

IMPACTS ON THE TRAILS IN THE TIJUCA NATIONAL PARK AND THE ROLE OF THE PHYSICAL EDUCATION PROFESSIONAL

IMPACTOS EN LOS SENDEROS DEL PARQUE NACIONAL TIJUCA Y EL PAPEL DEL PROFESIONAL DE EDUCACIÓN FÍSICA

IMPACTOS NAS TRILHAS NO PARQUE NACIONAL DA TIJUCA E O PAPEL DO PROFISSIONAL DE EDUCAÇÃO FÍSICA

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Abstract

When people go through trails, they can create a positive relationship of integration with nature, but cause impacts on the environment. This study aimed to understand the perceptions of visitors and Physical Education professionals on the Pedra da Gávea and Pedra Bonita trails, in the Tijuca National Park. A mixed methodology was used with questionnaires for hikers and semi-structured interviews for professionals. In the quantitative approach, the study informs about the profile, behaviors and perceptions of practitioners. The qualitative approach asks trail guides trained in Physical Education and Tourism about sustainable development, assessments of trail conditions, impacts, the physical conditioning of practitioners, media and commercial action. The study showed that not all people have access to the Park Rules and Regulations. Among the objectives of the participants are contact with nature and being able to take pictures to post on social networks. There is a great deal of commercial and media exploitation on the trails without concern for the conservation of the environment. There is the presence of garbage and lack of signage. Regarding the positive aspects, sustainable actions of a cultural nature carried out on the trails, environmental preservation, human, social and economic development were listed. The importance of the Physical Education professional was

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highlighted, pointing to a new market niche that has been forming in the area, especially when this professional acts as a teacher in favor of an ethical environmental commitment.

Keywords: Walking; Physical Education; Tourism; Sustainable Development.

Resumen

Cuando las personas recorren senderos, pueden crear una relación positiva de integración con la naturaleza, pero causan impactos en el medio ambiente. Este estudio tuvo como objetivo comprender las percepciones de los visitantes y profesionales de la Educación Física en los senderos Pedra da Gávea y Pedra Bonita, en el Parque Nacional de Tijuca. Se utilizó una metodología mixta con cuestionarios para senderistas y entrevistas semiestructuradas para profesionales. En el enfoque cuantitativo, el estudio informa sobre el perfil, comportamientos y percepciones de los practicantes. El enfoque cualitativo pregunta a los guías de senderos formados en Educación Física y Turismo sobre desarrollo sostenible, evaluaciones de las condiciones del sendero, impactos, condición física de los practicantes, medios y acción comercial. El estudio mostró que no todas las personas tienen acceso a las Reglas y Reglamentos del Parque. Entre los objetivos de los participantes está el contacto con la naturaleza y poder tomar fotografías para publicar en las redes sociales. Existe una gran explotación comercial y mediática de los senderos sin preocupación por la conservación del medio ambiente. Hay presencia de basura y falta de señalización. En cuanto a los aspectos positivos, se enumeraron las acciones sostenibles de carácter cultural realizadas en los senderos, la preservación del medio ambiente, el desarrollo humano, social y económico. Se destacó la importancia del profesional de Educación Física, apuntando a un nuevo nicho de mercado que se viene formando en el área, sobre todo cuando ese profesional actúa como maestro a favor de un compromiso ético ambiental.

Palabras clave: Caminata; Educación Física; Turismo; Desarrollo Sostenible.

Resumo

As pessoas ao percorrer trilhas podem criar uma relação positiva de integração com a natureza, mas causam impactos no ambiente. Esse estudo visou compreender as percepções dos visitantes e profissionais de Educação Física na realização das trilhas Pedra da Gávea e Pedra Bonita, do Parque Nacional da Tijuca. Utilizou-se uma metodologia mista com questionários para os trilheiros e entrevistas semiestructuradas para os profissionais. Na abordagem quantitativa, o estudo informa sobre o perfil, os comportamentos e as percepções dos praticantes. A abordagem qualitativa indaga os guias de trilhas formados em Educação Física e Turismo sobre desenvolvimento sustentável, avaliações sobre as condições das trilhas, os impactos, o condicionamento físico dos praticantes, a ação midiática e comercial. O estudo mostrou que nem todas as pessoas têm acesso às Normas e Regulamentos do Parque. Dentre os objetivos dos participantes estão o contato com a natureza e poder tirar fotos para postar nas redes sociais. Existe uma grande exploração comercial e midiática nas trilhas sem a preocupação com a conservação do meio ambiente. Há a presença de lixo e falta de sinalização. Sobre os aspectos positivos, foram listadas ações sustentáveis de cunho cultural realizadas nas trilhas, de preservação ambiental, de desenvolvimento humano, social e econômico. A importância do profissional de Educação Física foi destacada, apontando para um novo nicho de mercado que vem se formando na área, principalmente quando este profissional atua como professor em prol de um compromisso ético ambiental.

Palavras-chave: Caminhada; Educação Física; Turismo; Desenvolvimento Sustentável.

Introduction

With a favorable climate, natural beauty and mountains that make up a large part of its urban setting, the city of *Rio de Janeiro* (RJ) has several areas that favor sports and leisure activities in interaction with nature. Many residents and tourists have chosen hiking as a form of leisure.

According to Garrido (2005), in the city of RJ since the beginning of the 19th century, sport emerged in social life as a distinctive leisure habit of immigrants, as a lifestyle. In this way, the city is part of the tourist itinerary for lovers of adventure sports, nature sports and hiking.

According to the Ministry of Tourism (Brazil, 2010) and Pellegrini (2000), 'hiking' are day trips, with walking routes, on a predefined itinerary without overnight stays. They are practiced, for the most part, on previously marked trails. They have different levels of difficulty, thus catering to audiences with different physical conditions.

There has been an increase in the number of people choosing to go hiking around the city as a sport.

Trails constitute a cultural element present in human societies and, for a long time, served as a means of communication between different places inhabited or visited by human beings. With industrialization, technological evolution and the influence of the media, travel became easier, providing new leisure and tourism activities (CARVALHO; BÓÇON, 2004).

Costa (2006) states that the search for adventures in nature has been presented by several authors as a growing trend in today's society. Even in another century, Park (1973) already explained the interactions and processes between human beings and their city, which "[...] cannot be seen merely as a physical mechanism and an artificial construction. This is involved in the vital processes of the people who make it up; it is a product of nature and particularly of human nature" (p. 26).

Regarding these vital processes, it is worth highlighting the importance of protecting the city's natural ecosystem: protecting and conserving the environment in a sustainable way for future generations. According to Marques (2014), the term

sustainability relates precisely to practices that consist of mitigating impacts generated by human activity. It is necessary to develop environmental education with those who practice trail activities so that their actions are conscious and sustainable.

Adventure physical activities in nature can make several contributions to the environment if managed properly. From a transversal perspective, these activities can contribute to the maintenance and preservation of natural environments, and when associated with pedagogical interventions in environmental education they can generate a learning process about the environment, stimulating greater environmental awareness. (COSTA; REPPOLD, 2015, p 96)

Boff (2015), brings us a reflection on the current challenges for building sustainability, such as preserving its ecosystems, maintaining the vitality and integrity of Mother Earth. He also states that sustainability must be thought of from a global perspective, with universal responsibility, where changing feelings and the use of emotional intelligence and cordial intelligence are fundamental.

Talking about sustainability on the trails means thinking about and addressing the Sustainable Development Goals (SDGs), through the 2030 Agenda, outlined by the United Nations (UN). In this Agenda, seventeen objectives and one hundred and sixty-nine goals are outlined that aim to balance the three dimensions of sustainable development: economic, social and environmental, to improve the quality of life and respect the protection of the environment, promotion health, the defense of biodiversity, universal respect for human rights and human dignity. (UN BR, 2015).

Lopes et al. (2017) state that human beings are agents of transformation in society and the environment in which they live. They were capable of causing significant physical and biotic changes over the years, but without adequately taking care of the consequences of the impacts caused.

Trails can be considered a paradox for the conservation and restoration of natural environments. They represent a tool in favor of conservation and restoration, as they allow human beings to be in contact with nature and raise awareness of the need to conserve, however, they also constitute a source of imbalance in these environments (EISENLOHR et al., 2013).

For Belart (1978) apud Carvalho and Bóçon (2004), “walking, hiking, touring, away from the hustle and bustle of big cities is one of the favorite pastimes of most people” (p.23). However, with the rush of daily life, people who live and work in large urban centers look for leisure areas close to their homes.

Currently, trails have been used as a route to natural environments, to contemplate nature, practice of extreme sports, recreation and ecotourism (Costa; Triane; Costa, 2008). Some researches show that the use of trails has increased in recent decades, especially in environmentally protected areas, according to studies demonstrated by Balmford et al. (2009), who recorded an increase in the number of visitors to environmental protection areas in 15 of the 20 countries evaluated.

In this panorama, the city of Rio has countless green areas, squares, parks and gardens. Some of these areas are for environmental protection and preservation of flora and fauna. Included in this diversity of green areas in Rio is the Tijuca National Park (PNT), which was created on July 6, 1961, located in the center of the city, with access from the North, South and West Zones. The PNT protects the largest urban forest in the world replanted by man, with a current extension of 3,953 hectares of Atlantic Forest. According to statistics from the PNT Annual Report, in 2017 the park received 3,290,507 visitors throughout the year, making it the most visited in the country. Most of these visitors follow some of the 46 trails open to the public, 52 trails or mapped segments that total a network of 128 km throughout the entire park (PNT, 2017).

The PNT, as it is a large urban green area with the practice of various physical activities, including trail activities, was chosen as the location for this research. The park is divided into four sections, where the Pedra Bonita/Pedra da Gávea Sector is the one with trails with opposite degrees of difficulty: Pedra Bonita is considered light and easy, while Pedra da Gávea is heavy and technical, including a section climbing⁵ (FEMERJ, 2015).

⁵ Generic form used when a trail has some climbing, that is, it is not a simple walk, requiring the use of techniques to climb blocks, climb small walls, chimneys and cliffs, or cross tight horizontal corridors (FARIA, 2019).

In this context, with significant visits to the PNT, it is worth mentioning the action of television media and social networks as an expanding source in the process of human interaction with nature. It is worth noting that this interaction (human being/nature) is often not carried out in a conscious and environmentally protective manner. The 'trend' of trails has led many people to practice this type of activity, mainly looking for a photo to post on social media.

