Outra: _____

Espaços verdes urbanos

A sua relação com os espaços verdes urbanos

8. Indique o parque que mais costuma frequentar: *

_____

Por favor, tenha em mente que as próximas questões são referentes ao parque que indicou

9. Porque é que costuma visitar este parque? *

Selecione todos os que se apliquem

Marcar tudo o que for aplicável.

- [ ] Estar com amigos
- [ ] Andar
- [ ] Correr
- [ ] Fazer exercício físico
- [ ] Passear o cão
- [ ] Trabalhar
- [ ] Jogar jogos
- [ ] Ir a um quiosque ou café
- [ ] Ler
- [ ] Ouvir os pássaros
- [ ] Ver/estar na natureza
- [ ] Namorar
- [ ] Fazer picnics
- [ ] Ouvir música
- [ ] Ir a concertos
- [ ] Dormir
- [ ] Tirar fotos
- [ ] Desenhar
- [ ] Escrever
- [ ] Ver pessoas
- [ ] Outra: _____

10. Como se desloca até ao parque? *

Marcar apenas uma oval.

- ◯ A pé
- ◯ De bicicleta
- ◯ De trotinete
- ◯ Através de transportes públicos
- ◯ De carro
- ◯ De mota
- ◯ Outra: _____

11. Quanto tempo demora a chegar ao parque? *

Marcar apenas uma oval.

- ◯ <10 min
- ◯ entre 10 a 20 min
- ◯ entre 20 a 30 min
- ◯ >30 min

12. Com quem costuma ir ao parque? *

Marcar apenas uma oval.

- ◯ Amigos/as
- ◯ Parceiro/a
- ◯ Com os seus filhos
- ◯ Com os seus pais
- ◯ Com colegas do trabalho
- ◯ Sozinho
- ◯ Com o cão
- ◯ Com o gato
- ◯ Outra: _____

13. Quanto tempo costuma ficar em média no parque? *

Marcar apenas uma oval.

- ◯ <1 hora
- ◯ entre 1 a 2 horas
- ◯ entre 2 a 3 horas
- ◯ entre 3 a 4 horas
- ◯ >4 horas

14. Quando costuma visitar o parque? *

Marcar apenas uma oval.

- ◯ Durante a semana
- ◯ Durante o fim-de-semana
- ◯ Durante a semana e o fim-de-semana

15. Em que período costuma visitar o parque? *

Marcar apenas uma oval.

- ◯ Durante a manhã
- ◯ Durante a hora de almoço
- ◯ Durante a tarde
- ◯ Durante a noite

16. Com que frequência visita o parque num mês? *

Marcar apenas uma oval.

- ◯ Menos de uma vez
- ◯ 1 a 3 vezes
- ◯ 4 a 7 vezes
- ◯ 8 a 14 vezes
- ◯ mais de 14 vezes

17. Se tiver uma deficiência, por favor indique

_____

18. Indique se existem barreiras que limitem a sua utilização do parque e mencione-as

Considere o parque que costuma visitar mais

19. O parque tem eventos? *

Por exemplo, concertos, teatros ou exposições.

Marcar apenas uma oval.

- ◯ Sim *Avançar para a pergunta 20*
- ◯ Não *Avançar para a pergunta 21*

Considere o parque que costuma visitar mais

20. Que eventos ocorrem no parque? *

Considere o parque que costuma visitar

Considere o parque que costuma visitar

21. Que informação recebe sobre o parque? *

Marcar tudo o que for aplicável.

- ☐ Eventos
- ☐ Horário
- ☐ Instalações fechadas
- ☐ Intervenções temporárias
- ☐ Outra:

22. Em que áreas prefere estar? *

Selecione no máximo 3

Marcar tudo o que for aplicável.

- [ ] Relvado
- [ ] Parque infantil
- [ ] Zona de cães
- [ ] Área de água
- [ ] Quiosque ou café
- [ ] Zona de picnic
- [ ] Zonas isoladas
- [ ] Zonas com mais pessoas
- [ ] Zonas com sombras
- [ ] Zonas com sol
- [ ] Outra: _____

23. O que gosta no parque? Porquê?

_____

24. O que não gosta no parque? Porquê?

_____

_____

_____

_____

_____

Indique as razões pelas quais visita o parque

25. Que tipo de atividades gosta de fazer enquanto está no parque? *

Marcar apenas uma oval por linha.

	Nunca	Raramente	Algumas vezes	Quase sempre	Sempre
Estar com amigos					
Andar					
Correr					
Fazer exercício físico					
Passear o cão					
Trabalhar					
Jogar jogos					
Ir a um quiosque ou café					
Ler					
Ouvir os pássaros					
Ver/estar na natureza					
Namorar					
Fazer picnics					
Ouvir música					
Ir a concertos					
Dormir					

Tirar fotos					
Desenhar					
Escrever					
Ver pessoas					

Indique as razões pelas quais não vai a alguns parques públicos

26. Que parque prefere não visitar? *

27. Animais *

0. Sem Opinião; 1. Não é um problema; 2. Pequeno problema; 3. Problema moderado; 4. Problema sério; 5. Problema extremamente sério

Marcar apenas uma oval por linha.

	0. Sem Opinião	1. Não é um problema	2. Pequeno problema	3. Problema moderado	4. Problema sério	5. Problema extremamente sério
Pombos						
Insetos						
Gatos						
Cães						
Patos						
Gansos						

28. Condições climatéricas *

0. Sem Opinião; 1. Não é um problema; 2. Pequeno problema; 3. Problema moderado; 4. Problema sério; 5. Problema extremamente sério

Marcar apenas uma oval por linha.

