Original Article (short paper)

# Attitudinal, conceptual, and procedural dimensions of the knowledge of trail guides in national parks

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**Abstract - Aim:** This study aimed to present the conceptual, procedural, and attitudinal knowledge of the trail guides (TG) in the Serra da Capivara National Park (SCNP) and Caparaó National Park (CNP). **Results:** Seventy-nine TGs participated in this descriptive-exploratory research, with a qualitative approach, representing 84% (n = 40) of CNP guides and 80% (n = 39) of SCNP guides. **Conclusions:** The evidence describes the conceptual, attitudinal, and procedural dimensions displayed before and during trail-walking, with differences in conceptual knowledge, discrepancies in procedural knowledge, and equality in attitudinal aspects. The importance of the participation of the area of physical education was highlighted in the training of TGs, alongside the need to include didactic-pedagogical content, environmental education, exercise physiology, movement biomechanics, flora, fauna, notions of minimal or desirable impact, and first aid.

**Keywords:** physical education, dimensions of content, trail guides, training/qualification.

## Introduction

The growth in popularity of outdoor activities has been observed by several authors[1-7]. In addition to the potential for local economic impacts based on conservation values[8], activities can promote well-being and resilience among participants[9].

In Brazil, Conservation Units (CU) represent important alternatives for the practice of these activities, where studies have been developed to investigate the level of difficulty of the trails[10], the training of the trail guides[11], the importance of trail guides[12,13], the types of professional learning[14] , the training needs[15], the perception of competence[16], the professional profile[4,17]and the use of interpretative trails for raising awareness[18].

When considering the importance of the guides' grasp of didactic-pedagogical knowledge in the conceptual, procedural, and attitudinal dimensions[11-17,19-23], it is also necessary to understand the origin of these dimensions. Moreover, it is also recognized that the categories of educational objectives[24-26], known as the cognitive, psychomotor, and affective-social domains[27], contributed to the systematization of the dimensions of conceptual, procedural, and attitudinal contents, respectively[28-33].

Conceptual/cognitive knowledge considers the *meaning of the concept* and the intellectual and cognitive capacity of the human being in dealing with the content[34]. Procedural/psychomotor knowledge deals with the ability to develop an observable action[31]. The attitudinal/affective-social dimension is "the totality of feeling, a degree of acceptance or rejection, or an emotion, ranging from simple attention to the internally consistent complex qualities of character and consciousness[27]. A previous study also includes social and professional interactions with the environment[35]. Therefore, this study aimed to present the conceptual, procedural and attitudinal knowledge of trail guides (TG) in the National Parks (PARNAs) of Serra da Capivara (SCNP) in Piauí (PI) and Caparaó (CNP), located between the states of Minas Gerais (MG) and Espírito Santo (ES). In the research, guides who were studying for qualification are considered as graduates (G) and non-graduates (NG) are those who did not have the opportunity to begin this level of education.

## Methods

This research is descriptive-exploratory and follows a qualitative approach. Descriptive-exploratory investigations analyze the judgments of people or social groups in practice to clarify and/or modify the views and the concepts, based on assumptions that may be useful in future research[36]. The qualitative approach interprets and analyses the complexity of social facts to describe knowledge based on its dimensions[37].

After approval by the Ethics Committee (Decision N°. 1.315.275), the study acquired authorization from ICMBio (14.226.816). Subsequently, contact was made with the CU managers to present the investigation and clarify doubts. With the support of the managers, TGs were invited to participate voluntarily in the study. Those who agreed, read and signed the Informed Consent Form

and were interviewed individually with a voice recorder between November 2015 and January 2016.

The SCNP was chosen due to its structure, location (PI), and systematization of courses since 1993, as well as having ICMBio ordinance for the TGs who work in the CU and the obligation for visitors to be accompanied by TGs[38]. The CNP was chosen as a counterpoint to the reality of the SCNP. Located between ES/MG, the CU has no ICMBio ordinance for the registration of TGs and does not require the presence of guides during visits. When the SCNP ordinance[38] was assessed it was observed that 59 accredited TGs were registered, of which 06 do not operate long-distance trails, 02 do not reside in the region, and one left the profession. Thus, 50 TGs were intentionally targeted, and 80% (n = 40) agreed to participate voluntarily. In the CNP, a list of 46 TGs working in the CU was used, and 84.8% (n = 39) were interviewed.

Analyzing the level of schooling of the guides investigated, most have received Basic Education (62%). It was observed that 38% of responders are studying or have already completed some higher education courses. When the guides of each PARNA were assessed separately, it was noted that 22 of the SCNP guides (55%) are studying for or have already completed undergraduate or post-graduate courses, while 31 guides (79.5%) who work at the CNP have only basic-level (high-school) education. The university education of the 22 SCNP guides includes courses in Geography (n = 6), History (n = 5), Pedagogy (n = 3), Natural Sciences (n = 2), Biology (n = 2), Language/Portuguese (n = 1), Archeology (n = 1), Management (n = 1) and Mathematics (n = 1). Of the eight guides at the CNP, three have graduated in Tourism and the others in Biology, Industrial Design, Art Education, Pharmacy, and Civil Engineering[17].