For Gastaldo (2002), the media promotes and produces lifestyles, offering its audience to advertisers. A simple and quick search on the internet lists several trail groups on different social media such as Facebook, WhatsApp, Instagram and Twitter, active in the city of Rio, especially in the Tijuca National Park. In these lifestyles, practitioners of the activity become media actors used to sell and generate information.

Thompson (2013) states that the use of the media implies the creation of new forms of action and social interactions, with new ways of relating the individual with himself and others, with effects on the relationship between the public and the private, on the change in the link between visibility and power and in the conceptions of globalized products.

Visiting trails can be done in two ways: guided and self-led. Many groups that offer the activity do not have Tourist Guides specialized in natural attractions (as indicated by Ordinance No. 27 MTur). Furthermore, some people are not physically prepared, nor do they have prior support or guidance from a qualified professional to undertake the trails.

It is worth noting that there is an important difference between the Tourist Guide and the Visitor Conductor. Ordinance No. 27, of January 30, 2014, from the Ministry of Tourism, defines that the activity of tourism guide cannot be confused with that of a conductor. Article 8 § 1 states that the activity of conductor in federal, state or municipal conservation units must be carried out by professionals who:

“[...] receives specific training to work in a given unit, registered with the management body, and with the task of guiding visitors through natural spaces and/or legally protected areas, presenting experiential ecological knowledge, specific to the location in which it operates, being conducting is only permitted within the limits of this area”. (BRASIL, 2014, p. 110)

Following this line of thought, the issue of fads on trails brings to light alarming signs such as: the lack of adequate supervision in the city's various parks, overcrowding on the trails by groups that aim to commercially exploit the activity; the practice of the activity without specialized supervision (mainly by a physical education professional), in addition to the degradation of the ecosystem, for example, due to the waste left along the way.

Certainly, we live in a consumerist society, focused on purchasing and excessive spending, on new social media, on the generation of a large volume of waste, without worrying about ensuring the future of the next generations.

Theories of society can define and analyze why consumption has become so important in society, and theories about consumption could answer questions about the subjective processes that lead to certain consumption practices, and what desires and mediations the act of consumption represents in the lives of individuals. The culture of consumption or consumers is the culture of postmodern society, where there is an intimate and almost causal relationship between consumption, lifestyle, social reproduction and identity, with the loss of authenticity of social relations, resulting in materialism and superficiality (BARBOSA, 2010).

Costa (2006) highlights that the increase in the number of practitioners of adventure physical activities in the natural environment and technological advances lead to the emergence of complex and problematic situations. Although there are beneficial aspects in carrying out these activities, the negative environmental impact, the exposure of practitioners to polluted environments and unnecessary risks, are problems that must be considered, and are directly related to the uncontrolled growth of these activities, the increase in the number of practitioners and the lack of current standards to regulate each activity.

The correlation of ideological, economic, social impacts and issues that afflict our society, such as violence, are also present on the trails of a large city. According to Durkheim (1912) apud Murad (2009), social interaction is the basic process of life in society, a 'sacred' factor for the creation and maintenance of social processes and the social structure as a whole. Based on these processes and reflections, it is worth highlighting how the Physical Education professional has an important and transformative role in the social context of the trails.

The World Health Organization (WHO) defines health as a state of complete physical, mental and social well-being and not merely the absence of disease or illness (OPAS, 2016). According to Miragaya (2005), health promotion is the combination of educational and environmental assistance strategies that encourage behaviors or actions, individual or collective, which lead to the health of the population.

According to Farinatti and Ferreira (2006), from the perspective of health promotion, Physical Education, through its practices and strategies, provides an increase in the level of awareness and information of individuals and communities when making decisions related to health. Farinatti (2008) further states that “[...] acceptance is growing that sociocultural, economic and ecological aspects are as important to health as biological aspects and that health and illness profiles depend on general living conditions” (p. 39).

Thus, intertwining these concepts, walking is an excellent, pleasurable physical activity, which can and should be used to promote health. It is an aerobic activity (ACSM, 2014) that strengthens the cardiovascular system, providing greater resistance to strenuous activities, in addition to providing more energy in everyday life, thus expanding the concept of health and quality of life.

Currently, there are guidelines from the Brazilian Association of Technical Standards (ABNT, 2008) related to the practice of walking, for example, the ABNT NBR 15505-2:2008 Standard, which deals with the classification of walking routes without an overnight stay in terms of their characteristics and severity. In this Standard it is possible to find the effort index required by a person to complete a certain route, taking into account the severity of the environment and the intensity of physical effort.

In fact, on the most common trails in the city of Rio, especially on the trails delimited in green areas and controlled parks, not all information is accessible, which causes the practitioner to lack the necessary clarifications for the good practice of their activity, mainly regarding the physical conditioning necessary for its execution.

Physical Adventure Activities in Nature (BETRAN, 1995) or Sports in Nature are great ways to develop concepts relating to the environment, as they promote opportunities to change habits and behaviors. We have a greater need for learning,

understanding and getting interested in themes related to nature, of social relevance and with the participation of everyone, in the sense and commitment to protecting it as well as the search for a more harmonious experience.

For Cotes (2016), the area of Physical Education has been faced with an emerging job market for instructors/guides of activities that use natural areas where different sports modalities are practiced. In this way, the importance of the Physical Education professional is not only in leading subjects along the trails, but in guiding them regarding their practice, their physical conditioning, their environmental and social awareness, using an entire educational pedagogical apparatus with the aim of educating the relationship between human beings and nature.

The objective of this study is to comprehend the perceptions of visitors and Physical Education professionals when carrying out trails in the Tijuca National Park (Pedra da Gávea/Pedra Bonita Sector).

The guiding questions are: a) What are the characteristics of trail hikers on the PNT? b) What meanings and motivations do practitioners attribute to physical activity on trails? c) What understanding do practitioners have about the impacts that their activity has on the environment? d) How important is the role of the Physical Education professional as a transformative agent of sustainable development through physical activity on trails?

Methodology

Research is a set of actions, proposals and methods to find the solution to a given problem. This research presents a mixed methodology that allows you to combine qualitative and quantitative research approaches in the same investigation (SAMPIERI; CALLADO; LUCIO, 2013; SANTOS et al., 2017).

When planning this type of methodology, four main aspects must be considered: time distribution, weight allocation, combination and theorization. When distributing time, it must be assessed whether qualitative and quantitative data will be collected sequentially (in phases) or concomitantly (CRESWELL, 2010).

We opted for field research with a concomitant mixed design (SAMPIERI; CALLADO; LUCIO, 2013). This research collected the data and made the interpretations in a separate and parallel way, that is, analyzing and concluding the results obtained independently (quantitative part/qualitative part). After that, the data from each approach was consolidated (data integration), making one or several ‘meta-interferences⁶’ (SAMPIERI; CALLADO; LUCIO, 2013).

Two hundred PNT visitors were randomly chosen as participants who wished to freely participate in the research and who had just completed the trail activity. All participants were adults, over 18 years old and with no upper age limit, without distinction of sex, without employment relationship with the Park and who completed the Pedra da Gávea (100 participants) and Pedra Bonita (100 participants) trails.

Each research participant was informed about the objective of the investigation, presented the Free and Informed Consent Form with a copy for signature and guaranteed the anonymity of the volunteers since there was no type of identification in the questionnaire.

Two hundred equal questionnaires were administered individually to visitors who carried out the trail activity at the PNT, next to the guardhouse at the entrances/exits of the Pedra da Gávea and Pedra Bonita trails (one hundred in each), on weekends (four Saturdays and four Sundays) in the months November to December 2019, according to a pre-established schedule in Table 1.

Table 1 – Application of Questionnaires

Pedra Bonita Trail (100 participants)	Pedra da Gávea Trail (100 participants)
Saturdays: 11/16/19 and 11/30/19 Sundays: 11/24/19 and 12/08/19 Application time: 9am to 4pm Location: guardhouse at trail entrance	Saturdays: 11/23/19 and 12/07/19 Sundays: 11/17/19 and 12/01/19 Application time: 9am to 4pm Location: guardhouse at the entrance to the sector/trail
Weather conditions: clear to cloudy/overcast days, no rain in the area Temperatures: moderate to high (between 26° to 32°)	

Source: the authors.

⁶ Procedure that combines the interferences of results obtained in quantitative and qualitative approaches.

In addition to the visitors, five Physical Education professionals who work as Tour Guides directly in any sector of the PNT were selected as participants for individual and semi-structured interviews, with due authorization (TCLE), voice recording and full transcription into the Word program, with subsequent forwarding to interviewees to validate the statements. The Physical Education professionals/tour guides interviewed did not have an employment relationship with the PNT. Codes were created for each interviewee, so that their citations in the research are only indicated by random letters, giving the volunteers due anonymity.

Table 2 – Age range of PE Professionals / Tour Guides.

Interviewee	Training time in Physical Education	Tourist Guide training time
GC	35 years	Studying
HZ	27 years	1 year
MF	10 years	3 years
WS	10 years	15 years
RT	8 years	1 ½ year

Source: the authors.

The interviews were carried out between the weeks in which the questionnaires were administered. An interview guide was used that summarizes the questions and topics of discussion according to Gaskell (2002).

This study, with the concomitant design, analyzed the data obtained in qualitative and quantitative approaches. The data was consolidated and analyzed independently, and after this phase, integrated, thus obtaining a greater perspective and dimension of the problem, such as depth and complexity.

In the quantitative approach, the data obtained through the questionnaires administered were quantified. After quantification, some of this data was categorized into numerical data. The data were examined considering their meaning, categorized and included in thematic analyzes of patterns corresponding to the theoretical framework of the research (SAMPLERI; CALLADO; LUCIO, 2013).

In this way, the quantitative data were categorized into blocks, according to the profile of the questions and inserted into an Excel spreadsheet. A recount of each question was carried out, to check all markings, thus ensuring, in a second step, that the

quantities assigned to each item in the questionnaire would be in accordance with the previous count. After this step, the numbers were analyzed and transformed into graphs using the program's own resources.

In the qualitative approach, the data obtained were coded *a posteriori* through interviews, assigning codes and recording their incidence. After this step, they were categorized and analyzed (Sampieri; Callado; Lucio, 2013).