	0. Sem Opinião	1. Não é um problema	2. Pequeno problema	3. Problema moderado	4. Problema sério	5. Problema extremamente sério
Vento	◯	◯	◯	◯	◯	◯
Sol	◯	◯	◯	◯	◯	◯
Chuva	◯	◯	◯	◯	◯	◯
Pólen	◯	◯	◯	◯	◯	◯

29. Ruído *

0. Sem Opinião; 1. Não é um problema; 2. Pequeno problema; 3. Problema moderado; 4. Problema sério; 5. Problema extremamente sério

Marcar apenas uma oval por linha.

	0. Sem Opinião	1. Não é um problema	2. Pequeno problema	3. Problema moderado	4. Problema sério	5. Problema extremamente sério
Ruído geral	◯	◯	◯	◯	◯	◯
Ruído de crianças	◯	◯	◯	◯	◯	◯
Ruído de jovens	◯	◯	◯	◯	◯	◯
Ruído de adultos	◯	◯	◯	◯	◯	◯
Ruído de idosos	◯	◯	◯	◯	◯	◯
Ruído de aviões	◯	◯	◯	◯	◯	◯
Ruído de carros	◯	◯	◯	◯	◯	◯
Ruído de colunas de música	◯	◯	◯	◯	◯	◯
Ruído de máquinas	◯	◯	◯	◯	◯	◯
Ruído de motas	◯	◯	◯	◯	◯	◯

30. Informação do parque *

0. Sem Opinião; 1. Não é um problema; 2. Pequeno problema; 3. Problema moderado; 4. Problema sério; 5. Problema extremamente sério

Marcar apenas uma oval por linha.

	0. Sem Opinião	1. Não é um problema	2. Pequeno problema	3. Problema moderado	4. Problema sério	5. Problema extremamente sério
Sem informação de horário	◯	◯	◯	◯	◯	◯
Sem calendário de eventos	◯	◯	◯	◯	◯	◯
Sem informação traduzida	◯	◯	◯	◯	◯	◯
Sem regras do parque	◯	◯	◯	◯	◯	◯

31. Manutenção *

0. Sem Opinião; 1. Não é um problema; 2. Pequeno problema; 3. Problema moderado; 4. Problema sério; 5. Problema extremamente sério

Marcar apenas uma oval por linha.

	0. Sem Opinião	1. Não é um problema	2. Pequeno problema	3. Problema moderado	4. Problema sério	5. Problema extremamente sério
Falta de manutenção no geral	◯	◯	◯	◯	◯	◯
Falta de sinalização de manutenção	◯	◯	◯	◯	◯	◯
Falta de calendário de manutenção	◯	◯	◯	◯	◯	◯
Falta de equipamento de manutenção	◯	◯	◯	◯	◯	◯
Falta de manutenção por parte de responsável (por exemplo, limpar o chão, limpar lavatórios e sanitas, substituir lâmpadas, varrer folhas e detritos externos)	◯	◯	◯	◯	◯	◯
Falta de manutenção da paisagem (Falta de jardinagem, falta de limpeza da área verde.)	◯	◯	◯	◯	◯	◯

Falta de informação sobre manutenção	⬭	⬭	⬭	⬭	⬭	⬭

32. Instalações, espaços e equipamentos *

0. Sem Opinião; 1. Não é um problema; 2. Pequeno problema; 3. Problema moderado; 4. Problema sério; 5. Problema extremamente sério

Marcar apenas uma oval por linha.

	0. Sem Opinião	1. Não é um problema	2. Pequeno problema	3. Problema moderado	4. Problema sério	5. Problema extremamente sério
Falta de casas de banho						
Falta de café						
Falta de parque infantil						
Falta de zonas de informação						
Falta de quiosque						
Falta de espaços verdes disponíveis						
Falta de equipamentos de exercício físico						
Falta de bebedouro						
Falta de bancos						
Falta de mesas						
Falta de candeeiros						
Falta de equipamentos de recolha de lixo						

Falta de zonas de sombra						

33. Acessibilidade *

0. Sem Opinião; 1. Não é um problema; 2. Pequeno problema; 3. Problema moderado; 4. Problema sério; 5. Problema extremamente sério

Marcar apenas uma oval por linha.

	0. Sem Opinião	1. Não é um problema	2. Pequeno problema	3. Problema moderado	4. Problema sério	5. Problema extremament sério
Chão desnivelado						
Chão escorregadio						
Escadas						
Ruas estreitas						
Difícil acesso						
Poucos transportes públicos						
Sem parque de estacionamento						
Sem paragem de bicicletas/trotinetas						

34. Segurança *

0. Sem Opinião; 1. Não é um problema; 2. Pequeno problema; 3. Problema moderado; 4. Problema sério; 5. Problema extremamente sério

Marcar apenas uma oval por linha.

	0. Sem Opinião	1. Não é um problema	2. Pequeno problema	3. Problema moderado	4. Problema sério	5. Problema extremamente sério
Roubos e/ou assaltos	◯	◯	◯	◯	◯	◯
Assédio	◯	◯	◯	◯	◯	◯
Sem vigilância	◯	◯	◯	◯	◯	◯
Sem segurança	◯	◯	◯	◯	◯	◯

35. Limpeza do parque *

0. Sem Opinião; 1. Não é um problema; 2. Pequeno problema; 3. Problema moderado; 4. Problema sério; 5. Problema extremamente sério

Marcar apenas uma oval por linha.

	0. Sem Opinião	1. Não é um problema	2. Pequeno problema	3. Problema moderado	4. Problema sério	5. Problema extremamente sério
Caixotes do lixo cheios	◯	◯	◯	◯	◯	◯
Beatas de cigarro	◯	◯	◯	◯	◯	◯
Dejetos de cães	◯	◯	◯	◯	◯	◯
Sujidade de natureza (ramos partidos, folhas,...)	◯	◯	◯	◯	◯	◯
Garrafas partidas	◯	◯	◯	◯	◯	◯
Falta de sacos para apanhar dejetos de cães	◯	◯	◯	◯	◯	◯

36. Vandalismo *

0. Sem Opinião; 1. Não é um problema; 2. Pequeno problema; 3. Problema moderado; 4. Problema sério; 5. Problema extremamente sério

Marcar apenas uma oval por linha.