Semi-structured interviews were used to collect information, organized around the conceptual/procedural/attitudinal dimensions/topics (established *a priori*), and codified through the exploration of the material. The audio recordings of the interviews were then transcribed. The transcripts of the 79 interviews preserved oral and grammatical speech in order to ensure full preservation. During the validation of statements[37], the TGs made corrections, additions, and deletions to the text of their transcriptions. The QSR NVivo version 9.2 program was used to assist in content analysis[39]. Qualitative data were examined from the content analysis suggested by Bardin[39]: "pre-analysis, material exploration and treatment of results, inference, and interpretation".

## Results and Discussion

*Conceptual knowledge*

The analysis of TG responses from both parks did not allow us to identify any differences in conceptual knowledge between graduates and non-graduates across both CUs. However, there was a difference in the training of the SCNP TGs when compared with those of the CNP, both in terms of the quality and quantity of didactic-pedagogical and scientific content regarding the biome and the geological formation, with the SCNP surpassing the CNP. There was a lack of consensus among the CNP TGs with regards to the vegetation type and geology of the CU:

> Each trail is guided in a certain way, depending on the visitor. Some visitors want to know everything from the start, about the history of coffee while others keep asking about plants, which is the most awkward situation on the planet when I can't answer. They ask questions about the rock formations. There is no set point for stopping and talking about the place. Nowadays the trail is guided depending on the perspective of each guide and their experience. And there is no strict itinerary (TG38/CNP/bachelor's degree/tourism).
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> This must-have arisen from the beginning of time with the revolution of nature, I think it comes from nature itself. Or a natural disaster that may have happened, something major (TG21/CNP/bachelor's degree/Tourism).
>
> They say it was lava that melted from the bottom up and waves from the sea. I know my faith comes from the word of God, what God has done is done. And if God made the earth and the earth is like this, that is not a matter for me (TG23/CNP/NG).

Information from the CNP TGs analyzed regarding the biome revealed the need for greater emphasis on training in flora and geology in the conceptual dimension, where gaps were evident for both graduate and non-graduate TGs. The lack of basic knowledge of the unit's flora is displayed by TG38, with five years' experience, who shows his embarrassment when questioned. Research conducted in Brazil demonstrates the importance of concepts in the education of professionals who work in outdoor activities[14-16,19,40,41].

When asked about the characteristic of the geological formation of Pico da Bandeira, the main attraction of the CNP, 76.9% of the professionals said they do not know or do not remember at the moment. The 23.1% of the TGs who responded do not seem to have adequate knowledge on the subject, as previously described[15].

In the SCNP TG responses, there is a similarity between graduates and non-graduates with regards to the geology and the *Caatinga* biome with didactic-pedagogical and scientific characteristics similar to results described in the previous studies[4,20-22,14,15].

> Another feature is the geological formation that is peculiar to sandstone sedimentary rock. This was the seabed. It was also formed by river bottom sediments with pebble conglomerates, […] quartz rolled pebbles that were inserted into the top of the sandstone or as they say in some places "on the head" (TG40/SCNP /licentiate degree/History).
>
> These cliffs in my community are made up of sandstone and conglomerates of pebbles, that whiter rock, and were formed in the Silurian and Devonian geological periods. The water brought sediment and deposited it at the bottom of the basin with a huge quantity of sediment and the tectonic movements raised the region, which is why you see such straight cliffs. This is the beginning of the Parnaíba basin or formerly the Piauí and Maranhão

> sedimentary basin. Here it was seabed, and an example is the trilobites that I can't help mentioning (TG43/SCNP/NG).
> The Serra da Capivara is characterized by *caatinga* vegetation and the polygon of the dry region. Interestingly, in Piaui, there are several municipalities with remnants of Atlantic Forest, as is the case in Serra da Capivara. We don't find vegetation from the *caatinga only*, but several species from the tropical humid forest as well, such as the *cerrado*. It is found fauna that is not specific to the *caatinga*, such as the bare-throated bellbird from the Atlantic Forest, we also have jaguar and giant anteaters (TG69/SCNP/NG).

The repertoire of information on the SCNP includes megafauna, archaeology, anthropology, geology, geomorphology, ecology, rock paintings, and the history of American man, characterizing the CU with a detailed multidisciplinary collection of didactic-pedagogical and scientific knowledge in the conceptual dimension. In the responses, both for graduates and non-graduates, there is a systematization of information on the SCNP, notably the complex and diversified conceptual knowledge, suggesting adequate training for TGs and corroborating other studies in the area[14-17,19,41].