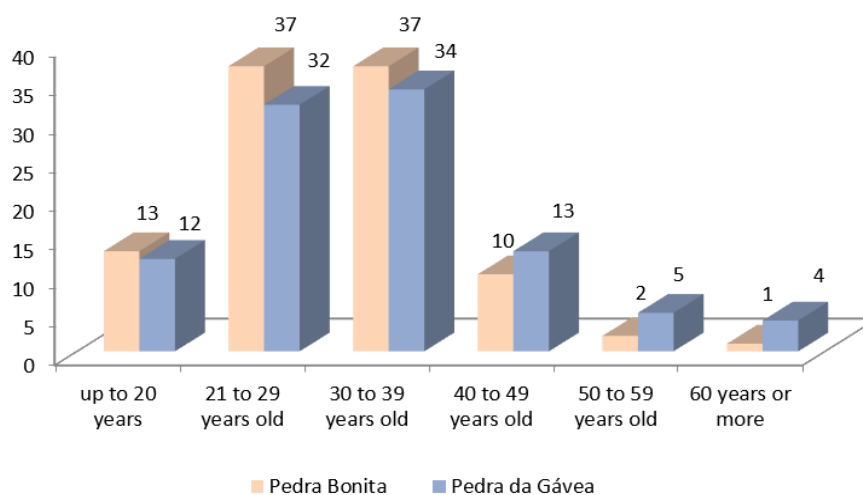
The results obtained in the two approaches were directly compared in the discussion of the results.

Results and Discussion

- Characteristics of trail hikers on the PNT

One of the characteristics of trail hikers on the PNT, according to the data obtained, is the age group with a predominance of individuals between 21 and 39 years old (Graph 1).

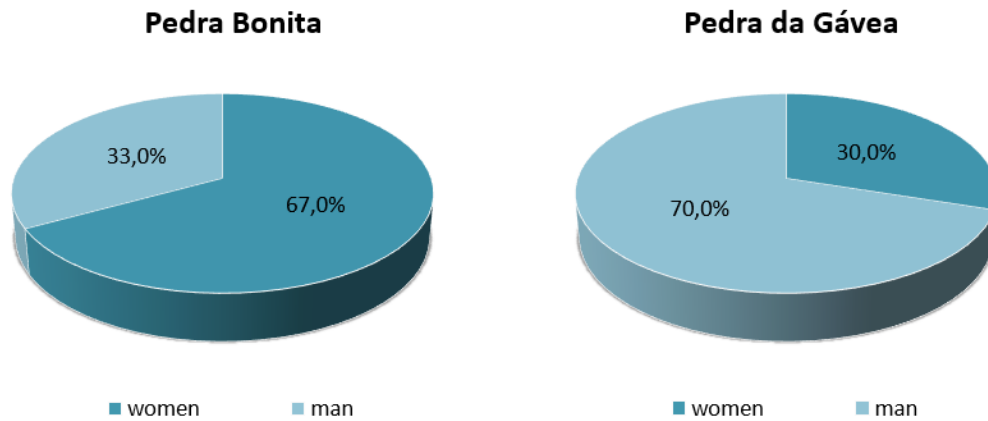
Graph 1 – Age range of participants.



Source: the authors.

An important fact that drew attention in the research was the prevalence of women on the Pedra Bonita Trail and men on the Pedra da Gávea Trail (Graph 2).

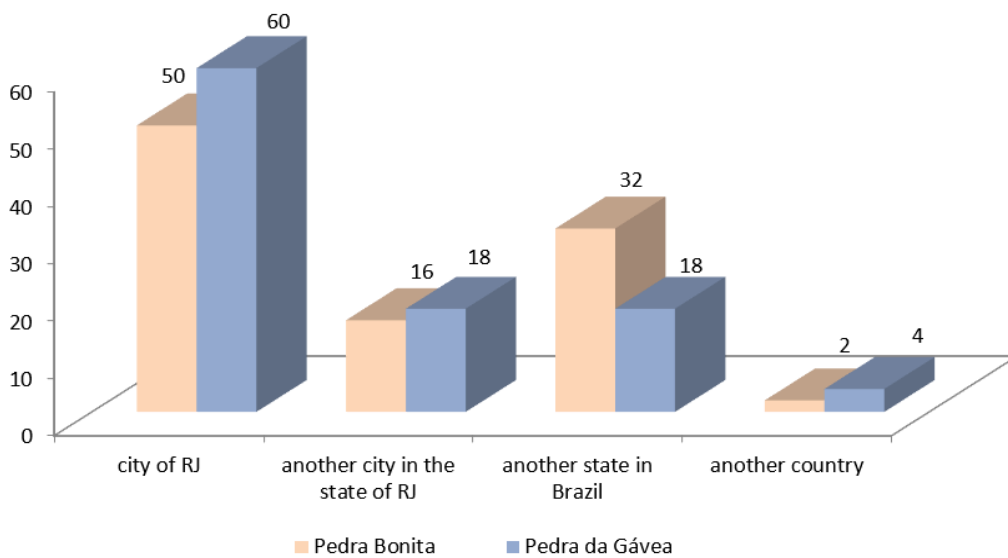
Graph 2 – Gender of participants



Source: the authors.

There is diversity of visitors' domicile: even though there is a higher percentage of people living in the city of RJ, there is a considerable presence of residents from other states, other cities in RJ and even other countries (Graph 3).

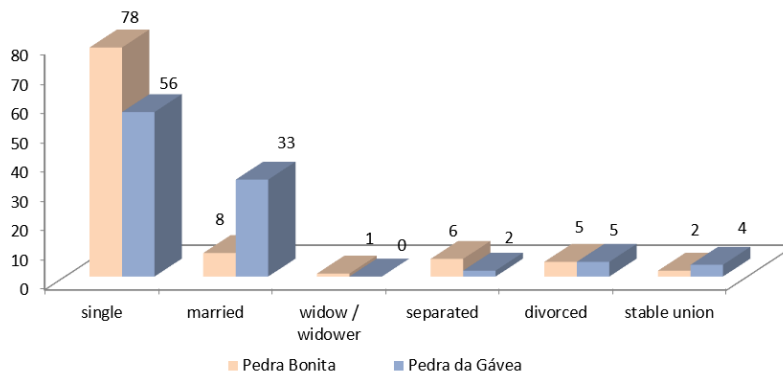
Graph 3 – Places of residence of participants



Source: the authors.

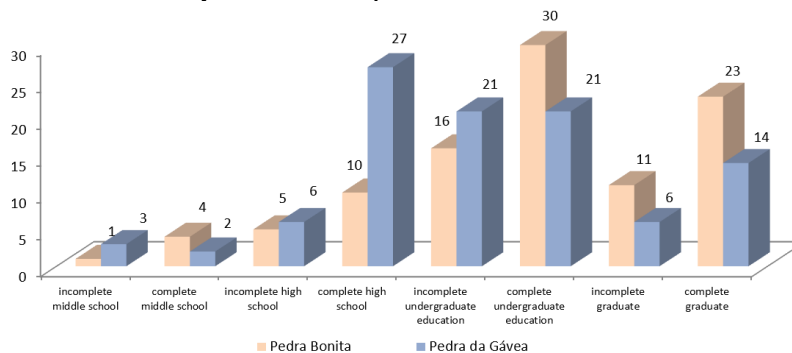
A greater number of single participants were observed in the researched trails (Graph 4), as we can also see a specific level of education, ranging from high school to graduate studies (Graph 5).

Graph 4 – Marital status of participants



Source: the authors.

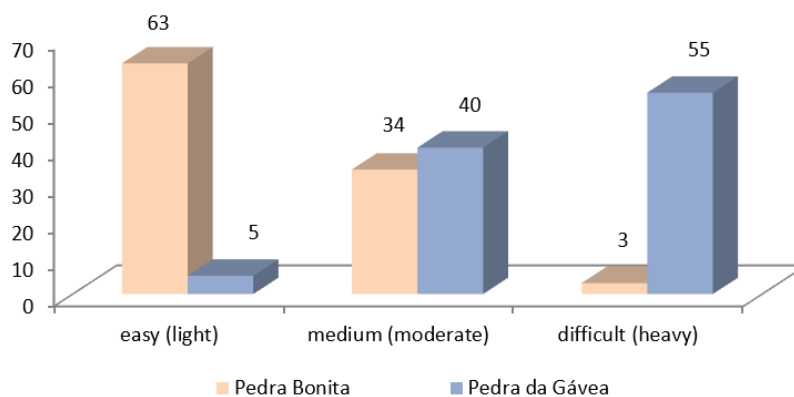
Graph 5 – Participants' education level



Source: the authors.

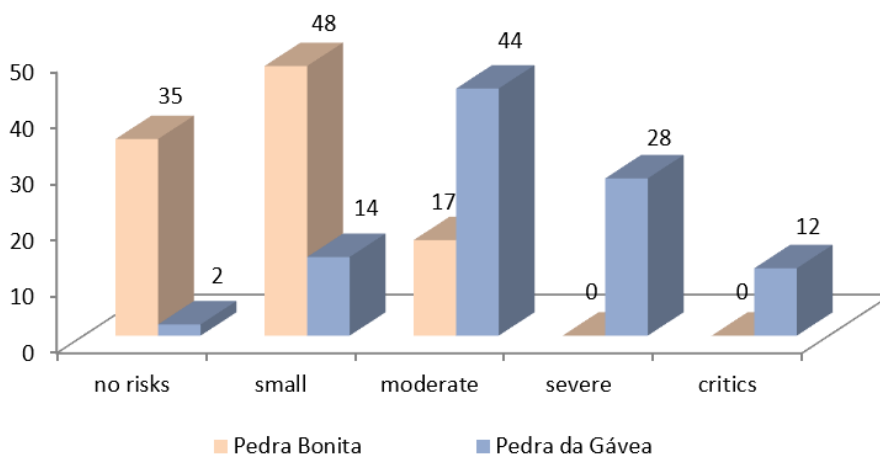
Regarding the level of difficulty of the trail, the majority of participants on the Pedra Bonita trail considered the trail to be light with small risks. On the Pedra da Gávea trail, the difficulty level was assessed as moderate to heavy, with moderate risks (Graphs 6 and 7).

Graph 6 – Classification of the difficulty level of the trail completed.



Source: the authors.

Graph 7 – Risk classification of the trail carried out.



Source: the authors.

The Pedra Bonita trail has a higher light level, based on the basic classification of effort required, according to FEMERJ (2015). The Pedra da Gávea trail has a moderately higher level in the same classification.