	0. Sem Opinião	1. Não é um problema	2. Pequeno problema	3. Problema moderado	4. Problema sério	5. Problema extremamente sério
Tags ou autocolantes						
Graffiti						
Janelas partidas						
Texto gravado (por exemplo, em árvores)						

37. Atividades *

0. Sem Opinião; 1. Não é um problema; 2. Pequeno problema; 3. Problema moderado; 4. Problema sério; 5. Problema extremamente sério

Marcar apenas uma oval por linha.

	0. Sem Opinião	1. Não é um problema	2. Pequeno problema	3. Problema moderado	4. Problema sério	5. Problema extremamente sério
Falta de concertos						
Falta de atividades desportivas						
Falta de workshops						
Falta de eventos de arte						
Falta de feiras						

38. Outros *

0. Sem Opinião; 1. Não é um problema; 2. Pequeno problema; 3. Problema moderado; 4. Problema sério; 5. Problema extremamente sério

Marcar apenas uma oval por linha.

	0. Sem Opinião	1. Não é um problema	2. Pequeno problema	3. Problema moderado	4. Problema sério	5. Problema extremamente sério
Ciclistas a alta velocidade	◯	◯	◯	◯	◯	◯
Trotinetes elétricas a alta velocidade	◯	◯	◯	◯	◯	◯
Skateboarders a alta velocidade	◯	◯	◯	◯	◯	◯
Cães sem trela e/ou açaimo	◯	◯	◯	◯	◯	◯

39. Relativamente ao parque que evita visitar indique outros problemas que queira realçar

_____

A sua relação com o parque

40. O que falta no parque que mais frequenta?

_____

_____

_____

_____

_____

41. Que informação sobre parques gostaria de receber?

42. Tem alguma solução possível para os problemas mencionados anteriormente?

Obrigado pelo seu contributo!

Demographic Information

43. What is your age? *

44. With which gender do you identify yourself? *

Marcar apenas uma oval.

- ◯ Male
- ◯ Female
- ◯ Outra: _____

45. In which parish do you live? *

46. Where do you live? *

Marcar apenas uma oval.

- ◯ Apartment
- ◯ House

47. What is your highest education level? *

Marcar apenas uma oval.

- ◯ Less than high school
- ◯ High school
- ◯ Bachelor's
- ◯ Master's
- ◯ Doctorate (PhD)
- ◯ Outra: _____

48. What is your marital status? *

Marcar apenas uma oval.

- ◯ Married
- ◯ Living with a partner
- ◯ Single
- ◯ Outra: _____

Urban green spaces

Your relation with urban green spaces

49. What park do you visit more often? *

_____

Please keep in mind that you will reply the next questions for the park that you indicated.

50. Why do you often go to the park? *

Select as many as applies

Marcar tudo o que for aplicável.

- [ ] Meet with friends
- [ ] Walk
- [ ] Run
- [ ] Exercise
- [ ] Dog walk
- [ ] Work
- [ ] Play games
- [ ] Go to a kiosk
- [ ] Read
- [ ] Listen to birds
- [ ] Be in/See nature
- [ ] Date
- [ ] Do picnics
- [ ] Listen to music
- [ ] Go to concerts
- [ ] Sleep
- [ ] Take photos
- [ ] Draw
- [ ] Write
- [ ] Observe people
- [ ] Outra: _____

51. How do you usually get to the park? *

Marcar apenas uma oval.

- ◯ By foot
- ◯ Bike
- ◯ Electric scooter
- ◯ Public transportation
- ◯ Car
- ◯ Motorcycle
- ◯ Outra: _____

52. How long does it take to arrive to the park? *

Marcar apenas uma oval.

- ◯ <10 min
- ◯ 10 to 20 min
- ◯ 21 to 30 min
- ◯ >30 min

53. Who do you often go to the park with? *

Marcar apenas uma oval.

- ◯ Alone
- ◯ Friends
- ◯ Partner
- ◯ Your children
- ◯ Your parents
- ◯ Work colleagues
- ◯ Dog
- ◯ Cat
- ◯ Outra: _____

54. How long do you stay in general? *

Marcar apenas uma oval.

- ◯ <1h
- ◯ between 1h-2h
- ◯ between 2h-3h
- ◯ between 3h-4h
- ◯ >4h

55. When do you usually go to the park? *

Marcar apenas uma oval.

- ◯ Weekdays
- ◯ Weekend
- ◯ Weekdays and weekend

56. At what time of day do you visit the park more often? *

Marcar apenas uma oval.

- ◯ During the morning
- ◯ During lunch time
- ◯ During the afternoon
- ◯ During the evening
- ◯ During the night

57. How often do you go to the park on a monthly basis? *

Marcar apenas uma oval.

- ◯ 1 to 3 days
- ◯ 4 to 7 days
- ◯ 8 to 14 days
- ◯ >14 days

58. Please indicate if you have any type of disability.

_____

59. Please indicate if there are any barriers in the park that limit your park utilization

_____

_____

_____

_____

_____

Consider the park that you visit the most

60. Are there any events occurring in the park? *

Marcar apenas uma oval.

- ◯ Yes *Avançar para a pergunta 61*
- ◯ No *Avançar para a pergunta 62*

Consider the park that you visit the most

61. What kind of events occur in the park? *

_____

Consider the park that you visit the most

62. Which information do you receive about the park? *

Select as many as applies

Marcar tudo o que for aplicável.

- ☐ Events
- ☐ Schedule
- ☐ Closed facilities
- ☐ Temporary interventions
- ☐ Outra: _____

63. Which areas do you often prefer to stay? *

Select max 3

Marcar tudo o que for aplicável.