*Attitudinal knowledge*

The results revealed a certain similarity in the TG's attitudinal knowledge at both PARNAs. Regardless of the level of training, there is a notable concern and care towards the PARNA, respect for the biological individuality of visitors, and entrepreneurial actions.

Concerning the care for the PARNA, garbage disposable and preservation were highlighted. The attitude of separating organic from recyclable waste was manifested by TG59/SCNP/NG, who reported that "The rest of the waste, we separate into organic in one bag and inorganic in another and dispose of it in the CU waste bins." In this sense, studies pointed to the power of environmental education (EE) in the educational process of outdoor activities[14,15,18,42-45].

Corroborating the logic of sustainability that *nothing is left behind, and nothing is taken away* on trails, the attitudinal dimension was present.

> This is an interesting question, not to take anything, then they asked: but not even a rock? No, we have around 25,000 people a year, if each one takes a rock there will come a time when my grandson, great-grandson, his son, the son of his son will not see the rocks (TG50/SCNP/licentiate degree/Mathematics).

The examples show the need for TGs to have environmental education (EE) training/qualification at both PARNAs. It is believed that this content is essential in the training of TGs in Brazil. Moreover, in research in Australian parks, Lugg and Slattery[46] indicate that professional qualification influences the use of EE for outdoor activities. Pereira et al.[11] pointed out positive aspects in TG training in Fernando de Noronha, since efficient training positively influences conservation. In this sense, it is pertinent to suggest that activities in PARNAs bring local economic benefit to conservation values[8] and promote well-being and resilience[9], and higher education needs to develop studies applied to sustainability producing knowledge/skills/competencies applicable in the teaching-learning process[42].

The importance of respecting individual needs, although present in both PARNAs, was demonstrated in the CNP. To reach the summit of Pico da Bandeira at 2,892m altitude, it is necessary to overcome adverse conditions, with temperatures falling below 0 °C, the steep and rocky terrain, and the weight of the camping equipment[15]. There is also a need to understand the rhythm of the visitors and respect individual needs, as reported by TG4/CNP/bachelor's degree/industrial design: "The timer that I learned on hikes outside the country is to respect the person, regardless of their rhythm. If the person is young and too cool, he will have to go after the old man here". TG4 stressed the need to speak politely and firmly to the fittest members of the group, so that they respect the rhythm of the least fit. Aspects related to the perception of the physical ability of the practitioner of outdoor activities have been the subject of studies that emphasize their relevance[4,14,19,20-22].

The attitudes of TG's to avoiding visitors returning home without the desired information was observed when approaching researchers within the SCNP:

> If I can I try to get this information or pass on the questions to other guides who are inside the SCNP or other more experienced people inside the park, or even archaeologists doing work or digging. We ask for permission and ask them to explain to the group […] it is a way for me to learn too (TG73/SCNP/bachelor's degree/Management).

When discussing a form of learning, the TG73 with 14 years of experience characterizes the attitudinal dimension/proactivity in obtaining information. A previous study reinforces this aspect by subdividing cognitive skills into four categories with instructors of adventure activities, signaling the value of knowledge during instruction[16].

Entrepreneurship was also perceived in the study, as previously described[47]. In the words of TG67/SCNP/NG: "I always want to grow and after some time working as a guide, I opened a receptive tourism agency and work with agencies from the Rio Grande do Sul and São Paulo".

Regarding accidents, we noticed creative and human attitudes in the responses at the CNP:

> I took a person up there and she sprained her ankle, I immobilized her, threw her on my back, and took her to the *Tronqueira* where the car goes (TG10/CNP/NG).
> Regarding hypothermia, it is necessary to warm people up and give them something hot to drink. Depending on the cold, we take off our jacket and give it to the person (TG36/CNP/licentiate degree/art education).

The above responses reveal the importance of physical education (PE) professionals in the TG training[45].

Didactic-pedagogical approaches, basic notions of exercise physiology, use of teaching styles, and movement biomechanics are essential in the training of this target group[14-17,45].

Being aware of one's function and limitations[16] is something noticeable and necessary in guiding trails, as assessed by TG72/SCNP/licentiate degree/History: "[…] there was a visitor who suffered a heart attack, it was fortunate that the guide was experienced, further the two sons of this person, who had the heart attack were doctors, and the person was a doctor too". As described by TG30/CNP/NG: "Tourists don't have a clue about climbing a high-altitude mountain and arrive unprepared and at-risk". TG72/SCNP and TG30/CNP also make clear the importance of the PE area in the training of TGs[45]. Analyzing the physical conditions of the visitor using physiological parameters and identifying if they can proceed is a prerequisite for mitigating accidents.

