

**A journey through pedestrian mobility and the sustainable city:  
discussing walkability**

**Gabriel Lincoln Lopes Carvalho**

Master's Degree Student, UFPB, Brazil.  
gabriellincolnlopes@live.com

**Emmanuel Marques da Silva**

Master's Degree Student, UFPB, Brazil.  
emmanuel\_marquess7@hotmail.com

**José Augusto Ribeiro da Silveira**

Doctor Teacher, UFPB, Brazil.  
ct.laurbe@gmail.com

**César Renato Canova**

Associate Doctor Teacher, UFPB, Brazil.  
canovacr@gmail.com

**Ana Gomes Negrão**

Doctor Teacher, UFPB, Brazil.  
agnegrao@hotmail.com

## ABSTRACT

The form of the built environment, walkability, and society are directly related, being points that influence not only mobility but several structural areas of a city, ranging from its social dynamics as well as the health of individuals, local and global politics, economy, comfort, safety, the identity of spaces, attractiveness and several other influencing factors. The perception of passers-by is influenced by several aspects, such as lighting, sense of safety, the width of sidewalks, attractiveness of facades and of the public space itself, as well as the potential of the space to promote social interaction, which is one of the essential focuses of contemporary urban planning. This research has the general objective of listing the essential factors when analyzing the walkability of spaces, discussing the aspects of the form of the built environment that favors walkability, thus expressing concepts, indexes, methods, and studies that enable and contextualize pedestrian mobility and its relationship with users, urban form and its potentials. As a methodological contribution, bibliographic review research was used, using studies already done in the thematic axes to systematize and generate the result that meets the objectives of the work. Therefore, a dynamic portrait was obtained concerning walkability and its multisystemic relations with the city, as well as applications in techniques and methods of urban studies.

**KEYWORDS:** Walkability. Pedestrian mobility. Urbanism.

## 1 STARTING POINT: INTRODUCTION

Walking presents itself as a fundamental part of displacements in urban spaces. Walking is not only the connection between a point of departure and a point of arrival, but it is much more than that, involving several sensations during the process, with interaction with people, landscapes, different flows, and urban furniture. Even though we know the importance of pedestrian mobility, after the industrial revolution we could see the predominance of an urban planning pattern with an emphasis on motorized transport. There is a focus on investments in infrastructure aimed at the exponentially increasing demand for these modes and their circulation, making the displacement of pedestrians a mythical process due to the convenience of motorized transport (ITDP, 2018). According to Maia (2002), the motor vehicle changes the focus of urban structuring, which stops thinking about the pedestrian and starts prioritizing the car. Jeff Speck (2017) emphasizes that since the mid-twentieth century, engineers have been concerned with making city centers easy to get to, with smooth traffic and ample parking, but due to a lack of perspective aimed at the passerby, the result has been the production of spaces that are not worth going to (SPECK, 2017).

In this context, the urban planner recognizes the lack of attention to pedestrians and begins to study, criticize and propose possible solutions to the problems of inadequacy and problems that exist in the streets. In this way, improvements in the functionality of the city are made possible, and spaces are qualified to be enjoyed by society effectively, allowing sociability, actions in favor of the environment, and several other aspects that favorable walkability makes possible (as in the areas: individual and collective health, economy, traffic, politics, among others).

It is important to focus on pedestrian mobility about architecture and its formal aspects because there is a link between its users and the form of the built environment, which reflects on social dynamics and consequently/simultaneously on architecture and urbanism. Sometimes the city becomes an objective reality, with its streets, buildings, and monuments, but it is the inhabitants of this city who build the ideas and images of collective representation, thus expressing the importance of not separating the role of the user from the space in which

he is inserted and enjoys. Coelho (2013) refers to the city as a focus of admiration for its qualities, its beauty, its ability to adapt to time, and the possibility of physical support in the lives of citizens. The author also defends how complex the form of the built environment and its composition in the urban network, knowing this, he lists three factors that can be affirmed as conditioners of the formal richness of the built fabric, they are complexity; diversity; identity (COELHO, 2013).