- [ ] Grass area
- [ ] Children's playground
- [ ] Dog area
- [ ] Lake area
- [ ] Kiosk or cafe
- [ ] Picnic table area
- [ ] Isolated zones
- [ ] Crowded zones
- [ ] Shadow zones
- [ ] Sunny zones
- [ ] Outra: _____

64. What do you like about the park? Why?

_____

_____

_____

_____

_____

65. What don't you like about the park? Why?

_____

_____

_____

_____

_____

Consider the park that you visit the most

66. What kinds of activities do you usually want to engage in while at the park? *

Marcar apenas uma oval por linha.

	1. Never	2. Rarely	3. Sometimes	4. Often	5. Always
Meet with friends					
Walk					
Run					
Do exercise					
Dog walk					
Work					
Play games					
Go to a kiosk					
Read					
Listen to birds					
See/ be in nature					
Date					
Do picnics					
Listen to music					
Go to concerts					
Sleep					
Take photos					

Draw	◯	◯	◯	◯	◯
Write	◯	◯	◯	◯	◯
Observe people	◯	◯	◯	◯	◯

Indicate some reasons for you to not go to some public parks

67. Which park you won't prefer to go? *

_____

68. Animal problems *

0. No opinion; 1. Not at all a problem; 2. Minor problem; 3. Moderate problem; 4. Serious problem; 5. Extremely serious problem

Marcar apenas uma oval por linha.

	0. No opinion	1. Not at all a problem	2. Minor problem	3. Moderate problem	4. Serious problem	5. Extremely serious problem
Pigeons	◯	◯	◯	◯	◯	◯
Bugs	◯	◯	◯	◯	◯	◯
Cats	◯	◯	◯	◯	◯	◯
Dogs	◯	◯	◯	◯	◯	◯
Ducks	◯	◯	◯	◯	◯	◯
Geese	◯	◯	◯	◯	◯	◯

69. Weather conditions *

0. No opinion; 1. Not at all a problem; 2. Minor problem; 3. Moderate problem; 4. Serious problem; 5. Extremely serious problem

Marcar apenas uma oval por linha.

	0. No opinion	1. Not at all a problem	2. Minor problem	3. Moderate problem	4. Serious problem	5. Extremely serious problem
Wind	◯	◯	◯	◯	◯	◯
Sun	◯	◯	◯	◯	◯	◯
Rain	◯	◯	◯	◯	◯	◯
Pollens	◯	◯	◯	◯	◯	◯

70. Noise *

0. No opinion; 1. Not at all a problem; 2. Minor problem; 3. Moderate problem; 4. Serious problem; 5. Extremely serious problem

Marcar apenas uma oval por linha.

	0. No opinion	1. Not at all a problem	2. Minor problem	3. Moderate problem	4. Serious problem	5. Extremely serious problem
General noise	◯	◯	◯	◯	◯	◯
Children noise	◯	◯	◯	◯	◯	◯
Teenager noise	◯	◯	◯	◯	◯	◯
Adult noises	◯	◯	◯	◯	◯	◯
Elderly noise	◯	◯	◯	◯	◯	◯
Airplane noise	◯	◯	◯	◯	◯	◯
Car noise	◯	◯	◯	◯	◯	◯
Loudspeakers noise	◯	◯	◯	◯	◯	◯
Machinery noise	◯	◯	◯	◯	◯	◯
Motorcycle noise	◯	◯	◯	◯	◯	◯

71. Park information *

0. No opinion; 1. Not at all a problem; 2. Minor problem; 3. Moderate problem; 4. Serious problem; 5. Extremely serious problem

Marcar apenas uma oval por linha.

	0. No opinion	1. Not at all a problem	2. Minor problem	3. Moderate problem	4. Serious problem	5. Extremely serious problem
Lack of information about schedules	◯	◯	◯	◯	◯	◯
Lack of communication for future events	◯	◯	◯	◯	◯	◯
Lack of translated information	◯	◯	◯	◯	◯	◯
Lack of information about park rules	◯	◯	◯	◯	◯	◯

72. Maintenance *

0. No opinion; 1. Not at all a problem; 2. Minor problem; 3. Moderate problem; 4. Serious problem; 5. Extremely serious problem

Marcar apenas uma oval por linha.

	0. No opinion	1. Not at all a problem	2. Minor problem	3. Moderate problem	4. Serious problem	5. Extremely serious problem
Lack of maintenance in general	◯	◯	◯	◯	◯	◯
Lack of warning signs about maintenance	◯	◯	◯	◯	◯	◯
Lack of schedules for maintenance	◯	◯	◯	◯	◯	◯
Lack of equipment maintenance	◯	◯	◯	◯	◯	◯
Lack of janitor maintenance (e.g., mopping floors, cleaning sinks and toilets, replacing light bulbs, sweeping out leaves and outdoor debris)	◯	◯	◯	◯	◯	◯
Lack of landscape maintenance (planting, mowing and weeding lawns areas; removing leaves and	◯	◯	◯	◯	◯	◯

snow; managing irrigation systems; and fertilizing lawns, maintaining signage and fencing)						
Lack of information about maintenance	⬭	⬭	⬭	⬭	⬭	⬭

73. Facilities, Areas and Equipment *

0. No opinion; 1. Not at all a problem; 2. Minor problem; 3. Moderate problem; 4. Serious problem; 5. Extremely serious problem

Marcar apenas uma oval por linha.