According to the classification information on the PNT website, we have the Pedra Bonita trail labeled as light and the Pedra da Gávea trail as heavy. In any case, these trails have opposite ratings related to effort, especially with regard to existing natural obstacles.

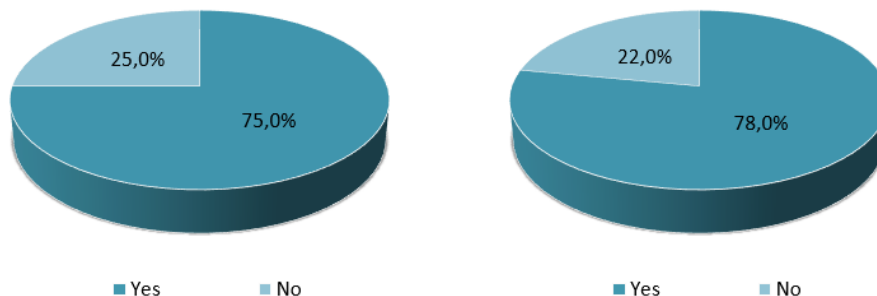
This reason could perhaps represent and translate the prevalence of women in Pedra Bonita and men in Pedra da Gávea, with its climbing section. However, it is important to highlight that there is no sexism or physiological or technical impediment for both sexes, within their capabilities, to undertake any of the trails.

When analyzing the data regarding physical conditions and associating it with the ACSM (2014) definitions and guidelines, it was possible to identify that more than 75% of participants practice regular physical activity (Graph 8), which favors health-related components of physical fitness such as, for example, muscle strength and cardiorespiratory condition. The majority of respondents consider that their fitness is in the range of “very good” to “acceptable” (Graph 9), but a small percentage did not feel prepared and stated that their physical fitness was not sufficient to complete the trails (13% in Pedra Bonita and 20% in Pedra da Gávea– Graph 10).

Graph 8 – Participants’ regular physical activity.

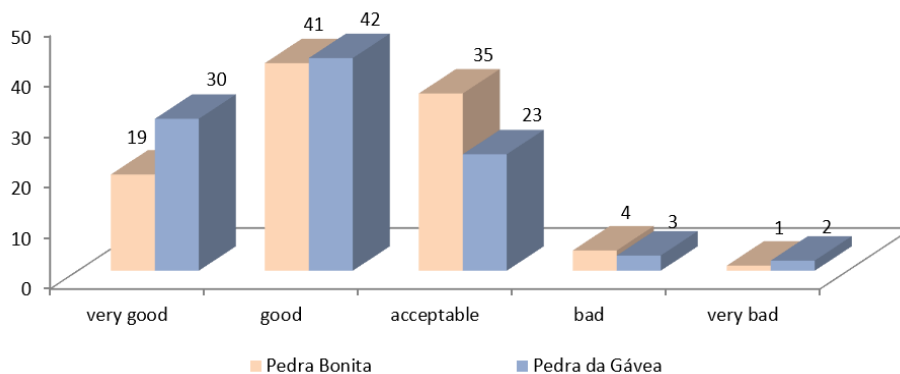
Pedra Bonita

Pedra da Gávea



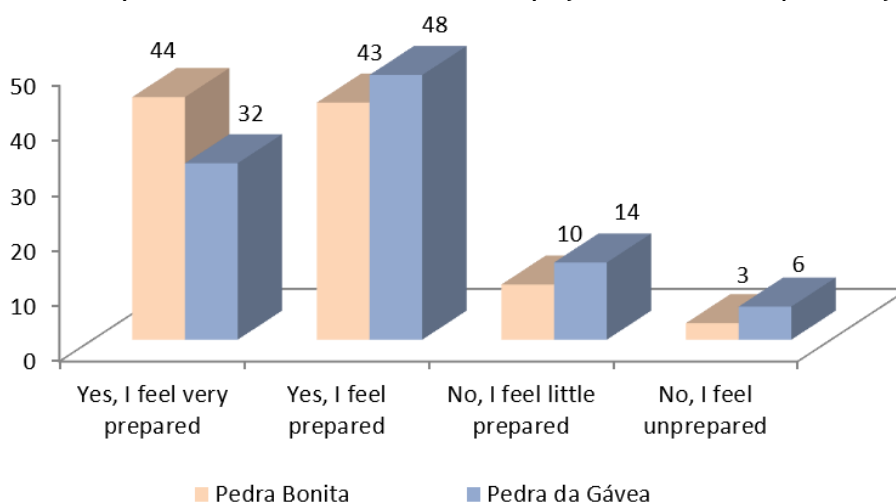
Source: the authors.

Graph 9 – Assessment of physical fitness by the participants themselves.



Source: the authors.

Graph 10 – Participants’ own assessment of the physical fitness required by the trail.

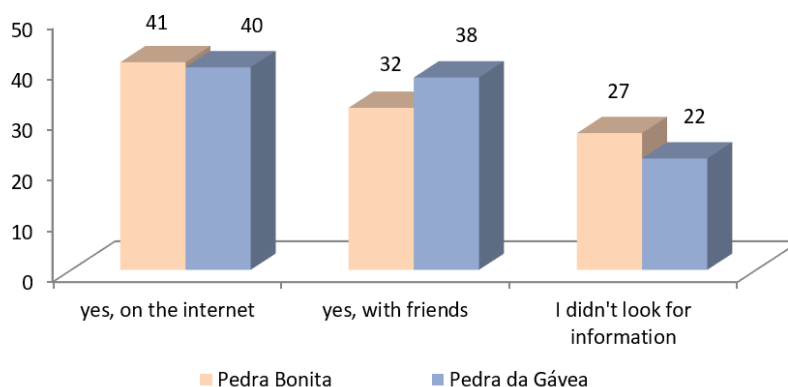


Source: the authors.

With the information obtained in the questionnaires, it was possible to realize that many people are really unaware of the activity they are carrying out on the trails, their physical conditioning, nor the risks involved in the activity. And, corroborating Schelhas' (1986) statement, to know the target audience capable of walking a trail, one must know the trail, its degree of difficulty, its technical level, in short, a lot of information that not all participants seek to know.

When asked about searching for information about the trails, most participants looked for references with friends or on the internet (Graph 11).

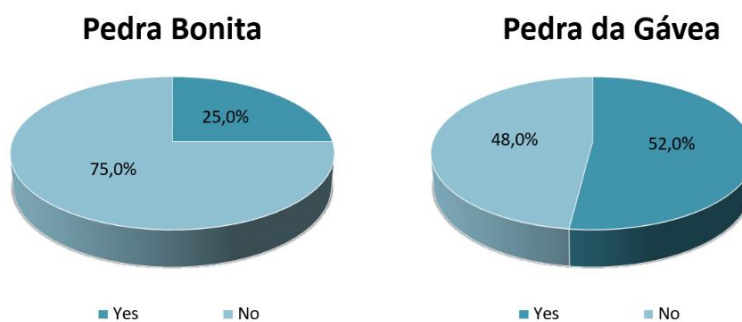
Graph 11 – Search for information to complete the trail.



Source: the authors.

In general, the information sought was not focused on the Public Use Rules and Regulations of the park itself, as the data shows that the vast majority are unaware of the guidelines provided in these documents (Graph 12).

Graph 12 – Knowledge of the PNT Regulations or Standards.



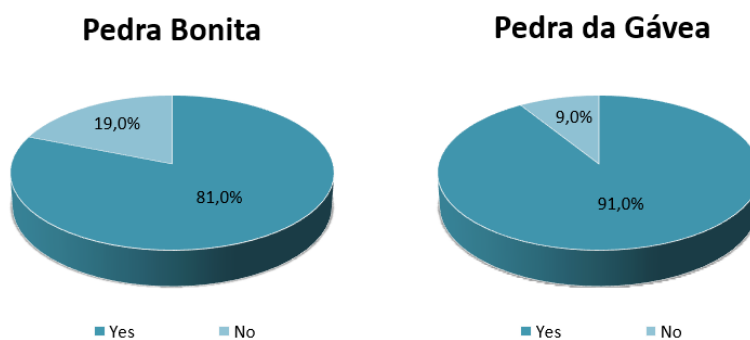
Source: the authors.

Information from the questionnaires indicates that visitors are not aware of the rules, which generates negative impacts on the conservation of the Park. It is important that planned awareness/education actions are carried out that address socio-environmental issues that minimize problems that cause damage to the Protected Area.

The data shows that the majority of participants were concerned about hydration, bringing enough water or sports drinks to carry out the trail activity (Graph 13).

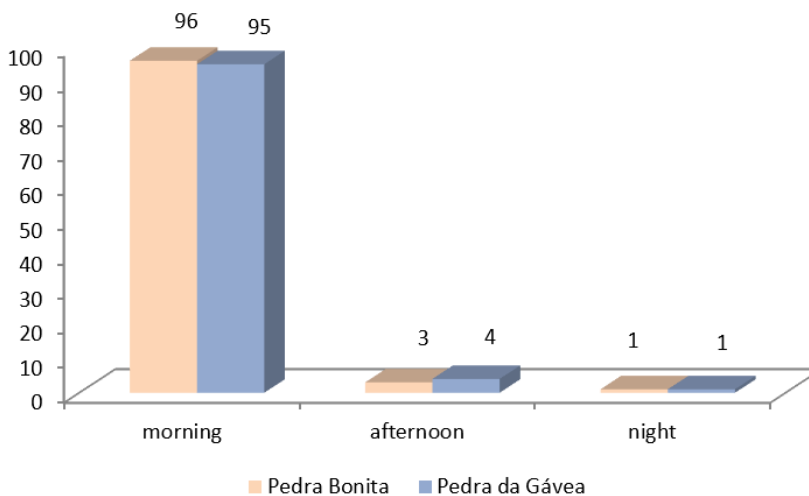
The morning period appears to be the best time to carry out the activity (Graph 14). In this sense, Cotes, Erler and Mielke (2021) warn that walking on trails, where the lack of vegetation cover exposes the practitioner to ultraviolet radiation, can cause burns and excessive light can cause damage to vision.

Graph 13 – Sufficient amount of water or isotonic drinks to complete the trail.



Source: the authors.

Graph 14 – Time preference for carrying out trail activities.