In recent years, there has been a progressive growth of studies that evaluate pedestrian mobility and the behavior of its users based on the form of the built environment, thus expressing the importance of several factors that encompass them. Researchers are increasingly committed to proving, through research, conceptual applications, techniques, and consequently results, the direct relationship between the configuration of urban space and human behavior. In the article "(Looking for) The social effects of architectural morphology", the instigating question is precisely about the role of building form in urban vitality and whether architectural morphologies would have different effects on what happens in public spaces. The focus on the constitution of urban structures and their effects, presented by the authors, is a topic already addressed by renowned researchers such as William Whyte (1980), Bill Hillier (1984), Jane Jacobs (2000), Jan Gehl (2010), among several other authors analyzing and discussing social dynamics and their connection with the built environment (NETTO, VARGAS and SABOYA, 2012).

In seeking answers to personal questions about the movement of walking and its relation to the reading and writing of the city by each individual, a context emerges that includes discussions about the mobile and static relationships established between man and the city. Walking, building a path and a route, taking for oneself, recognizing new realities, and transforming them; however, this process of transformation in the urban environment is not always done in a sustainable and altruistic way (PALLASMAA, 2011).

For Vieira and Morastoni (2013), the modal system has a clear impact on the size and configuration of the city, since it allows the population to make long journeys. In this sense, it can be seen that urban mobility is directly linked to urban planning and depends on it to act with fluidity and be accessible to all since the population began to suffer from problems with infrastructure and road systems due to the accelerated growth of cities in an unplanned way (AYUB, 2016).

When dealing with urban mobility, the National Policy of Sustainable Urban Mobility, developed by the Ministry of Cities (BRASIL, 2004), introduces the issue of the dimension of space, combining it with the principles of urban form, i.e. mobility is considered as an attribute of the people and the economic environment in which they live, at the time they seek to make the displacement they need, taking into account the dimensions of space and the complexity of the activity to be developed. In this context, there is already a new concern on the part of the Federal Government concerning the concept of walkability, i.e. the quality provided by the environment where pedestrians circulate, valuing the space belonging to the population.

Walkability can be defined as the quality of a space that allows its users to walk through it, regardless of the reason for doing so. The built environment form can allow the act of walking and provide sufficient structure to support it, not only with comfort and safety, but also with several other factors that influence such an act, such as the uninterrupted use of

spaces and different users, thus creating the "eyes of the streets", a concept advocated by Jane Jacobs (1961), or also the different perspectives and use of small public spaces by specific groups, as supported by William Whyte (1980), and economic, socialization, political, health and structural factors discussed by Jeff Speck (2017) and Jan Gehl (2010) (CAMBRA, 2017; BARROS, 2006).

According to Silva (2014), the technical-scientific development and the way this knowledge has been applied to the production process are determining factors of the profound transformations imposed on the environment and contemporary societies. Dialectically, these changes have propelled society to a level of achievement and technical and economic development never before experienced, but at the same time have plunged it into an atmosphere that harbors a series of socio-environmental risks (ROMERO, 2014). These changes, which are present and widespread in the daily life of society, occur constantly, infiltrating the landscape in an almost silent, imperceptible, and unpredictable way. They are quickly integrated into the daily lives of the inhabitants and, at the same time, cause a series of insecurities, anxieties, and uncertainties about the future of the environment in society, both in the present and in the future (ROMERO, 2014).

This thesis deals with pedestrian mobility, with a focus on walkability. In this context, the initiating problem of the research is the following question What elements would make urban spaces walkable? Knowing that the environmental built form provides different experiences and perceptions, this research has as a general objective to list the essential factors when analyzing the walkability of spaces, expressing concepts, indexes, methods, and studies that enable and contextualize pedestrian mobility and its relationship with users and the urban form and its potentials.

This study is carried out from the search of theoretical references analyzed and published in books, scientific articles, and websites, among others, that refer to urban mobility and the concepts of walkability. In other words, bibliographical research is carried out to conceptualize, characterize, and unite the main elements that contribute to the knowledge of pedestrian mobility, through the understanding of aspects of the built environment form that favor walkability.

## **2 THE PATH FORWARD: METHODOLOGICAL APPROACH**

First of all, this study is carried out by searching for theoretical references analyzed and published in books, scientific articles, and websites, among others, that refer to the architectural foundations, urban planning, urban Mobility, and the concepts of walkability. In other words, bibliographical research will be carried out in which, according to Marconi and Lakatos (2003, p.225), the search for documents or bibliographies in the dialectical method is of utmost importance to avoid plagiarism, arbitrariness, and speculation in the work.