	0. No opinion	1. Not at all a problem	2. Minor problem	3. Moderate problem	4. Serious problem	5. Extremely serious problem
Lack of toilets	◯	◯	◯	◯	◯	◯
Lack of coffee shops	◯	◯	◯	◯	◯	◯
Lack of children playground	◯	◯	◯	◯	◯	◯
Lack of info points	◯	◯	◯	◯	◯	◯
Lack of kiosk	◯	◯	◯	◯	◯	◯
Small green spaces available	◯	◯	◯	◯	◯	◯
Lack of physical exercise equipment	◯	◯	◯	◯	◯	◯
Lack of water dispensers	◯	◯	◯	◯	◯	◯
Lack of benches	◯	◯	◯	◯	◯	◯
Lack of tables	◯	◯	◯	◯	◯	◯
Lack of lights	◯	◯	◯	◯	◯	◯
Lack of trash bins	◯	◯	◯	◯	◯	◯

Lack of shaded areas						

74. Accessibility *

0. No opinion; 1. Not at all a problem; 2. Minor problem; 3. Moderate problem; 4. Serious problem; 5. Extremely serious problem

Marcar apenas uma oval por linha.

	0. No opinion	1. Not at all a problem	2. Minor problem	3. Moderate problem	4. Serious problem	5. Extremely serious problem
Uneven floor						
Slippery floor						
Stairs						
Narrow paths						
Hard access						
Lack of public transportation						
Lack of parking lot						
Lack of bikes/electric scooter stops						

75. Security *

0. No opinion; 1. Not at all a problem; 2. Minor problem; 3. Moderate problem; 4. Serious problem; 5. Extremely serious problem

Marcar apenas uma oval por linha.

	0. No opinion	1. Not at all a problem	2. Minor problem	3. Moderate problem	4. Serious problem	5. Extremely serious problem
Theft	◯	◯	◯	◯	◯	◯
Harassment	◯	◯	◯	◯	◯	◯
Lack of surveillance	◯	◯	◯	◯	◯	◯
Lack of security guards	◯	◯	◯	◯	◯	◯

76. Park cleanness *

0. No opinion; 1. Not at all a problem; 2. Minor problem; 3. Moderate problem; 4. Serious problem; 5. Extremely serious problem

Marcar apenas uma oval por linha.

	0. No opinion	1. Not at all a problem	2. Minor problem	3. Moderate problem	4. Serious problem	5. Extremely serious problem
Overfilled trash bins	◯	◯	◯	◯	◯	◯
Cigarette butts	◯	◯	◯	◯	◯	◯
Dog poops	◯	◯	◯	◯	◯	◯
Natural trash (broken branches, leaves, ...)	◯	◯	◯	◯	◯	◯
Broken bottles	◯	◯	◯	◯	◯	◯
Lack of dog poop bags	◯	◯	◯	◯	◯	◯

77. Vandalism *

0. No opinion; 1. Not at all a problem; 2. Minor problem; 3. Moderate problem; 4. Serious problem; 5. Extremely serious problem

Marcar apenas uma oval por linha.

	0. No opinion	1. Not at all a problem	2. Minor problem	3. Moderate problem	4. Serious problem	5. Extremely serious problem
Tags/Stickers	◯	◯	◯	◯	◯	◯
Graffiti	◯	◯	◯	◯	◯	◯
Broken windows	◯	◯	◯	◯	◯	◯
Engraved text/signs	◯	◯	◯	◯	◯	◯

78. Events/Activities *

0. No opinion; 1. Not at all a problem; 2. Minor problem; 3. Moderate problem; 4. Serious problem; 5. Extremely serious problem

Marcar apenas uma oval por linha.

	0. No opinion	1. Not at all a problem	2. Minor problem	3. Moderate problem	4. Serious problem	5. Extremely serious problem
Lack of concerts	◯	◯	◯	◯	◯	◯
Lack of sport activities	◯	◯	◯	◯	◯	◯
Lack of workshops	◯	◯	◯	◯	◯	◯
Lack of art events	◯	◯	◯	◯	◯	◯
Lack of fairs	◯	◯	◯	◯	◯	◯

79. Others *

0. No opinion; 1. Not at all a problem; 2. Minor problem; 3. Moderate problem; 4. Serious problem; 5. Extremely serious problem

Marcar apenas uma oval por linha.

	0. No opinion	1. Not at all a problem	2. Minor problem	3. Moderate problem	4. Serious problem	5. Extremely serious problem
Bikers speeding	◯	◯	◯	◯	◯	◯
Electric scooter riders speeding	◯	◯	◯	◯	◯	◯
Skateboarders speeding	◯	◯	◯	◯	◯	◯
Dogs without leash	◯	◯	◯	◯	◯	◯

80. Please indicate any other problem that you want to highlight in the park you avoid to visit.

_____

Your relation with the park

81. What's missing in the park?

_____

_____

_____

_____

_____

82. What information would you like to get from parks?

83. Do you have any idea of a possible solution for the problems you mentioned?

Thank you for your contribution!

Este conteúdo não foi criado nem aprovado pela Google.

Google Formulários

Appendix D – Distribution of the most mentioned public parks

District	Council	Park
Lisbon	Lisbon	Jardim da Alameda Dom Afonso Henriques, Jardim do Campo grande, Jardim Guerra Junqueiro, Gulbenkian, Jardim de Belém, Jardim Fernando Pessa, Jardim da Quinta de Santa Clara, Jardim Botânico Tropical, Parque Florestal de Monsanto, Parque Bensaúde, Parque Eduardo, Parque dos Moinhos de Santana, Quinta das Conchas e Lilases, Parque das Nações and Parque do Vale do Silêncio.
	Loures	Parque Municipal do Cabeço de Montachique and Parque Adão Barata.
	Oeiras	Jardim de Oeiras, Parque Urbano do Jamor, Parque de Carnaxide and Parque dos Poetas.
	Cascais	Parque Bosque dos Gaios, Parque Urbano do Outeiro de Polima, and Parque Quinta da Alagoa.
	Sintra	Parque da Liberdade, Parque Urbano Felício loureiro and Parque Urbano da Rinchoa.
	Odivelas	Parque da Ribeirada.
Setúbal	Setúbal	Parque natural da Arrábida, Parque da Algodeia and Parque Urbano de Albarquel.
	Moita	Parque Municipal da Moita.
	Almada	Parque da Paz.
Coimbra	Coimbra	Parque verde and Jardim dos Patos.
Porto	Porto	Parque da cidade.
Braga	Braga	Parque da rodovia.
Leiria	Leiria	Parque de Leiria.
Aveiro	Aveiro	Jardim do Cais da Fonte Nova Parque Infante D. Pedro Jardim da Baixa de Santo António
	Ílhavo	Jardim Oudinot.