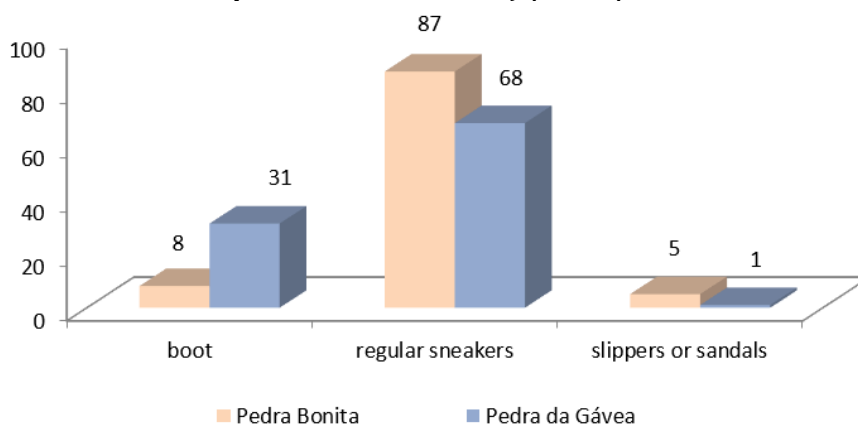


Source: the authors.

Regarding clothing and the correlation of AGUIPERJ (2018) guidelines regarding the use of minimum necessary equipment and appropriate accessories to carry out the activity safely (use of light clothing, closed shoes and sun protection), the results showed that the majority of participants made use of these items (Graphs 15 and 16).

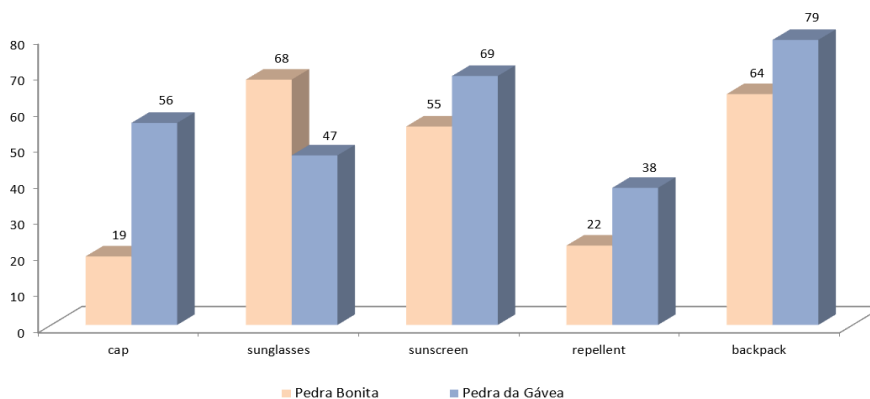
On trails with a higher incidence of light, it is important to use personal protective equipment (PPE) such as a cap or hat, UV sun protection shirt, sunglasses and sunscreen (COTES; ERLER; MIELKE, 2021).

Graph 15 – Shoes used by participants.



Source: the authors.

Graph 16 – Protections and/or accessories taken by participants.

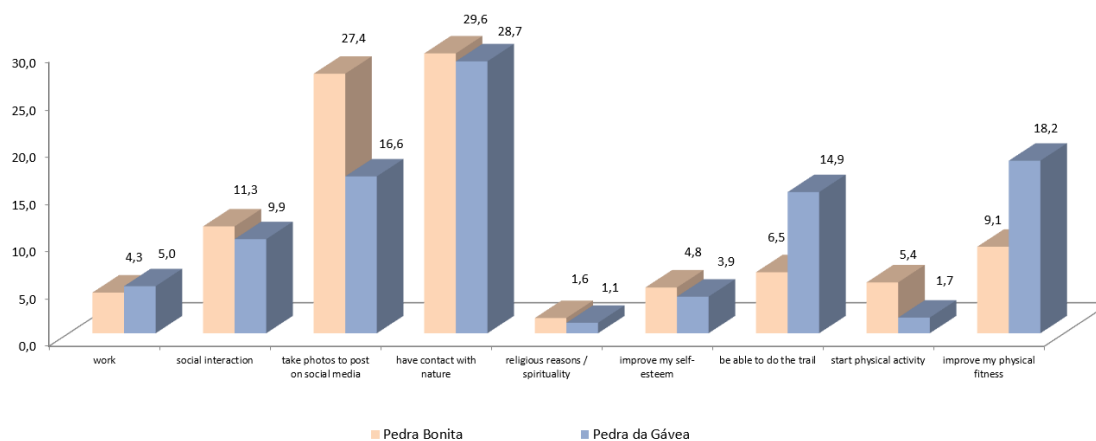


Source: the authors.

- Meanings and motivations that practitioners attribute to physical activity on trails

When observing the data obtained from the questionnaires on the Pedra Bonita trail, the objectives and motivations of the participants are contact with nature and being able to take photos to post on social media. On the Pedra da Gávea trail, in addition to contact with nature and photos, the aim is to improve physical conditioning (Graph 17).

Graph 17 – Participants’ Objectives and Motivations.



Source: the authors.

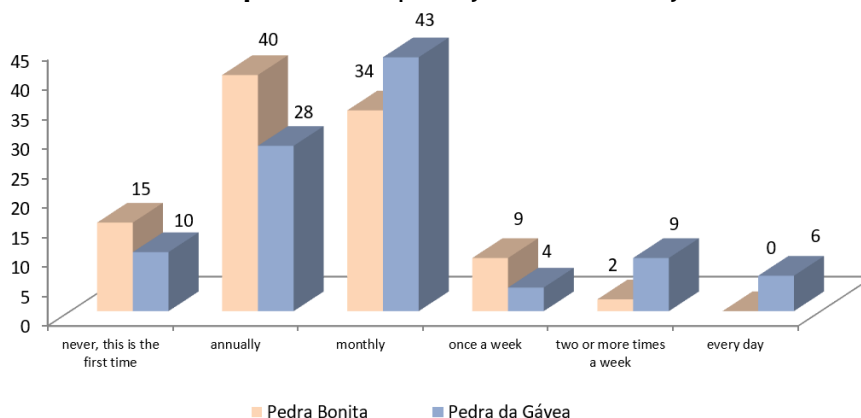
Regarding the behavior of taking photos to share, Rosa, Walkowski and Perinotto (2022) point out that digital influencers and their followers produce and reproduce photographic materials of travel and city locations on social media. Thus, people look for places and images to promote themselves and approval by those who watch them on screens.

Media action encourages people's interest in experiencing new environments, but the trend of trails and the search for photos to post on social media generate negative impacts on the environment, leading to a greater number of accidents.

Regarding personal achievement, it is worth emphasizing the result found in the questionnaires, with the representative percentage (14.9%) of participants imbued with a sense of challenge and overcoming when completing one of the most challenging trails in RJ, Pedra da Gávea (Graph 17).

The majority responded that they like to carry out activities on trails, but they do not practice this activity as often. A low percentage of participants who had never done any type of trail (10%) were starting the activity for the first time in Pedra da Gávea (Graph 18).

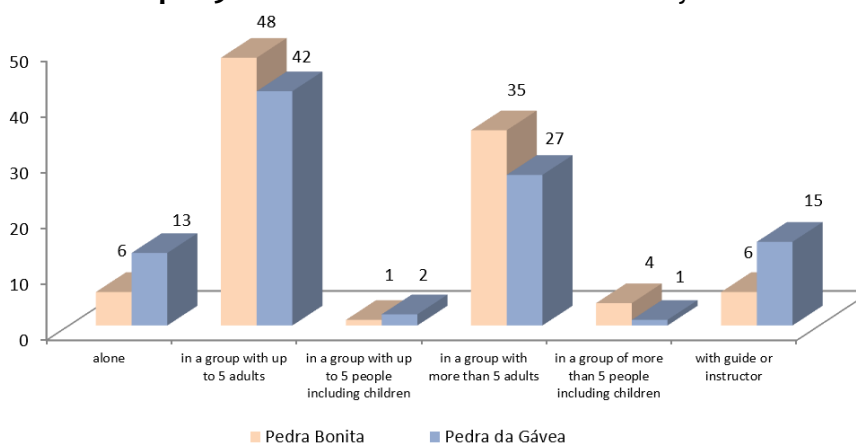
Graph 18 – Frequency of trail activity.



Source: the authors.

In this context we notice the formation of groups of people on the trails, as described by Marinho (2004) when he states that activities in nature mostly occur in groups. According to the results of the questionnaires applied to visitors who took the Pedra Bonita or Pedra da Gávea trail, the majority of participants practiced the activity in groups (Graph 19) and considered that the trails were ‘not very crowded’ (Graph 20). As these groups become ‘large groups’, greater reflection is needed regarding the impacts caused to the environment.

Graph 19 – Who carried out the trail activity with.

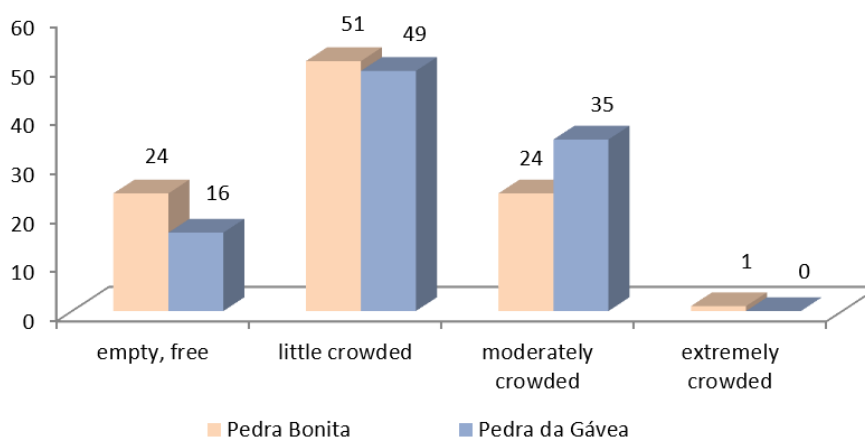


Source: the authors.

On the Pedra Bonita trail and on the Pedra da Gávea trail, only 6% and 13% of the research participants, respectively, completed the trail alone. This information corroborates the statements made by Marinho (2004) pointing to the formation of groups. Graph 19 indicates a higher percentage (15%) of participants who undertake the

Pedra da Gávea trail, compared to the Pedra Bonita trail (6%), accompanied by a guide or instructor. This fact is justified by the technical level of the Pedra da Gávea trail, which is classified as a “moderately superior” effort level, with many obstacles, uneven ground and places where it is necessary to use your hands to maintain balance and/or climb (FEMERJ, 2015).