The theoretical framework will serve as the basis for the development of the article. In this methodology, the data will be obtained by gathering information from previous publications of authors who work and deepen in the area. By making an overview of the importance of this research, it collaborates with the use of the results obtained in possible aid in clarifying them to the urban planner, concerning promoting a discussion about the pedestrian and a fruitful, safe,

comfortable, and attractive locomotion environment. With this focus, the guiding question of the study is to list the main elements that would make urban spaces walkable.

The bibliographical research in the interpretation of Padua (1996, p.29) is "[...] an activity of search, inquiry, investigation, questioning of reality, it is the activity that will allow us, within the framework of science, to elaborate a knowledge [...]". In this development, the main determinants that help in the analysis of walkability and systematization of pedestrian mobility will be explained and gathered according to each author.

A systematic literature review was conducted based on the last ten years, with productions related to walkability with the study of form, therefore, the cut of the object is in the application of form studies based on walkability. Periodicals have been selected from the platforms: Scielo, Periódicos Capes, Google Acadêmico, and Science, with the aforementioned time frame, although including authors with significant notoriety who have published some work in previous years (being the exception). From these articles/books/journals, the application methods and the main results were extracted to discuss walkability and its essential power to build more sustainable cities.

The methodological steps of this work have been divided into three main stages: in the first stage, information, data, articles, and authors related to walkability and pedestrian mobility have been collected; in the second stage, the information has been systematized, extracting the main data according to the general objective, unraveling the relationships between the built environment and walkability; finally, in the third stage, the results and discussion of the research are presented, with a dynamic portrait of the subject.

### **3 ONE STEP AT A TIME: WALKABILITY AND ITS IMPACTS**

Walking is the most democratic form of locomotion because pedestrians bring vitality to the city, interact with the urban space, and integrate with the landscape. Andrade and Linke (2017, p. 06) argue that pedestrians are children, adults, and the elderly, who may have permanent or temporary mobility limitations, and that the urban environment should be accessible to all, providing autonomy and safety in the desired displacement (LYNCH, 1988).

**Figure 1 - Pedestrians walking in a public space.**



Source: PIXABAY, 2022.

According to Bescorovaine (2019), "altruism in urban architecture stems from a reciprocal relationship that correlates sustainable behaviors, environmental protection, and human well-being". The author also points out that the development of urban cores is linked to the development of transportation, which influences the location, size, and characteristics of cities, including even the habits of residents. The ease of movement of people and goods in the urban area corresponds to urban mobility, which is a characteristic of the city. This displacement is influenced by factors such as the dimensions of urban space, the availability of transport services, and urban planning, among others (PAPPA; CHIROLI, 2011).

Walking as a means of transport, even if it is the most primitive form of locomotion, is currently and simultaneously the most sustainable, because it contributes to reducing the negative consequences expressed by the use of cars, stimulating physical exercise, mitigating cardiovascular problems, reducing the incidence of obesity and psychological aggravations; In addition, it provides greater opportunities for social interaction in the urban environment and the gradual appropriation of public space, and is a bridge for the conformation of the cultural and social identity of certain sectors, since both the population can shape the city and the city and the experiences in it shape its users. The positive consequences of walking extend according to the optics followed, and such action is aligned with other social and economic sectors, influencing the valuation of areas of a city, in commerce, services, uses and flows, transport and tourism, administrative sectors, and perception of safety and well-being. Thus, it shows plausible aspects for the need to structure and focus on pedestrianism and its physical and road accessibility (MAGALHÃES et al., 2004; PETERS et al., 2002; SPECK, 2012).

A diverse urban environment, where social and recreational activities are mixed, is also of paramount importance for aspects that provide walkability in spaces. However, for this to work, there must be the necessary space for pedestrian and vehicular circulation, as crowded sidewalks with people bumping into each other will never be attractive (GEHL, 2015). The ideal sidewalk, as described by Choay (2003), must provide a virtually uninterrupted walk, as it is also important that residents appreciate a street full of activity, as no one likes to look out the window and observe an empty street. Others who have analyzed the effects of land use include Kubat et al. (2007), who, through studies of flow and pedestrian activity, were able to propose guidelines for urban expansion in Istanbul. Cervero and Kockelman (1997) in their work carried out the correlation of aspects of urban form and health, which had as a consequence what they called 3Ds: density, diversity, and design; in their research, the relationships between buildings and travel behavior were evaluated.