Appendix E – List of problems and possible solutions pointed out by respondents

Problem	Possible Solution
Lack of cultural events	Promote more cultural events and inform the public about these events more efficiently through newsletters and social networks.
Lack of communication between city councils and parishes	Better integration between the city council and parish councils. Streamlining interventions and better control over investments.
Garbage	Collection more than once a day during weekends and holidays. Placing more garbage bins.
Cigarette butts	Placement of dedicated garbage stations for cigarettes.
Dog waste on the floor	Distribution of bags for collecting dog waste
Lack of security	More security and more ways to collect security information.
Lack of knowledge about parks and gardens' importance	Actions to raise awareness and awareness of parks and gardens.
Inadequate or lack of signage about fauna and flora	Placement of informative signs in the park and on the plants about its fauna and flora.
Lack of places to ride bikes and skateboards safely	Creation of cycling paths and skateparks
Bad maintenance	More maintenance, more regular maintenance, and more control over maintenance teams.
Lack of blue elements in the park	Placement of more water fountains
Lack of facilities and new places	Installation of more WCs. Construction of different parking spaces.
Many tourists	Diversify the offer to tourists so they are not concentrated in the same area.
Bad interventions	Technical interventions in parks must be suitable for users.
Lack of information	Conducting a competition to design new signage well integrated with the park
Difficulty to get to the park	Reorganization of the traffic flow

Appendix F – Cluster composition

Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6	Cluster 7
Azinhaga	Jardim Adão Barata - Jardim no Bairro do Bom Nome	Estufa Fria	Jardim da Praça de Diu	Jardim Amnistia Internacional - Jardins de Campolide	Alameda da Encarnação	Alameda dos Oceanos (Parque das Nações)
Jardim 9 de Abril	Jardim Avenida Ventura Terra	Jardim Afonso de Albuquerque	Jardim das Ondas	Jardim António Viana Barreto	Eucaliptal de Benfica	Jardim Amália Rodrigues
Jardim Alfredo Keil / Jardim da Alegria	Jardim Bento Martins	Jardim Botânico da Ajuda	Jardim do Cabeço das Rolas - Parque das Nações	Jardim Garcia de Orta - Parque das Nações	Jardim Braamcamp Freire - Jardim do Campo Santana	Jardim Augusto Monjardino
Jardim Amélia Carvalheira (Igreja de Fátima)	Jardim Botto Machado	Jardim Botânico da Faculdade de Ciências da Universidade Lisboa	Jardim Ducla Soares	Jardim Vasco da Gama	Jardim da Alameda Dom Afonso Henriques	Jardim da Cerca da Graça
Jardim António Feijó - Jardins da Igreja dos Anjos	Jardim da Alameda Roentgen	Jardim da Bela-Flor	Miradouro Eduardo Noronha	Parque da Belavista-Central	Jardim da Quinta Alegre - Campo das Amoreiras	Jardim de Santa Clara - Quinta de Santa Clara
Jardim Augusto Gil / Jardim da Graça	Jardim da Parada dos Prazeres - Praça São João Bosco	Jardim da Luz / Parque Teixeira Rebelo	PFM: Jardim do Palácio Marquês de Fronteira	Parque do Casal Vistoso	Jardim do Campo Grande	Jardim Mahatma Gandhi
Jardim Avelar Brotero - Jardim do Alto de Santo Amaro	Jardim da Rua João Frederico Ludovice (Jardim do Mercado)	Jardim da Praça do Império		Parque do Vale Fundão	Jardim do Marquês de Marialva - Jardim do Campo Pequeno	Jardins da Avenida da Liberdade
Jardim Bulhão Pato	Jardim do Torel	Jardim do Museu Agrícola Tropical / Jardim do Ultramar		Parque Eduardo VII de Inglaterra	Jardim Fernando Pessa - Forum Lisboa	Miradouro do Monte Agudo
Jardim Cesário Verde	Jardim Maria de Lourdes Sá Teixeira	Jardim dos Sabores		PFM: Alameda Keil do Amaral	Jardim França Borges - Jardim do Príncipe Real	Praça de Santo Eugénio
Jardim Cinco de Outubro - Jardim da Burra	Jardim na Rua Eugénio de Castro	Jardim Ribeira das Naus		PFM: Mata de São Domingos de Benfica	Jardim Guerra Junqueiro - Jardim da Estrela	Quinta das Carmelitas
Jardim Constantino		Jardim Sá da Bandeira		PFM: Parque da Pedra	Parque Bensaúde - Parque Urbano Quinta Bensaúde	
Jardim da Praça de Goa		PFM: Parque Recreativo do Alto da Serafina		PFM: Parque Florestal de Monsanto (Serafina)	Parque da Mata de Madre de Deus	
Jardim da Praça de Londres		Tapada das Necessidades		PFM: Parque Recreativo do Alvito	Parque das Quintas das Conchas e dos Lilases	
Jardim de São Pedro de Alcântara / Jardim António Nobre				Quinta Nossa Senhora da Paz	Parque do Vale do Silêncio	