Graph 20 – Participants’ perception regarding capacity.



Source: the authors.

These results show commercial exploitation on the trails without concern for environmental education and conservation. In ‘large groups’ there is a lack of control over the maximum number of people who make up the group, there is a lack of responsible people with appropriate training, and there is a lack of awareness among many participants, as they do not know the activity or the risks.

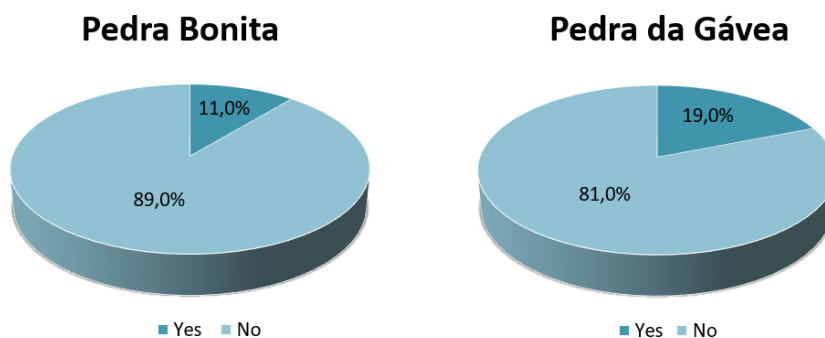
As a consequence of these behaviors, several accidents are recorded by CBMERJ, with numerous rescues carried out by the RJ Fire Department. The mass visitation present in nature tourism harms the development of educational and awareness-raising actions (Tertuliano, 2022).

- Impacts of trail activity on the environment

The results of the interviews carried out with PE professionals show that the impacts of trail activities will always exist, but according to the data obtained in the questionnaires with the participants, not all people are aware of this. Information from

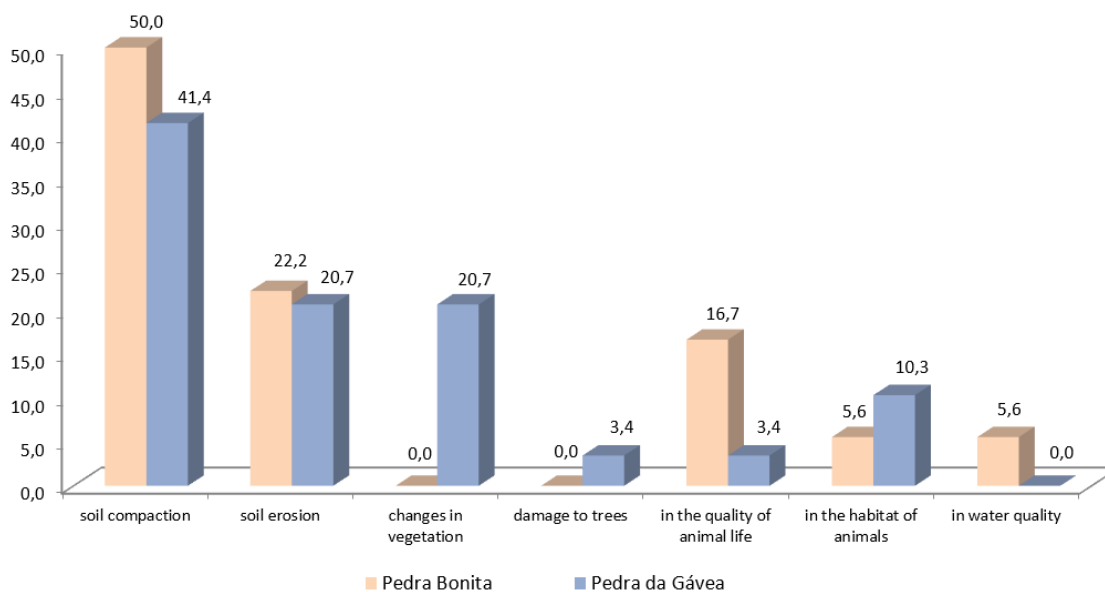
the questionnaires shows that more than 80% consider that their activity does not cause any type of impact on the environment (Graph 21). Still correlating these data, within the small percentage (less than 20%) of participants who state that their activity caused some type of impact, soil compaction and erosion stand out (Graphics 21 and 22).

Graph 21 – Participants’ perception of whether the trail activity caused any impact on the environment.



Source: the authors.

Graph 22 – Main impacts caused to the environment listed by participants.



Source: the authors.

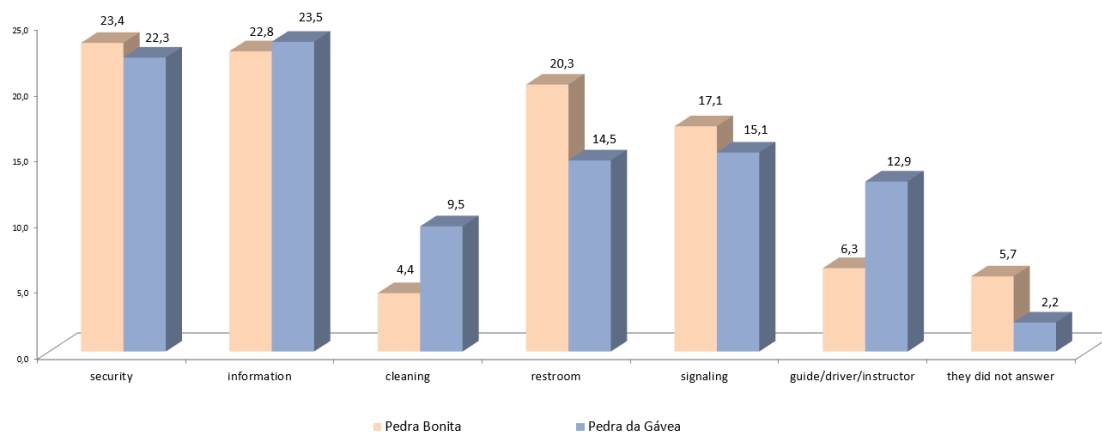
Several authors, such as Lemos (1999), Magro (1999), Barros (2003) and Leung and Marion (2000) pointed out in their studies that impacts on trails are related to excessive use, due to the direct action of their use and visitation. Leung and Marion (2000) listed the direct and indirect effects caused by public use in natural areas.

Based on the results of interviews with PE professionals, negative impacts such as soil compaction, widening of trails, use of shortcuts and litter are in line with the authors' idea. These results are also linked to those obtained in the questionnaires administered to visitors.

As for the negative points, we can list: 1) issues related to solid waste (garbage); 2) robberies and violence; 3) lack of security; 4) presence of 'large groups', with congestion/crowding of visitors; 5) diversified accidents; 6) little and/or lack of signage; 7) presence of detours and use of shortcuts; 8) improper feeding of wild animals by visitors; 9) loud sound/excessive noise; 10) lack of awareness among PNT visitors; 11) sale of products; 12) presence of graffiti; 13) lack of awareness programs.

It was recorded in the questionnaires that some important measures need to be improved or implemented on the trails, such as safety and information (Graph 23). It is understood that preventive actions by the PNT and competent public security bodies can make a difference in improving security. Furthermore, awareness procedures and accurate and permanent information throughout the Park, such as interactive totems, would minimize information-related issues.

Graph 23 – Aspects to be improved on the trails according to the participants.



Source: the authors.

On the other hand, the results of the interviews with PE professionals show a more encouraging scenario, bringing behind-the-scenes information that is not always perceived by the general public. Among them, the issue of volunteering on the PNT, the joint efforts for maintenance, signage and trail demarcation, in addition to the guidance given by the PNT Visitor Center itself.

The Visitor Center⁷ has a permanent exhibition called “A Forest in the Metropolis”, didactic and interactive that aims at the conscious use of areas and resources for public use, covering the history and trajectory of the PNT.

To elucidate and highlight this new universe brought to light by these interview results, it is worth highlighting some essential information: the PNT has had a Volunteer Program⁸ since 2003 that consists of maintaining trails, producing and planting native seedlings, recovering degraded areas and raising awareness among visitors about important topics such as not feeding wild animals, among other activities through monthly joint efforts, adoption of trails and corners, volunteer brigades, children's joint efforts, extra help and long-term volunteering on specific projects.

Volunteer activities at PNT are related to the Volunteer Program of the Chico Mendes Institute for Biodiversity Conservation (ICMBio), through public calls on the organization's website. They are opportunities to exercise citizenship and contribute to a more balanced environment. The program is based on strategies that involve society in socio-environmental management, so that people develop a positive relationship with nature and with ICMBio, contributing to the preservation of environmental heritage. It offers opportunities for voluntary work throughout the Institute's structure, including Conservation Units and Research Centers, in person and/or remotely (GOV.BR, 2023).

Furthermore, we have as positive results the beauty of the park, its location with good and easy access and the great diversity of trails.

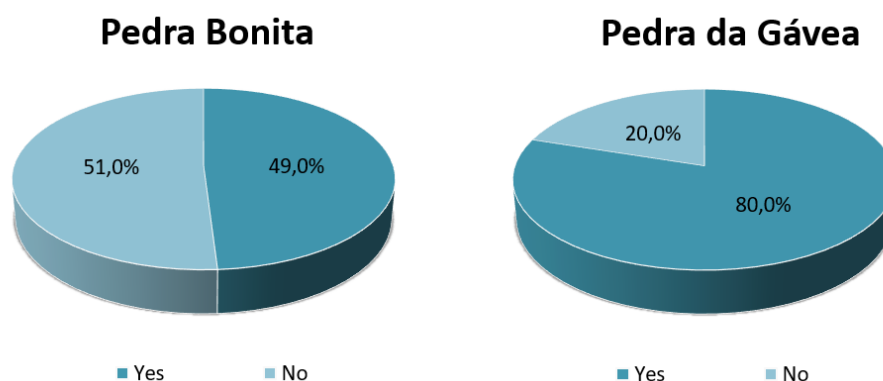
- The Physical Education professional as a transformative agent of sustainable development in trail activities

⁷ Visitor Center of PNT: <<https://parquenacionaldatijuca.rio/loais/centro-de-visitantes/>>. Accessed in: 29 Aug. 2023.

⁸PNT Volunteer Program: <<https://parquenacionaldatijuca.rio/voluntariado/>>. Accessed in: 29 Aug. 2023.