According to Gehl (2015), when urban planners develop holistic urban planning that aims not only to ensure that people walk or cycle through the city, but also that they have direct contact with the society present around the circulation spaces, they end up providing vibrant public environments that are used by different groups of people with different styles. From this point of view, the city must provide its citizens with the maximum quality in public spaces in terms of pedestrian mobility, which would bring benefits to everyone, including the municipality, because when residents have the opportunity to walk for their various activities, they influence several areas as mentioned above, and having as an influential example the fact that when citizens walk to perform their daily activities, such as walking, exercise, shopping, and services; the most immediate response is the logic that there will be more physical activities that improve the quality of life, increased sociability in contact between its residents and will also have more money retained within the community itself, knowing that there are different scales when walking (SPECK, 2017).

The form of cities can express some basic functions, such as circulation, the use of major urban spaces, and key focal points. In this regard, Lynch (1988) points out that "[...] when the environment is visibly organized and clearly identified, the citizen can imbue it with his own meanings and relationships," making it an unmistakably walkable place.

Thus, a city's main streets must have some unique quality that distinguishes them from other traffic routes. In this regard, Lynch (1988, p.106) points out that such a quality could be a special activity, a different pavement texture or facade, a special lighting system, or typical vegetation. Thus, the population does not use a street without a reason, since it must offer attractions such as shops and public places along the sidewalks, as well as the place must contain points that remain open at night, such as bars and restaurants, since these provide security to the street (CHOAY, 2003). Such conditions described above are qualities that can be used to advantage in modern urbanism, since, according to Gehl (2015), the main points that promote urban life are: "direct, logical, compact routes; modestly sized spaces; and a clear hierarchy according to which decisions have been made to select the most important spaces."

As such, walkability is an essential aspect of urban spaces as a "thermometer" of the quality of walking provided by the spaces through which its users pass and should ensure both social stimuli, activities, absence of barriers, and integration clarity in the structure and daily life

of the population, thus encompassing functionality, contemplation and other important conditioning factors of pedestrian mobility (WHYTE, 1980; LYNCH, 1988; GEHL, 2010).

Aiming at ways to reduce taxes on vehicular infrastructure and equalize them equivalently to the situation of different neighborhoods in Ottawa, Canada, Chris Bradshaw, who was a Canadian politician and businessman, was a pioneer in measuring aspects of public spaces quality related to walking, creating the first Walkability Index to guide and size taxes from data evaluated in the areas studied (CAMBRA, 2012).

Walkability can be described as the quality of space that allows its users to walk through it, regardless of the reason for doing so. It is the ability of the form of the built environment to allow the act of walking and to provide sufficient structure to support it, from good accessibility to different points in the city to attractiveness, motivation to Walk, and the possibility to perform different activities such as leisure, shopping, contemplation, among others (CAMBRA, 2017; ABLEY, 2005; BARROS, 2006; GHIDINI, 2010).

The index created by Bradshaw proved to be very efficient for reading the conditions provided for walking in a neighborhood, and this indicator was conceptualized as the quality of places that, according to Bradshaw (1993), are susceptible to four characteristics, which are:

- A physical environment that “invites” walking.
- A Variety of nearby destinations.
- A natural environment that can support external weather conditions, such as sun, rain, or wind.
- A diverse local culture.

The fact that many contemporary urban planners are concerned with urban vitality is not strictly an ideological notion or aesthetic planning, much less a utopian vision of the ideal city, but rather an attempt to bring walkability to cities and may be a potential solution to numerous complex and ongoing problems of society and involving social welfare, economics, environmental sustainability, urban management, among others (SPECK, 2017).

According to these four specificities, a human-environment relationship as a function of its urban policies and the perception of the being with the architectural environment may be able to generate psychological restoration and cognitive well-being, confirming the role of cognitive quality in urban environments and its aggregate social causes concerning public space (BESCOROVAINE, 2019).