Jardim do Alto de Santa Catarina - Jardim do Adamastor				Quinta Pedagógica dos Olivais	Parque Edgar Sampaio Fontes (Parque Urbano dos Olivais)	
Jardim do Alto Varejão					Parque José Gomes Ferreira - Mata de Alvalade	
Jardim dos Jacarandás					Parque Recreativo dos Moínhos de Santana	
Jardim Elisa Baptista Sousa Pedroso - Jardim Salazar - Jardim da Imprensa					Parque Ribeirinho Oriente	
Jardim Fernanda Castro					Parque Silva Porto / Mata de Benfica	
Jardim Fialho de Almeida					Parque Urbano do Rio Seco	
Jardim Gomes de Amorim - Casa da moeda					Parque Urbano do Tejo e Trancão	
Jardim Henrique Lopes de Mendonça					Parque Urbano do Vale Chelas	
Jardim Igrejas Caeiro					Parque Urbano do Vale da Ameixoeira	
Jardim Jorge Luís Borges - Jardim do Arco do Cego					Parque Vale Grande - Parque Oeste	
Jardim Júlio de Castilho					PFM: Parque da Tapada da Ajuda	
Jardim Lisboa Antiga					Quinta da Granja	
Jardim Manuel Azevedo Coutinho						
Jardim Marcelino de Mesquita - Jardim das Amoreiras						
Jardim Maria da Luz Ponces de Carvalho						
Jardim Nuno Álvares / Jardim de Santos						
Jardim Olavo Bilac						
Jardim Praça de Damão						
Jardim Praça de Malaca						

Jardim Praça João do Rio						
Jardim Roque Gameiro						
Jardim Téofilo de Braga - Jardins de Campo de Ourique						
Largo da Igreja de São João de Deus - Jardim Irmã Lúcia						
Miradouro Nossa Senhora do Monte						
Parada do Alto de São João						
Parque da Rua Gualdim Pais						
Praça António Sardinha						
Praça de São Bento						
Praça Dona Filipa						
Praça Paiva Couceiro						
Praça Rainha Santa						

Appendix G – Observation sheet

Observation sheet

UNIDCOM/IADE

Date:

Start time: : End time: : Total: :

T °C:

Legend:

Pains	Environment	Interactions
Users	Activities	Objects

Notes:

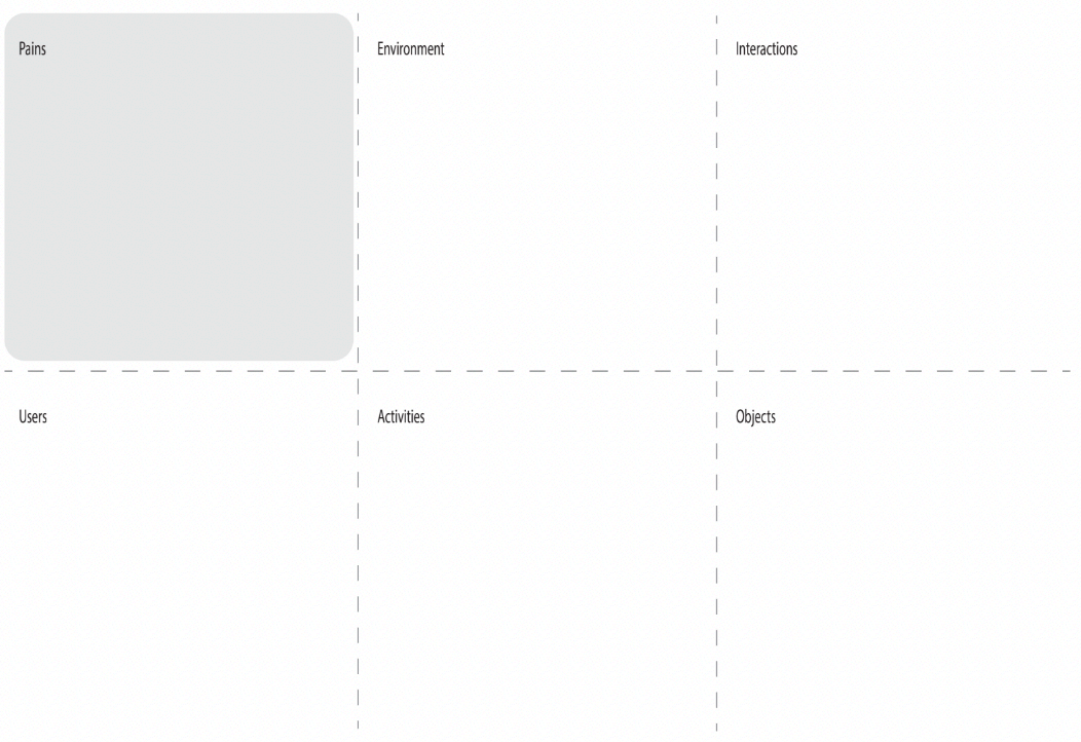
Observation sheet UNIDCOM/IADE

Date:

Start time: : End time: : Total: :

T °C:

Legend:


Pains
Environment
Interactions
Users
Activities
Objects

Notes:

Observation sheet UNIDCOM/IADE

Date:

Start time: : End time: : Total: :

T °C:

Legend:

Pains	Environment	Interactions
Users	Activities	Objects

Notes:

Appendix H – Observation protocol

UNIDCOM/IADE
Observation protocol

Introduction:

This observation aims to give more information into park problems from the user's perspective. This method will be held in three parks in Lisbon, focusing primarily on young, disabled and elderly users and secondarily on the other users.

Method:

Observation

Tools:

Observation sheet
AEIOU+Pains
Checklist of problems

Participants:

Park users, more specifically children, the elderly and people with disabilities.
After the survey method, as expected, the younger, the disabled and the elderly were the populations that didn't participate. There was a lack of information about these three groups. This method is proposed to close this gap and find other problems that were not discovered until now.