The importance of the Physical Education professional was highlighted in the results of the questionnaires with visitors who did the trail activity, mainly in Pedra da Gávea, where 80% of participants consider it important to have guidance from this professional (Graph 24).

Graph 24 – Importance of the PE professional in the trail activity.



Source: the authors.

It is important to highlight that this result is significant and important, especially for the new market niche that has been forming for the area of Physical Education (Cotes, 2016). The interviews carried out corroborate this statement, since the growing motivation of professionals is at the junction of the two trainings (PE professional and Tourist Guide).

PE professionals seek to regulate the activity of Tourist Guides, to legally develop activities close to nature and show that this confluence generates benefits and new possibilities.

There is also a shock regarding the market powers linked to this practice. Pimentel (2013) draws attention to this issue when he raises questions about professional legalization. But, in this case and with these results, this research shows a new job market, where professional training in Physical Education can and should be a differentiator. It is true that there is a legal provision from the Ministry of Tourism that must be complied with and that determines the activities and differences between Tour Guides and conductors, in addition to other measures (Ordinance 27, of January 30, 2014).

The results of the interviews show that 80% of the Physical Education professionals interviewed claim to be aware of the regulations that differentiate the profession of tour guide and visitor conductor. This differentiation is important and fundamental information for professionals who are or intend to work with trails or any other activities linked to nature.

It is worth noting that only 60% of those interviewed had contact with environmental concepts or sports in nature during their academic training (undergraduate degree in PE). This data is in line with the statements of Cotes et al. (2018) about the need to make efforts in undergraduate curricular subjects with content related to the natural environment and, according to the authors Leite and Caetano (2004), when they state that the curriculum of PE courses do not effectively contemplate the study of the environment.

Furthermore, to think of the Physical Education professional as a transformative agent of sustainable development through trail activities, a prior understanding of this concept is necessary. The results showed that definitions of sustainable development include terms and words such as: “preserve for future generations”, “conscious exploration”, “preserve and sustain”, “commitment to not depleting environmental resources for future generations” and “care that must be taken”. These expressions are in tune with the concept of sustainable development by authors such as Boff (2015) and Sachs (2017), as well as with the Sustainable Development Goals (SDGs) and their respective targets defined in the 2030 Agenda by the UN, which, when integrated, balance the dimensions economic, social and environmental, for a better world (UN BR, 2015).

But knowledge of this conception should not be limited to discourse. It must be part of the actions of the PE professional as an Educator, as observed in excerpts from the interviews. Respect, ethics of care and ethics of responsibility, addressed by Boff (2015) and the means that PE has to promote education, health, development and peace, according to Osborne and Batista (2010), they must always be in the field of actions.

In this way, it is understood that the PE professional has an environmental ethical commitment and can be a transformative agent (Cotes, 2018). By listing the sustainable actions that exist on or because of the trails, observed and intrinsic in the results of the questionnaires and interviews in this research (Table 3), it is possible to perceive and understand the relationship that PE must have in this context.

Table 3 – Sustainable actions on PNT trails.

Culture	<ul style="list-style-type: none"> ➤ Enhancement of the Park ➤ Appreciation of the sense of trailing, walking and exploring
Environmental Preservation	<ul style="list-style-type: none"> ➤ Park: protection of natural ecosystems ➤ Management Plan ➤ Recreation, education and environmental interpretation activities, and scientific research carried out ➤ Trails with interpretative and educational use ➤ Joint efforts ➤ Contemplation and integration of human beings with nature
Social Development	<ul style="list-style-type: none"> ➤ Search for ethical principles and values: solidarity; friendship; holistic education; peace ➤ Promotes gender equality and social relations ➤ Promotes social inclusion ➤ Volunteer Participation ➤ Trails for all ages, children, women, young people, elderly people, people with special needs
Human Development	<ul style="list-style-type: none"> ➤ Improved public health and well-being
Economic Development	<ul style="list-style-type: none"> ➤ Enables the communities involved to develop sustainable economic activities in the surrounding area ➤ Encouraging investment in new products for trail users ➤ Organizing events ➤ Sports ➤ New professionals who join

Source: the authors.

Final considerations

Regarding the characteristics of trail hikers, there was a predominance of young, single individuals, with regular physical activity, a considerable level of education and living in RJ. The most difficult trail, considered to have moderate risks, was more frequented by men and the easier one, considered light, was more frequented by women. In general, the hikers used appropriate clothing and equipment. Most people sought information about the trails from friends or on the internet and were unaware of the Park's rules and regulations.

The main motivations of the practitioners were contact with nature, taking photos to show on social media, improving physical conditioning, and the desire to challenge and overcome themselves.

Most trail hikers do not realize the impacts they have on the environment. Those who notice the impacts list soil compaction, erosion and changes in vegetation as the main ones. PE professionals highlighted the widening of trails, garbage left along the route and improper feeding of wild animals as impacts. They also highlighted the crowding of visitors, the lack of security and poor signage within the Park.

PE professionals reported important initiatives adopted by the PNT Volunteer Program, such as cleaning efforts, planting, recovery of degraded areas, and raising awareness among visitors not to feed animals. Especially on the Pedra da Gávea trail, which requires more physical conditioning, hikers recognize the importance of having guidance from a PE professional. But this professional cannot be restricted to the dimension of physical preparation for trail activities. It is necessary to be an educator with knowledge and feelings regarding sustainability, ethics and care for all forms of life.

Certainly, the trails presented themselves as excellent and suitable places for the integration of human beings with nature, enabling a harmonious relationship. However, human beings must reflect on their actions when carrying out a trail activity and how they should maintain and conserve them as an intangible asset for future generations.

Shared responsibility must always exist on the trails. In the Tijuca National Park, this awareness must be raised by both the management of the Protected Area, the guides, conductors or instructors, and the visitors. It is important that there is a set of opportunities that promote environmental awareness, with differentiated actions and the construction of environmental, social and economic capabilities, motivating principles of responsibility and ethical values.

Natural spaces in the heart of urban centers allow for a range of diverse physical activities. Trails are part of these activities, providing leisure, improving quality of life and well-being. They promote values that connects individuals with nature, advancing

tourism, interpretation and environmental education initiatives. Therefore, a Protected Area embedded within urban space constitutes a great opportunity to reconcile physical activity with the objectives of sustainable development.

If, on the one hand, activities in nature can promote better interaction between humans and the environment, improving their health, on the other hand they can also affect them. It is crucial to understand the impacts caused by physical activities in nature, especially when we go on a trail. In this sense, these impacts must be minimized, safety must be ensured and the risk of accidents reduced.

Issues relating to violence in cities are reflected in the trails of Tijuca National Park. As it is an area with access from several neighborhoods, it requires a detailed look in order to implement public and environmental policies, due to the impact caused by the social dynamics of its surroundings. This fact increases the complexity regarding the integrity of the heritage, the protection of biodiversity, the inspection and safety of its visitors and the professionals who work there.

The PE professional must be imbued with his/her social and educational role to act in a transformative way in society. It is important to develop body practices in their various forms of coding and social significance, helping to raise awareness of the potential and limits of the body, the importance of an active life and the maintenance of health, within a larger process that is education. The trails must be used consciously and Physical Education, through this new and emerging market, can lead experiences that contribute to the construction of a more fair, democratic and inclusive society.

For nature and PE lovers, this new market niche can be very beneficial, as it has significantly brought together different people with different motivations and desires, creating spaces for action to be conquered. It is a way of sowing opportunities and allowing subjects to see yet another possibility of working in the area of PE.

Improving the format of trails for interpretation, designing cooperative and multidisciplinary projects with different areas of knowledge or institutions, developing multipliers and innovative ideas are some of the possibilities that can generate good debates and work for future public policies in Protected Areas.

The PNT and other Protected Areas, in addition to being a great heritage for humanity, are places for preserving the environment, cultivating well-being, coexistence and education. They provide moments of pause and reflection where human beings can seek inspiration to build a better life.

References

ABNT. Associação Brasileira de Normas Técnicas. **NBR 15505-2: Turismo com atividades de caminhada. Parte 2 – Classificação de percursos.** Rio de Janeiro: ABNT, 2008.

ACSM. American College of Sports Medicine. **Diretrizes do ACSM para os testes de esforço e sua prescrição.** 9 ed. Rio de Janeiro: Guanabara, 2014.

AGUIPERJ, Associação de Guias e Profissionais de Escalada do Estado do Rio de Janeiro. **Força Tarefa – Pedra da Gávea / PNT.** 2018. Disponível em: http://aguiperj.org.br/2018/03/forca-tarefa-pedra-da-gavea-pnt/#.XZK7B_BKjIU. Acesso em: 27 mar. 2019.

BALMFORD, *et al.* A global perspective on trends in nature-based tourism. **PLoS Biol**, v.7, n.6, p. e1000144, 2009. Disponível em: <https://journals.plos.org/plosbiology/article/file?id=10.1371/journal.pbio.1000144&type=printable>. Acesso em: 15 set. 2018.

BARBOSA, L. **Sociedade de consumo.** 3 ed. Rio de Janeiro: Zahar, 2010.

BARROS, M. I. A. **Caracterização da visitação, dos visitantes e avaliação dos impactos ecológicos e recreativos do planalto do Parque Nacional do Itatiaia.** 121 f. 2003. Dissertação (Mestrado em Recursos Florestais) – Universidade de São Paulo, Piracicaba, 2003. Disponível em: <http://www.teses.usp.br/teses/disponiveis/11/11150/tde-23092003-140646/publico/maria.pdf>. Acesso em: 07 jan. 2019.

BETRAN, J. O. Las actividades físicas de aventura em la naturaleza: análisis sociocultural. **Apunts Educación Física y Deportes**, n.41, p.5-8, 1995.

BOFF, L. **Sustentabilidade: o que é – o que não é.** 4. ed. Petrópolis: Vozes, 2015.

BRASIL. Ministério do Turismo. **Turismo de Aventura: orientações básicas.** 3.ed. Brasília, 2010. Disponível em: http://www.turismo.gov.br/sites/default/turismo/o_ministerio/publicacoes/downloads_publicacoes/Turismo_de_Aventura_Versxo_Final_IMPRESSO_.pdf. Acesso em: 15 set. 2018.

BRASIL. Portaria nº 27, de 30 de janeiro de 2014. Estabelece requisitos e critérios para o exercício da atividade de Guia de Turismo e dá outras providências. **Diário Oficial da União**, Brasília, DF, v.151, n.22, Seção 1, p. 110-111, 31 jan. 2014.