#### **4. THE PATH TAKEN: CONTRIBUTIONS RELATED TO PEDESTRIAN MOBILITY, WALKABILITY AND SOCIETY**

There has been a significant number of studies that have focused on aspects of pedestrian mobility and walkability, examining numerous characteristics and using data in as many different areas as possible. In Austin, the capital of Texas, in one of his analyses, Handy (2007) concluded that the form of the built environment is the second factor encouraging walking in one of his studies assessing pedestrian mobility, using three types of roads (based on six neighborhoods) with different morphological characteristics.



Others who have analyzed the effects of the use of spaces together with syntactic analyses of streets were Kubat et al. (2007), who made it possible to propose guidelines for urban expansion in Istanbul through studies of flow and pedestrianism. Cervero and Kockelman (1997) in their work carried out the correlation of aspects of urban form and health, causing the 3Ds: density, diversity, and design. There was also the evaluation of the relationships between buildings and travel behavior.

Koohsari et al. (2016) developed a study that was conducted in Adelaide, Australia, with the primary objective of characterizing the built environment through walking, to generate a discussion about its interference with physical activity behavior, and with possible implications for the health of the participating citizens. They used the 3D concept developed by Cervero and Kockelman (1997) as a driving reference, and due to the limited availability of geographic data needed to build an association between walking behavior and walkability. They also explored the knowledge of Spatial Syntax to propose an alternative walkability index, the Spatial Syntax Walkability (SSW), and throughout the study process there was the analysis of data acquired and processed through this index and the agreement with another existing walkability index, the Full Walkability (WT).

Studies of walkability and indices that generated an understanding of accident vulnerability related to pedestrians in the city of Oakland, California, were also research axes used by Raford and Ragland (2003), who through their analyses obtained quantitative data on pedestrians and social aspects capable of contributing to possibilities of preventing exposure to areas that expressed greater risks to passersby (RAFORD and RAGLAND, 2003).

In a study conducted in Lisbon in 2018, Rigo, Moura, and Heitor (2018) evaluated the conditions of walkability through an exploratory study. They used an existing tool: the Index of Accessibility and Attractiveness of Pedestrian Environments (IAAPE) and Spatial Syntax. The IAAPE tool is composed of seven categories (connectivity, convenience, comfort, conviviality, clarity, coexistence, and commitment) formed by 17 indicators related to their respective criteria. The study focused on the concordance between the IAAPE tool and the SE, with the example of concordant indicators being the Integration value and the Choice value, which in the IAAPE refer respectively to pedestrian infrastructure - continuity of the route and conditions to make a path as direct as possible (both included in the Connectivity category in the IAAPE).

Barros (2006) and Barros, Silva, and Holanda (2007), through their analyses of sociocultural, socioeconomic, and behavioral aspects, exposed the characterization of more integrated, more segregated express areas, which paths have greater feasibility of choice and the discussion of why through evaluations and correlations involving pedestrian mobility.

Cambra, Moura, and Gonçalves (2017) present questions about pedestrian flow in Lisbon, correlated with measures of urban space. They extracted from the object of study the data necessary to validate the results of two different built environment assessment methods, one of which (with its methodology) is walkability. It was concluded that future research on the integration of the approaches can improve the behavioral understanding of pedestrian mobility (CAMBRA; MOURA; GONÇALVES, 2017).

In a Brazilian research that used concepts of studies of social dynamics in public spaces to verify the pedestrian flow, Nogueira (1998) analyzed the data: continuity, convexity, and axuality to answer his problem. It was possible to verify a better understanding of personal

relations on the campus of the Federal University of São Carlos, identifying behaviors with little social interaction, also caused by a great fractioning of spaces and having as a consequence the segregation of individuals inserted in the evaluated place (NOGUEIRA, 1998).

Sandt et al (2008) discuss several advantages of pedestrian mobility, as a means of locomotion that influences the preservation of the environment, encourages the movement and appropriation of public spaces, quality of life, and personal and collective satisfaction, among several other positive points that the action of walking brings to society, listed by the author. The same author recommends that the essential factors for classifying walkable spaces are attractiveness, comfort, functionality, and safety.

In this field of study, Jeff Speck (2017) in his book "Walkable City" reports that a good walk should be: fruitful, safe, comfortable, and interesting; and lists ten steps to achieve these points:

- Put the car in its place;
- Mix uses;
- Adjust parking;
- Make the transportation system flow;
- Protect the pedestrian;
- Welcome bicycles;
- Create good Spaces;
- Plant trees;
- Create pleasant and unique streetscapes; and finally
- Choose your priorities.