Places and hours:

Park observation hours and days were based on Google Maps, busy areas and average time spent by people. "To determine popular times, wait times, and visit duration, Google uses aggregated and anonymized data from users who have opted in to Google Location History, which is off by default. Popular times, wait times, and visit duration are shown for the business if it gets enough visits from these users. You can't manually add this information to your location, and it appears only if Google has sufficient visit data for the business." - https://support.google.com/maps/answer/11323117?hl=en
"Visit data may include:

- **Popular times graph**: This graph shows how busy your location typically is during different times of the day. Popular times are based on average popularity over the last few months. Popularity for any given hour is shown relative to the typical peak popularity for the business for the week. For example, in the image below, 8 PM–9 PM on Saturday is one of the more popular times of the week for this business.

- **Live visit data**: This data shows how active your location is right now. Live visit data is updated in real time and overlaid on the popular times graph. For example, in the image below, the highlighted section of the graph represents how active the location is right now compared to its usual level of activity.
- **Visit duration**: This data shows how much time customers typically spend at your location. Visit duration estimates are based on patterns of customer visits over the last several weeks.
- **Wait time estimates:** This data shows how long a customer would have to wait before they receive service during different times of the day. It also shows the peak wait time for each day of the week. The displayed wait time is based on patterns of customer visits over the last several weeks. Wait time estimation differs for different business types. For instance, a sit-down restaurant's wait time reflects how long customers wait before they are seated.

" - https://support.google.com/business/answer/6263531?hl=en

For each park, the least busy hours and most busy hours were chosen during weekdays and weekends.
The three parks were chosen based on people's mentions and based on a cluster of parks from Lisbon. This happened because all the mentioned parks were from cluster 6.
The parks chosen need to verify these aspects:

- Be residential
- Have activities
- Their area must have more than 1 Ha
- Be accessible
- Be free
- Be managed by a council or a parish
- Be the most mentioned

Procedure:

Each park will be held eight observations for four days, two weekdays and two weekend days. Each observation will have a duration of 2 hours.
The parks chosen are Jardim Guerra junqueiro, Jardim da Alameda e Parque Bensaúde.
During observations will be applied the AEIOU framework, a checklist and will be collected images and pointed notes.
Each park will be characterised and classified based on places of stay, problematics and characteristics.

Observation schedule:

Park	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Average time spent
Jardim Guerra Junqueiro			12h-14h	12h-14h		12h30-14h 30		1h30min
			16h-18h	16h-18h			15h-17h	
Jardim da Alameda	12h-14h				14h-16h	12h-14h		1h30min
	18h-20h				16h-18h	15h-17h		
Parque Bensaúde		12h-14h		14h-16h		10h-12h		1h30min
			16h-18h	16h-18h		14h-16h		

Materials:

Tablet
Mobile Camera
Tablet pen
Observation sheet
Map of the park
Checklist

Changes:

- Observation schedule was adapted due to changing hour. The observation was adapted to comprise the sunset hour + 1 hour as the maximum period of observation.
- AEIOU was done after the observation based in observation map, notes and photos. Notes were much more accurate if done in the same area, AEIOU is a good tool to organize the information.

Appendix I – Problems observed in Jardim Guerra Junqueiro

Problems Weekdays	**Children**	**Youth**	**Adults**	**Older adults**	**Homeless**	**Disabled users**	**Families**
Lack of closed facilities when it rains	x	x	x	x	x	x	x
Wet benches and tables when it rains	x	x	x	x	x	x	x
Uneven and slippery floor				x		xx	
Lack of bike lane	x	x	x			x	
No shadows or sheds				x	xx	x	
Lack of dog park	x	x	x	x	-	-	x
Lack of dog poop bags							
Dogs without leash	x	x	x	x	-	-	x
No visible communication signs			x	x			
Speeding electric scooters	x	x	x	x	-	-	x
Maintenance problems	x	x	x	x	x	x	x
Clogged drinking fountain	x	x	x	x	x	x	x
Lack of picnic tables		x	x	x			
Wrong use of fitness equipment	xx						
People spitting on the floor		x	x	xx			
Noise	x	x	x	x	x		x
Lack an area for sports and ball games	xx	x	x				
Lack a stroller park near the playground							xx

Problems weekends	**Children**	**Youth**	**Adults**	**Older adults**	**Homeless**	**Disabled users**	**Families**
Loud music from speakers			x	x			
Garbage in the grass	x	xx	x	x			x
Lack of benches		x	x	x	xx		

Appendix J – Problems observed in Jardim da Alameda Dom Afonso Henriques

Problems Weekdays	**Children**	**Youth**	**Adults**	**Older adults**	**Homeless**	**Disabled users**	**Families**
The green area isn't used				xx	-	xx	x
A large number o pigeons annoying users			x	x	x	-	
No specific area to walk dogs. Users tend to walk on grass	x		x	xx	-	-	x
Automobile roads crossing the park				xx	-	xx	x
Low usage of fitness equipment		x	x	x	-	xx	-
High sidewalks				x	-	xx	x
Unaccessible park regions (Area 1)	x			x		xx	x
Territorial usage (pic-nic tables used by older adults)		x	x		x	x	x
Unaccessible playground (The floor is gravel)	x			x		xx	
Lack of benches			x	xx	x		
Garbage/Dirt/waste	x	x	x	x	x	x	x
Noise				x			

Problems Weekens	**Children**	**Youth**	**Adults**	**Older adults**	**Homeless**	**Disabled users**	**Families**
Lack o shades				xx	xx		
Garbage/Dirt/Waste	x	x	x	x	x	x	x

Appendix K - Problems observed in Parque Bensaúde

Problems Weekdays and weekends	Children	Youth	Adults	Older adults	Homeless	Disabled users	Families
Orientation of park map	x	x	x	x	-	x	x
Accessibility (Slippery floor, big slope, holes in the floor…)	x	x	x	xx	-	xx	x
Temperatures range a lot	x	x	x	x	-	-	x
Lack of park illumination	x	x	x	x	-	-	x
The water dispenser is very high	xx	-	-	-	-	x	-
Low usage of the dog park	x	x	x	x	-	-	x