CARVALHO, J.; BÓÇON, R. Planejamento do traçado de uma trilha interpretativa através da caracterização florística. **Revista Floresta**, v.34, n.1, p. 23-32, 2004.

COSTA, V. C.; TRIANE, B. P.; COSTA, N. M. C. Impactos ambientais em trilhas: agricultura x Ecoturismo – um estudo de caso na Trilha do Quilombo (PEPB - RJ). **Revista Brasileira de Ecoturismo**, v.1, n.1, p.84-113, 2008.

COSTA, A. V.; REPPOLD, A. R. O potencial das atividades físicas de aventura na natureza: as contribuições para o meio ambiente. **Revista de Ciencias del Deporte**, v.11, p.95-96, 2015. Disponível em: <http://www.e-balonmano.com/ojs/index.php/revista/article/view/230>. Acesso em: 15 jan. 2018.

COSTA, A. V. **O potencial das atividades físicas de aventura na natureza em Porto Alegre: um estudo integrado dos parâmetros paisagísticos, socioambientais, infra estruturais e de riscos.** 228 f. 2006. Dissertação (Mestrado em Ciências do Movimento Humano) – Universidade Federal do Rio Grande do Sul, Porto Alegre, 2006. Disponível em: <http://www.lume.ufrgs.br/bitstream/handle/10183/10026/000593637.pdf?sequence=1>. Acesso em: 15 jan. 2018.

COTES, M. **Saberes profissionais dos condutores de trilhas de longa duração para atuação em parques nacionais: contribuições para formação inicial em Educação Física.** 188 f. 2016. Tese (Doutorado em Educação Física) - Universidade Federal de Santa Catarina. Florianópolis, 2016.

COTES, M. Trilha interpretativa: uma ferramenta à sensibilização. **Motricidade**, v.14, p.78-84, 2018.

COTES, M.; ERLER, D.M.; MIELKE, M.S. Trilhas Interpretativas em áreas de Mata Atlântica: um diagnóstico a partir de fotografias hemisféricas. **Revista Brasileira de Ecoturismo**, v.14, n.2, p.160-177-177, 2021.

COTES, M., et al. Perfil sociodemográfico, acadêmico e profissional de condutores de trilhas de longa duração em Parques Nacionais Brasileiros. **Revista Brasileira de Ciência e Movimento**, v.26, n.1, p.167-177, 2018.

CRESWELL, J. W. **Projeto de pesquisa: métodos qualitativo, quantitativo e misto.** 3 ed. Porto Alegre: Artmed, 2010.

EISENLOHR, P. V., et al. Trilhas e seu papel ecológico: o que temos aprendido e quais as perspectivas para a restauração de ecossistemas? **Hoehnea**, v.40, n.3, p.407-418, 2013. Disponível em: <http://www.scielo.br/pdf/hoehnea/v40n3/02.pdf>, Acesso em: 10 mar. 2018.

FARIA, A. P. Variáveis geográficas para definir e graduar trilhas técnicas. **Revista Brasileira de Geografia Física**, v.12, n.1, p.268-282. 2019.

FARINATTI, P. T. V. **Envelhecimento, promoção da saúde e exercício: bases teóricas e metodológicas.** Barueri: Manole, 2008. v. 1

FARINATTI, P. T. V.; FERREIRA, M. S. **Saúde, Promoção da Saúde e Atividade Física: conceitos, princípios e aplicações.** Rio de Janeiro: EdUERJ, 2006.

FEMERJ. Federação de Esportes de Montanha do Estado do Rio de Janeiro. **Metodologia de Classificação de Trilhas**. 2015. Disponível em: <http://www.femerj.org/wp-content/uploads/classifica%C3%A7%C3%A3o-trilhas-v6.1.pdf>. Acesso em: 05 abr. 2018.

GARRIDO, F. Lazer e esportes no Rio de Janeiro. In: DA COSTA, L.P (org). **Atlas do esporte no Brasil: atlas do esporte, Educação Física e atividades físicas de saúde e lazer no Brasil**. Rio de Janeiro: Shape, 2005.

GASKELL, G. Entrevistas individuais e grupais. In: BAUER, M. W.; GASKELL, G. (orgs). **Pesquisa qualitativa com texto, imagem e som: um manual prático**. Petrópolis: Vozes, p. 64-89, 2002.

GASTALDO, E. **Pátria, chuteiras e propaganda: o brasileiro na publicidade da copa do mundo**. São Paulo: Annablume, 2002.

GOV.BR. **Programa de Voluntariado do Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio)**. 2023. Disponível em: <https://www.gov.br/icmbio/pt-br/assuntos/acoes-e-programas/acoes-socioambientais-e-consolidacao-territorial-em-ucs/programa-de-voluntariado-do-icmbio>. Acesso em: 29 ago. 2023.

LEITE, D. M. T.; CAETANO, C. A. Educação física, esporte e lazer na natureza: preservação, modismo, apologia. Será tudo isso? **Motrivência**, v.26, n.22, p.137-143, 2004.

LEMOS, A. I. G. **Turismo: impactos socioambientais**. São Paulo: Hucitec, 1999.

LEUNG, Y.; MARION, J. L. Receptions Impacts and Management in Wilderness: A State of Knowledge Review. In: Wilderness science in a time of change conference: wilderness ecosystems, threats and management, Missoula, 1999. **USDA Forest Service Proceedings**, RMRS-P-15-VOL-5, p.23-48, 2000. Disponível em: https://www.fs.fed.us/rm/pubs/rmrs_p015_5.pdf. Acesso em: 20 mar. 2019.

LOPES, A. E. *et al.* Do ecodesenvolvimento ao desenvolvimento sustentável: a trajetória de conflitos e desafios para o meio ambiente. **ForSci**, v.5, n.2, 2017. Disponível em: <http://www.forscience.ifmg.edu.br/forscience/index.php/forscience/article/viewFile/314/158>. Acesso em: 17 mar. 2019.

MAGRO, T.C. **Impactos do uso público em uma trilha no planalto do Parque Nacional do Itatiaia**. Tese (Doutorado em Engenharia Ambiental) – Universidade de São Paulo, São Paulo, 1999.

MARINHO, A. Atividades na natureza, lazer e educação ambiental: refletindo sobre algumas possibilidades. **Motrivência**, v.16, n. 22, p. 47-69, jun. 2004.

MARQUES, L. W. **Sustentabilidade não tem cara, mas tem vida**. Cianorte: Clube dos autores, 2014.

MIRAGAYA, A. Promoção da Saúde Através da Atividade Física. In: DA COSTA, L. P. **Atlas do esporte no Brasil: atlas do esporte, Educação Física e atividades físicas de saúde e lazer no Brasil**. Rio de Janeiro: Shape, 2005. p. 588-596 Disponível em: <http://cev.org.br/arquivo/biblioteca/4013460.pdf>. Acesso em: 22 nov. 2018.

MURAD, M. **Sociologia e educação física: diálogos, linguagens do corpo, esportes**. Rio de Janeiro. Editora FGV, 2009.

ONU BR – NAÇÕES UNIDAS NO BRASIL **A Agenda 2030**. 2015. Disponível em: <https://brasil.un.org/sites/default/files/2020-09/agenda2030-pt-br.pdf>. Acesso em: 29 mai. 2023.

OPAS. Organização Pan-Americana da Saúde. **OPAS/OMS apoia governos no objetivo de fortalecer e promover a saúde mental da população**. 2016. Disponível em: https://www.paho.org/bra/index.php?option=com_content&view=article&id=5263:opas-oms-apoia-governos-no-objetivo-de-fortalecer-e-promover-a-saude-mental-da-populacao&Itemid=839. Acesso em: 24 fev. 2018.

OSBORNE, R. S.; BATISTA, W. A. Educação Física na década da educação para o desenvolvimento sustentável. **Motriz**, v.16, n.1, p.28-36, 2010.

PARK, R. E. A cidade: sugestão para a investigação do comportamento humano no meio urbano. In: VELHO, O. G. (Org.). **O fenômeno urbano**. 2 ed. Rio de Janeiro: Zahar Editores, 1973. p.26

PELLEGRINI, A. F. **Dicionário Enciclopédico de Ecologia e Turismo**. São Paulo: Manole, 2000.

PIMENTEL, G. Esportes na natureza e atividades de aventura: uma terminologia aporética. **Revista Brasileira de Ciências do Esporte**, v.35, n.3, p.687-700, 2013.

PNT. Parque Nacional da Tijuca. **Relatório Anual 2017**. MMA: ICMBio., 2017. Disponível em: http://parquenacionaldatijuca.rio/files/report_anual_2017.pdf. Acesso em: 15 jul. 2018.

ROSA, J. P.; WALKOWSKI, M.; PERINOTTO, A.R.C. A viagem espetáculo: reflexões sobre a exposição e o consumo do viajar nas redes sociais. **Revista Brasileira de Pesquisa em Turismo**, v.16, p.e-2591, 2022.

SACHS, J.D. **A era do desenvolvimento sustentável**. Portugal: Conjuntura Actual Editora, 2017.

SAMPIERI, R.H.; CALLADO, C.F.; LUCIO, M.P. B. **Metodologia da pesquisa**. 5 ed. Porto Alegre: Penso, 2013.

SANTOS, J.L.G. et al. Integração entre dados quantitativos e qualitativos em uma pesquisa de métodos mistos. **Texto-Contexto**, v.26, n.3, 2017.

SCHELHAS, J. Construção e manutenção de trilhas. In: **Curso de treinamento e capacitação em gerenciamento de parques e outras áreas protegidas**. São Paulo, 22 nov. a 14 Dez., 1986. São Paulo, Instituto Florestal.

TERTULIANO, S. M. S. **Parque Nacional do Iguaçu**: análise da percepção dos visitantes por meio de coleta das avaliações publicadas no Tripadvisor dos anos 2019 e 2021. 101 f. 2022. Trabalho de Conclusão de Curso (Bacharelado em Turismo) – Universidade Estadual Paulista, Rosana, 2022. Disponível em: <https://repositorio.unesp.br/handle/11449/238402>. Acesso em: 21 fev. 2022.

THOMPSON, J.B. **A mídia e a modernidade**: uma teoria social da mídia. 15 ed. Petrópolis: Vozes, 2013.