Speck (2017, p. 15) further reports that the ten parameters "are designed to get us from where we are to where we need to be. For Gehl (2015, p. 121), most people are willing to walk 500 meters before using a motor vehicle, so this distance is considered acceptable for a route. However, the quality of the location is an aspect that needs to be taken into consideration, and the author reinforces that "what is acceptable is always a combination of distance and quality of the route [...]", that is, if the route is interesting, a longer walk is accepted, while if it is uninteresting, a 200 to 300-meter route becomes too long.

It is a well-known fact that man modifies the natural environment in which he lives. Taking as an example the space in the city, the infrastructure is a determining factor for the installation of housing, even if precarious, the risks and damages related to the environmental aspect and also the intervention of public authorities (GUERRA, 2015).

## **5. FINISH POINT: FINAL THOUGHTS**

Based on the theoretical framework and considering the complexity of urban problems and the need for a systemic view of reality based on interdisciplinary methods, environmental perception of cities contributes a vision of unity and co-evolution between social and natural systems, because it is about the reciprocal relationship between behavior and the physical environment, both built and natural (WACHELKE, 2014).

The theoretical framework described is of utmost importance since it is this report that carries out the biases to be addressed, as well as the methodological routing that describes the

paths to be followed to achieve the research objectives. When it comes to a bibliographic review, a summary is made to simplify the search for a topic with a maximum of contributions and to help as a possible guide for further studies and future research. When working with walkability, we simultaneously deal with studies of sustainable, safe, and profitable cities, considering techniques and studies with different applications and areas. It has been possible to verify analyses of walkability aimed at the real estate sector, correlating it with the economic area, health, safety, comfort, encouragement, or avoidance of walking, among other aspects in which there is a direct and indirect influence of walkability.

The studies presented help to understand the concepts and meanings of the term "walkability" and describe the main requirements for classifying a city or a neighborhood as walkable and the importance of recognizing the pedestrian as the great protagonist of urbanism. Then, the approaches to the study of walkability are explained, taking into account the research of the main scholars in this field, respectively Bradshaw (1993); Nabors, et al. (2007); Frank, et al. (2006); Sandt, et al. (2008); Pozueta, et al. (2009) Cambra (2012) among others previously cited and commented. Through the definitions of these authors, it has been possible to verify, in general, how a walk can be profitable, safe, comfortable, and interesting, relating them to the theoretical framework.

By considering all these issues before public and political decisions are made, it is possible to increase the positive impacts and reduce the negative ones, should they occur. It is possible to thoroughly verify the points that need to be intervened in the moment of renovation or that need to be created in the moment of project conception. The application of studies that measure the quality of spaces in terms of pedestrian mobility, or even the study of some of the various indices of walkability that have been created and adapted, help the urban planning professional as a guide in his decision-making when planning and designing spaces that meet the needs of society, taking into account the factors mentioned above.

It is important that urban planners, architects, researchers, historians, and society as a whole focus on and discuss aspects of urban mobility that advocate and stimulate pedestrian mobility, not just discuss, but promote and create subsidies that enable walkable streets, neighborhoods, and cities, so that we can gradually have pedestrian mobility as our main ideology, both in the way we design and plan and in the way we appropriate and experience the city.

## REFERENCES

ABLEY, S. **Walkability scoping paper**. 2005. Disponível em: < <http://www.levelofservice.com/walkability-research.pdf> > Acesso em: 10 de abril de 2022.

ANDRADE, V.; LINKE, C. C. **Cidades para pedestres: a caminhabilidade no Brasil e no mundo**. Rio de Janeiro: Babilonia Cultura Editorial, 2017.

AYUB, U. **Mobilidade: uma questão para o planejamento urbano**. 2016. Dissertação (Mestrado em Arquitetura e Urbanismo) – Programa de Pós-Graduação da Universidade São Judas Tadeu, São Paulo.

BARROS, C. **A ideologia do movimento tenentista**. 2005. Trabalho final de Graduação em História apresentado à Universidade Federal do Paraná, Curitiba.