One aspect highlighted by Schön[48] is that when professionals are not aware of their roles or problems, they do not realize the need to choose between them. Thus, they do not pay attention to how they construct the reality in which they operate; it is simply the given reality. In this sense, during the accidents is when the TGs realize the importance of first aid courses.

*Procedural knowledge*

The results pointed out some differences in the procedural dimension of knowledge between the SCNP and CNP TGs, with emphasis on the systematization of the didactic-pedagogical work of TGs at SCNP:

> It is important to get to the park and get organized to pass on the rules and standards that must be obeyed and then discuss the itinerary with colleagues. This is systematized and we do the same thing […] with regards to the issue of how to proceed with visitors, and I prioritize the safety (TG43/SCNP/NG).
> It can often happen that it has been arranged to visit a certain place, but an unusual question arises along the way and in the middle of the itinerary the visitor wants to do something different. And what I had programmed turns out differently (TG59/SCNP/NG).

At CNP it was observed that there is a strategy for the socialization of knowledge, and concern for safety and the lack of formatting of the trails:

> We have a chapter on the type of walk, a chapter on what to carry, the tent, the sleeping bag, the clothes, etc. We ask each one to identify themselves, tell us where they come from, why they came so that we can imagine what will happen. The breaks are for people's breathing. We leave Tronqueira and do some stretching, the climb stratified people by strength: the ablest at the front, the least behind. The second guide stays at the back to provide moral support. (TG4/CNP/bachelor's degree/industrial design).
> Each trail is guided in a certain way, depending on the visitor. There is no set point for stopping and talking about the place. Nowadays the trail is guided depending on the perspective of each guide and their experience. But there is no strict itinerary (TG38/CNP/bachelor's degree/tourism).

The reports from both graduate and non-graduate TGs from SCNP display a systematization analogous to the structure of teaching a class revealed in Paixão and Tucher's study, conducted in the state of Minas Gerais with adventure sports instructors[4]. Flexibility in actions to please the visitor demonstrates autonomy and organization similar to teaching work, as well as the concern with the safety of the SCNP TGs. Guiding trails in natural areas have similar characteristics to a teacher performing their educational craft[4,49,50] in terms of the need to master knowledge. This knowledge is equivalent to the nature of the educator's professional knowledge[4,49]. This aspect is perceived in the language of TG43, when they suggest that the procedure they adopt while guiding the trail can modify the visitor's view of the environment, corroborating the findings of Cotes[18] regarding interpretative trails and visitor awareness.

The SCNP TGs do not seem to depend on the wishes of the visitor in the organization of the itinerary. In contrast, the CNP's TG testimonials demonstrate a clear dependence on the visitor's desire to visit Pico da Bandeira as its main attraction. Although it is necessary to meet the expectations of visitors, the lack of adequate knowledge ends up interfering with the autonomy and orientation of the guiding process[15]. Schön[48] highlights that although professionals tend to build and re-signify their knowledge in practice, reflecting on it and in it, this does not mean that they can subtract knowledge only from the tacit, built-in practice.

## Conclusion

The findings reveal that the work of guiding trails in Brazilian PARNAs involves didactic-pedagogical characteristics. In addition to encompassing an intricate repertoire of content that requires knowledge to better inform and guide visitors, there is a need to master aspects of exercise physiology, movement biomechanics, compass navigation, use of GPS, and the history, geology, fauna, and flora of the CU, etc. In this sense, it is worth emphasizing the need for the contribution to physical education, adding knowledge to the TGs.

In the analysis of the dimensions, it was possible to identify the attitudinal, conceptual, and procedural knowledge, present before and during the work. It can be suggested that TG training courses should contain content prepared simply and objectively, but always prioritizing practical classes within the CU. Also, the study points out the need to elaborate specific information for each PARNA and for at least 50% of the content to come in classes or field instructions in practice.

Regarding attitudinal knowledge, construction and resignification were evident with regards to the practice of the CU TGs towards minimal impact and respect for biological individuality. However, the lack of sufficient mastery of concepts among the CNP TGs has favored the

development of mostly intuitive actions that do not cover the educational complexity of guiding trails.

The profession of a TG in a CU play an important role in favoring the interpretation of the environment, minimize impacts, and mitigate risks. However, this requires mastery of systematized multidisciplinary conceptual knowledge of outdoor activities. In general, there are differences in conceptual knowledge and procedural discrepancies between the systematization of TG actions in the CNP and SCNP, with the latter proving superior.

One aspect evidenced in the study is that the SCNP presents itself as a management model in TG training, with continuing education courses given regularly since 1993. Thus, it is believed that this approach should be able to meet the characteristics and the level of TG training of each CU. Furthermore, the seven distinct biomes in the 72 PARNAs of the Brazilian territory justify a plurality of content to meet the demands of specific realities, as well as TG training courses that include didactic-pedagogical content, environmental education, exercise physiology, movement biomechanics, flora, fauna, notions of minimal or desirable impact and first aid.

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