BESCOROVAINE, Wellington Francisco. **Um novo olhar para os resíduos urbanos: uma experiência de educação ambiental com estudantes de arquitetura e urbanismo**. V.1, n.1, ed. Riga - Letônia: NEA - Nova Edições Acadêmicas, 2019.

BRADSHAW, C. **A rating system for neighborhood walkability towards an agenda for “local heroes”**. Ottawa, Canada, 1993. Disponível em: < [https://www.cooperativeindividualism.org/bradshaw-chris\\_creating-and-using-a-rating-system-for-neighborhoodwalkability-1993.htm](https://www.cooperativeindividualism.org/bradshaw-chris_creating-and-using-a-rating-system-for-neighborhoodwalkability-1993.htm) > Acesso em: 15 de julho de 2022.

\_\_\_\_\_. **Understanding walkability thinking with our feet**. 2008. Disponível em: < <http://www.greens.org/sr/48/48-12.html> > Acesso em: 23 de junho de 2022.

CAMBRA, P. **Pedestrian Accessibility and Attractiveness for Walkability Assessment**. Master thesis. Instituto Superior Técnico da Universidade de Lisboa, 2012.

CHOAY, F. **O urbanismo**. 5.ed. São Paulo: Perspectiva, 2003.

CERVERO, R.; KOCKELMAN, K. (1997). **Travel Demand and the 3ds: Density, Diversity, and Design**. Transport Research Part D: Transport and Environment. Volume 2, Issue 3 Pg. 199-219.

GEHL, J. **Cidades para pessoas**. 3.ed. São Paulo: Perspectiva, 2015.

HANDY, S. (2007). **Urban Form and Pedestrian Choices: Study of Austin Neighborhoods**. Transport Research Record. p. 135-144.

JACOBS, Jane. **Morte e vida de grandes cidades**. Martins Fontes, 2000.

KUBAT, A. S.; KAYA, H. S.; SARI, F.; GÜLER, G.; ÖZER, Ö. (2007) **The effects of proposed bridges on urban macroform of Istanbul: a syntactic evaluation**. Proceedings 6 th International Space Syntax Symposium. Istanbul. Universidade/Ufrgs, 1999.

LYNCH, Kevin. **A imagem da cidade**. Lisboa: Edições 70. 1988.

MAGALHÃES, Marcos Tadeu Queiroz et al. (2004) **Identificação de Padrões de Posicionamento Determinantes do Comportamento dos Pedestres**. In: Anais do XVIII Congresso de Pesquisa e Ensino em Transportes, p. 999-1010.

SANDT, L.; SCHNEIDER, R.; NABORS, D.; THOMAS, L.; MITCHELL, C.; ELDRIDGE, R. **A RESIDENT’S GUIDE FOR CREATING SAFE AND WALKABLE COMMUNITIES**. Washington: FHWA, 2008

SILVA, D. B. **O planejamento urbano e a administração popular de Porto Alegre: discursos e práticas**. 2004. Dissertação (Mestrado em Planejamento Urbano e Regional) – Programa de Pós-Graduação em Planejamento Urbano, Universidade Federal do Rio Grande do Sul, Porto Alegre.

MARCONI, Marina de Andrade. LAKATOS, Eva Maria. **Fundamentos de metodologia científica. 5. ed. São Paulo: Atlas, 2003**.

MOURA, F. ;CAMBRA, P. e GONÇALVES, A.B. **Measuring walkability for distinct pedestrian groups with a participatory assessment method: A case study in Lisbon**. Landscape and Urban Planning, 2017.

PAPPA, M. F.; CHIROLI, Daiane M. G. **Mobilidade Urbana Sustentável**. In: Encontro Internacional de Produção Científica - EPCC, 7, 2011, Maringá. Artigo Completo. Maringá: Centro Universitário de Maringá.

PETERS, John et al (2002) **From Instinct to Intellect: The Challenge of Maintaining Healthy Weight in the Modern World**. Obesity Reviews, v. 3, p. 69-74

PIXABAY. **Fotografia de pedestres em movimento**. Site. 2022. Disponível em: <<https://pixabay.com/pt/photos/pedestres-pessoas-ocupado-movimento-400811/>> Acesso em: 01 de outubro de 2022.

POZUETA, J.; DAUDÉN, F. J. L.; SCHETTINO, M. P.. **La ciudad paseable**. Madrid: Cedex, Espanha, 2009.